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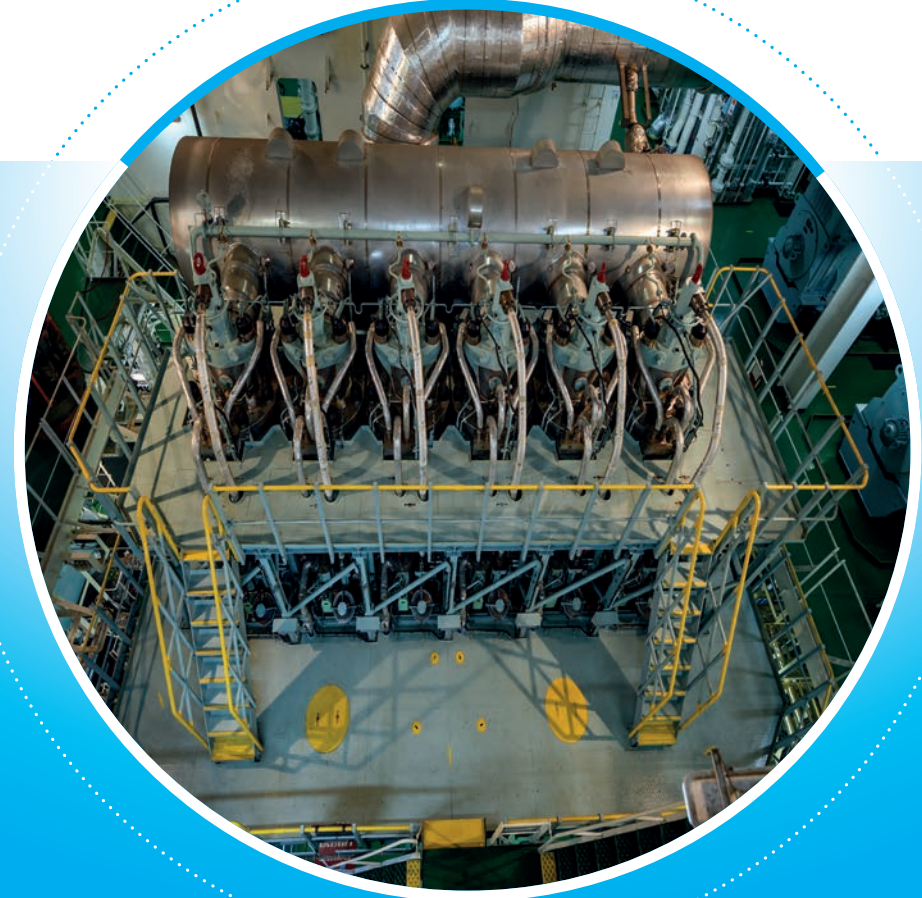
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İkinci Fıkrası Çerçevesinde Bandrol Taşınması Zorunlu Değildir.

MARITIME MARINE ENGINEERING MANAGEMENT PRACTICES IN FOREIGN LANGUAGE 10

VOCATIONAL AND TECHNICAL ANATOLIAN HIGH SCHOOL

MARITIME | **MARINE ENGINEERING
MANAGEMENT PRACTICES
IN FOREIGN LANGUAGE**



10 COURSE
MATERIAL



VOCATIONAL AND TECHNICAL ANATOLIAN HIGH SCHOOL

MARINE ENGINEERING MANAGEMENT PRACTICES IN FOREIGN LANGUAGE

10th GRADERS

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Oya KILIÇ

Tümay Turgay MISIRLIOĞLU

Yalçın BAŞ



MİLLÎ EĞİTİM BAKANLIĞI YAYINLARI.....: 8328
YARDIMCI VE KAYNAK KİTAPLAR DİZİSİ.....: 2220

Her hakkı saklıdır ve Millî Eğitim Bakanlığına aittir.
Ders materyalinin metin, soru ve şekilleri kısmen de olsa hiçbir surette alınıp
yayımlanamaz.

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İSTİKLÂL MARŞI

Korkma, sönmez bu şafaklarda yüzen al sancak;
Sönmeden yurdumun üstünde tüten en son ocak.
O benim milletimin yıldızıdır, parlayacak;
O benimdir, o benim milletimindir ancak.

Çatma, kurban olayım, çehreni ey nazlı hilâl!
Kahraman ırkıma bir gül! Ne bu şiddet, bu celâl!
Sana olmaz dökülen kanlarımız sonra helâl.
Hakkıdır Hakk'a tapan milletimin istiklâl.

Ben ezelden beridir hür yaşadım, hür yaşarım.
Hangi çılgın bana zincir vuracakmış? Şaşarım!
Kükremiş sel gibiyim, bendimi çiğner, aşarım.
Yırtarım dağları, enginlere sığmam, taşarım.

Garbın âfâkını sarmışsa çelik zırhlı duvar,
Benim iman dolu göğsüm gibi serhaddim var.
Ulusun, korkma! Nasıl böyle bir imanı boğar,
Medeniyet dediğin tek dişi kalmış canavar?

Arkadaş, yurduma alçakları uğratma sakın;
Siper et gövdeni, dursun bu hayâsızca akın.
Doğacaktır sana va'dettiği günler Hakk'ın;
Kim bilir, belki yarın, belki yarından da yakın.

Bastığın yerleri toprak diyerek geçme, tanı:
Düşün altındaki binlerce kefensiz yatanı.
Sen şehit oğlusun, incitme, yazıktır, atanı:
Verme, dünyaları alsan da bu cennet vatanı.

Kim bu cennet vatanın uğruna olmaz ki feda?
Şüheda fışkıracak toprağı sıksan, şüheda!
Cânı, cânânı, bütün varımı alsın da Huda,
Etmesin tek vatanımdan beni dünyada cüda.

Ruhumun senden İlahî, şudur ancak emeli:
Değmesin mabedimin göğsüne nâmahrem eli.
Bu ezanlar -ki şehadetleri dinin temeli-
Ebedî yurdumun üstünde benim inlemeli.

O zaman vecd ile bin secde eder -varsa- taşım,
Her cerâhamdan İlahî, boşanıp kanlı yaşım,
Fışkırır ruh-ı mücerret gibi yerden na'sım;
O zaman yükselerek arşa değer belki başım.

Dalgalan sen de şafaklar gibi ey şanlı hilâl!
Olsun artık dökülen kanlarımın hepsi helâl.
Ebediyyen sana yok, ırkıma yok izmihlâl;
Hakkıdır hür yaşamış bayrağımın hürriyyet;
Hakkıdır Hakk'a tapan milletimin istiklâl!

Mehmet Âkif Ersoy

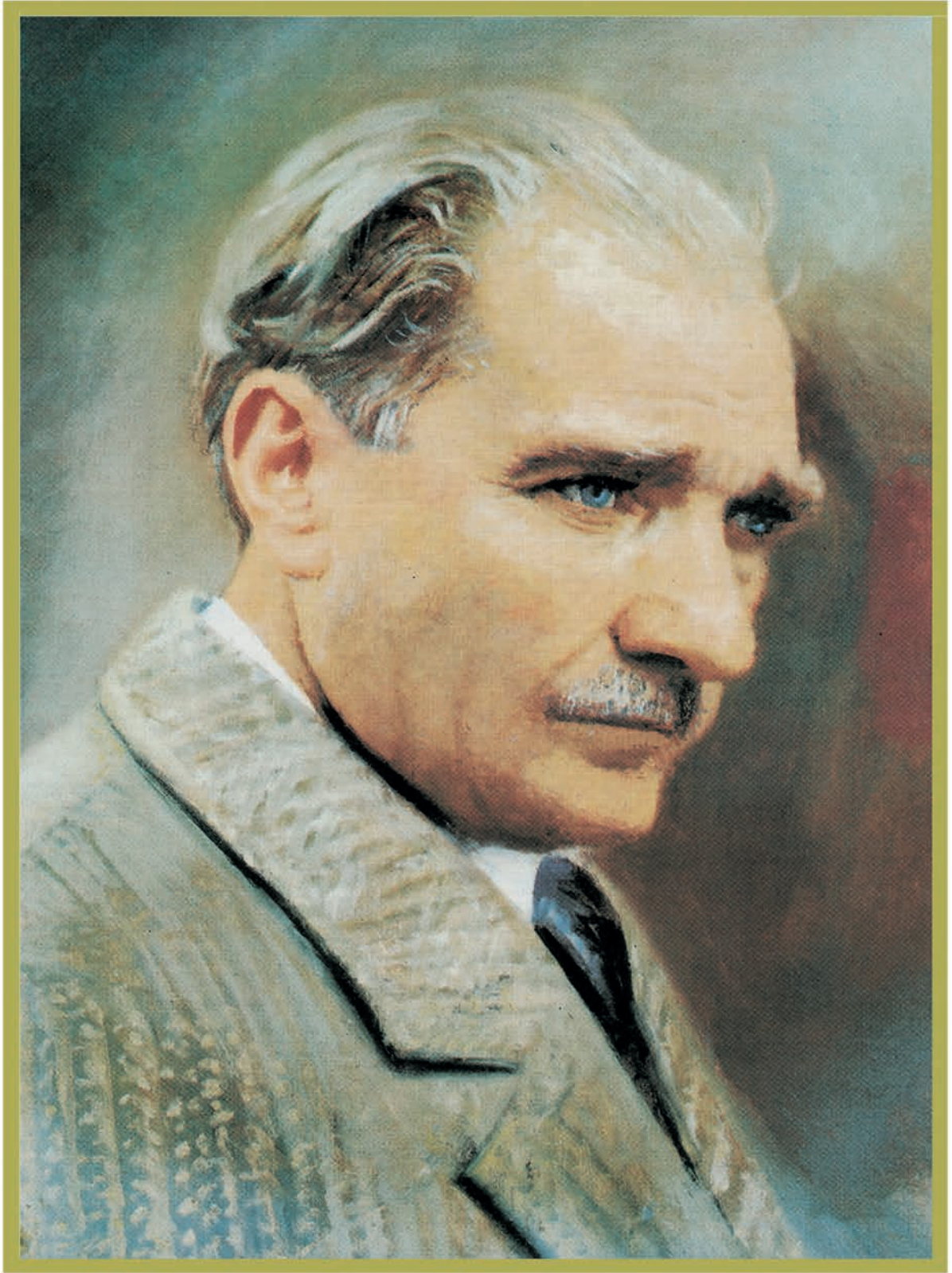
GENÇLİĞE HİTABE

Ey Türk gençliği! Birinci vazifen, Türk istiklâlini, Türk Cumhuriyetini, ilelebet muhafaza ve müdafaa etmektir.

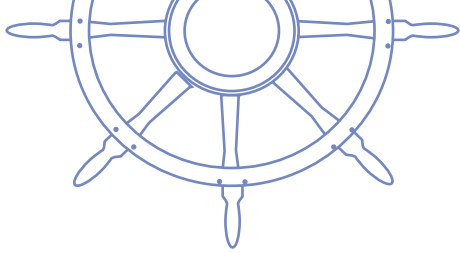
Mevcudiyetinin ve istikbalinin yegâne temeli budur. Bu temel, senin en kıymetli hazinendir. İstikbalde dahi, seni bu hazineden mahrum etmek isteyecek dâhilî ve hâricî bedhahların olacaktır. Bir gün, istiklâl ve cumhuriyeti müdafaa mecburiyetine düşersen, vazifeye atılmak için, içinde bulunacağın vaziyetin imkân ve şeraitini düşünmeyeceksin! Bu imkân ve şerait, çok namüsaît bir mahiyette tezahür edebilir. İstiklâl ve cumhuriyetine kastedecek düşmanlar, bütün dünyada emsali görülmemiş bir galibiyetin mümessili olabilirler. Cebren ve hile ile aziz vatanın bütün kaleleri zapt edilmiş, bütün tersanelerine girilmiş, bütün orduları dağıtılmış ve memleketin her köşesi bilfiil işgal edilmiş olabilir. Bütün bu şeraitten daha elîm ve daha vahim olmak üzere, memleketin dâhilinde iktidara sahip olanlar gaflet ve dalâlet ve hattâ hıyanet içinde bulunabilirler. Hattâ bu iktidar sahipleri şahsî menfaatlerini, müstevlîlerin siyasî emelleriyle tevhit edebilirler. Millet, fakr u zaruret içinde harap ve bîtap düşmüş olabilir.

Ey Türk istikbalinin evlâdı! İşte, bu ahval ve şerait içinde dahi vazifen, Türk istiklâl ve cumhuriyetini kurtarmaktır. Muhtaç olduğun kudret, damarlarındaki asil kanda mevcuttur.

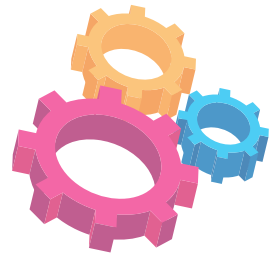
Mustafa Kemal Atatürk



MUSTAFA KEMAL ATATÜRK



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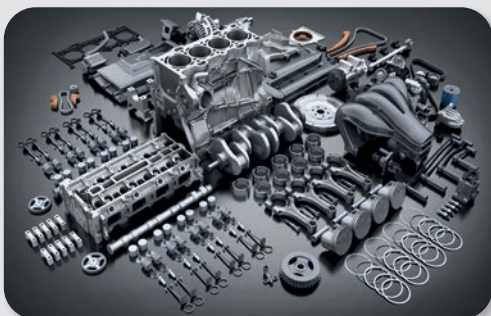
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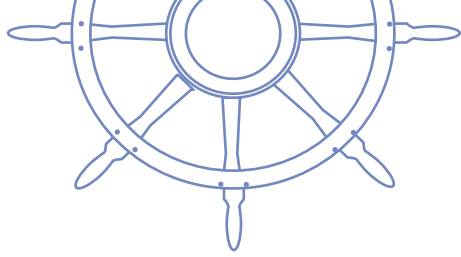
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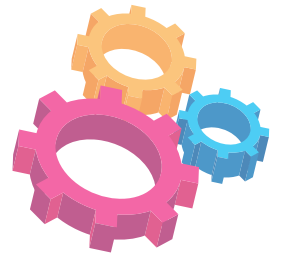
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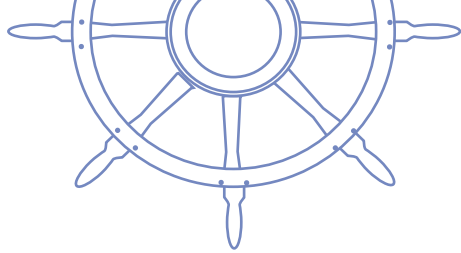
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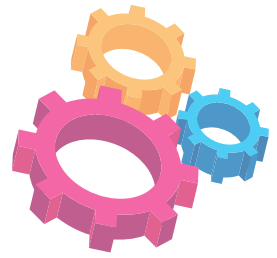


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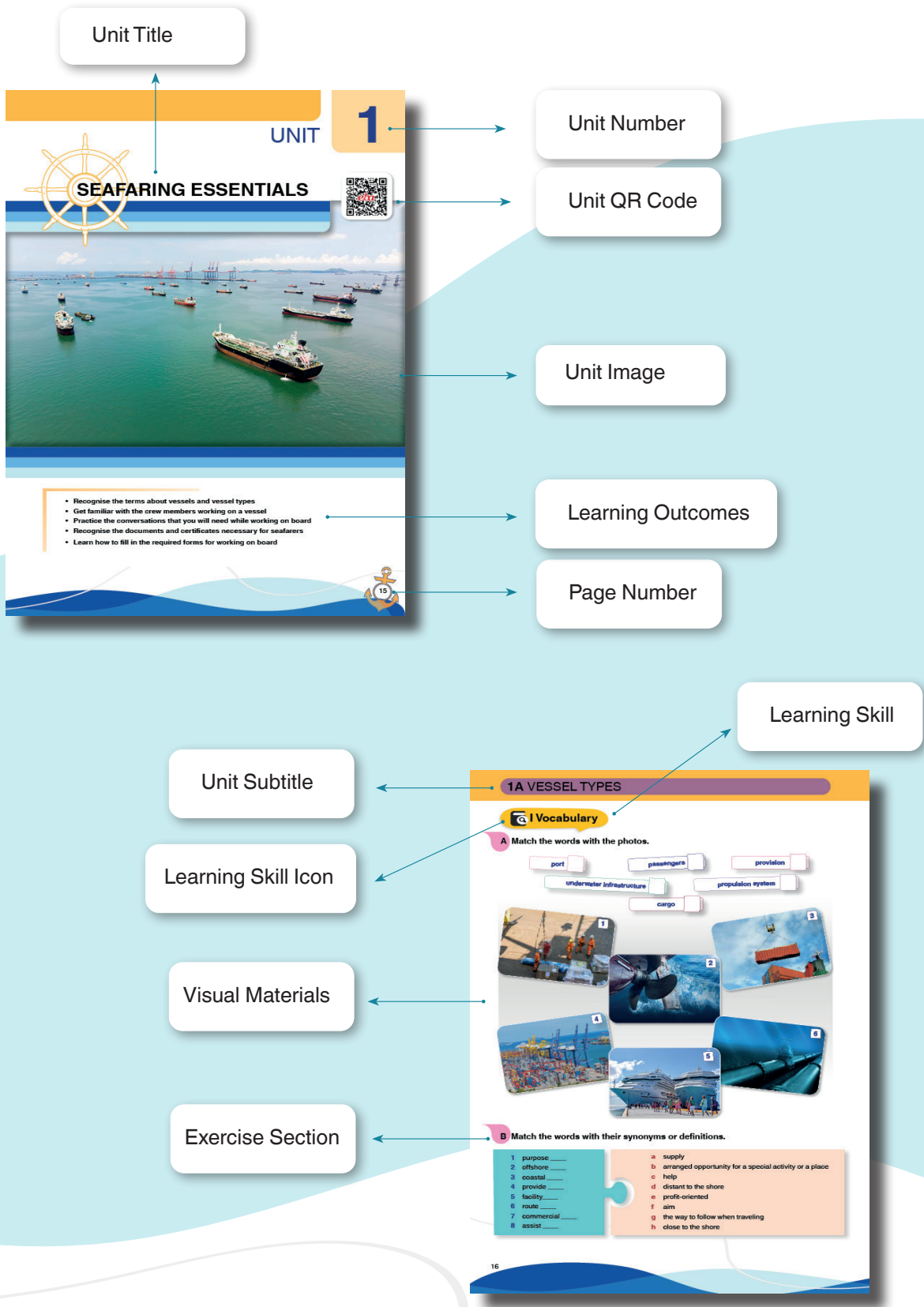


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INTRODUCTION



D Read the sentences below and write TRUE or FALSE.

- Compressed air is sent to all cylinders at the same time.
- The first point that compressed air reaches is the turning gear.
- Piston is propelled by the compressed air.
- Piston is a component of the starting air system.
- Fuel is sent to the engine with the compressed air at the same time.

E Listen and match the starting air system components with their functions.

1 Compressor	a stores the compressed air.
2 Air receiver	b sends air to the starting valve of the next cylinder.
3 Starting air distributor	c sends the compressed air to the cylinder.
4 Starting air valve	d produces compressed air.

F Write the names of the starting air system components on the diagram.

Starting air valve
Starting air distributor
Air receiver
Compressor

126

True/False exercises to assess your comprehension

Exercise QR Code

Exercise Instruction

Projects to help you apply what you have learned in a practical way

Self assessment to provide you a valuable feedback on your progress

Revision to help you identify the areas that you need to improve

PROJECT

Work in groups and choose different types of vessels. Find out the advantages and disadvantages of working on those types of vessels. Present your findings and ideas in your class. You can visit the ships, prepare questions, interview the crew members, take photos and videos if it is allowed for your presentation.

SELF ASSESSMENT 1

I can recognise the terms about vessels and vessel types.	😊	😐	😞
I can name the crew members and their duties.	😊	😐	😞
I can understand and take part in conversations while working on board.	😊	😐	😞
I can recognise the documents and certificates necessary for seafarers.	😊	😐	😞
I can fill in the required forms for working on board.	😊	😐	😞

REVISION 1

A Choose the correct option.

- Steering a vessel through its route is _____.
a widening b escorting c deepening d manoeuvring
- _____ are used to open a wider and deeper seabed for large vessels.
a Tugs b OSVs c Dredgers d Icebreakers
- _____ precautions are very important both on commercial and passenger ships.
a Pollution b Safety c Operation d Emergency
- Controlling the temperature is the most important point for the perishable cargo on _____.
a bulk carriers b livestock carriers c gas tankers d reefers
- _____ are used to catch fish on longliners.
a Baited hooks b Seine nets c Parse nets d Trawling nets
- The money you pay for transportation is _____.
a schedule b destination c passage d fare
- Dangerous cargo is carried on _____.
a chemical tankers b container ships c livestock carriers d bulk carriers
- OSVs are usually used for _____.
a catching pelagic species b provision supply c vehicle transportation d pleasure trips
- _____ plan is used to place the cargo on the ship properly.
a Discharging b Loading c Stowage d Storage
- _____ are used to transport wheeled vehicles.
a Tugs b Dredgers c Ro-Ros d OSVs

35



Scripts to check what you have listened

UNIT 1 SEPARATING ESSENTIALS

1A VESSEL TYPES

III LISTENING

A - B

A vessel is a watercraft which moves on water by a propulsion system like ships or boats. Vessels can be used for military purposes, pleasure, or public utility. Most vessels are used for commercial purposes, like transporting cargoes or passengers. Ships are usually large, offshore vessels.

They carry cargoes or passengers from one port to another, or among multiple ports. On the other hand, boats are small crafts used in coastal waters for different purposes such as fishing or assisting larger ships in various ways. There are four basic types of commercial vessels: Cargo carriers, passenger ships, service vessels and fishing vessels.

Cargo carriers are the most common commercial ships. They carry various dry cargoes, liquid cargoes, or both. The ones which carry liquid or liquefied cargo are known as tankers. Widely used cargo ships are container ships, bulk carriers, general cargo ships, heavy-lift cargo ships, reefers, Ro-Ros, livestock carriers, oil tankers, LNG/LPG tankers and chemical tankers. Passenger ships are also used for commercial purposes. Two types of passenger ships are commonly used today: Ferries and cruise ships. The former is used for short cross-water trips for passengers and vehicles between fixed routes; the latter is preferred for pleasure trips with a lot of onboard facilities like the ones in luxurious hotels.

Fishing vessels are used for catching or processing fish. Trawlers, gillnetters, long liners and seiners are among widely used fishing vessels. They are named according to their method of catching the fish, or the type of the equipment they use to catch the fish. Except for these, there are fish processing vessels which process the caught fish and get it ready for the marketing.

Service vessels are used to assist larger ships, or they provide the needs of ships such as provisions, fuel, or equipment. Tugs, offshore-supply vessels, icebreakers, dredgers are among most commonly encountered service vessels. Some service vessels, like cable layers or pipe layers, deal with underwater infrastructure. They are used to lay or repair underwater cables or pipes.

VI Listening and Speaking

Listen to the dialogue between two maritime high school students and practice it with your partner using your own names and choices.

41281

Cemre : What type of a ship would you like to work on in the future?
Murat : I think, I would choose to work on a tanker.
Cemre : Why is that?
Murat : My uncle is an engineer on a tanker and he says that you earn a lot when you work on a tanker. Also, you gain a lot of skills that will be useful for your career.
Cemre : It sounds nice. I have never thought in that way.
Murat : What about you?
Cemre : I suppose I would like to work on a cruise ship. I think voyages among beautiful coastlines would be fun and I love seeing different touristic places.
Murat : That sounds fun. I hope you can spare time to enjoy those places.
Cemre : I hope so.

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VISUAL REFERENCES

Scan this QR code to access answer key and visual reference

Visual References and Answer Key QR Code

Vocabulary **Speaking**

Listening **Reading**

Listening and Speaking **Writing**



SEAFARING ESSENTIALS



- **Recognise the terms about vessels and vessel types**
- **Get familiar with the crew members working on a vessel**
- **Practice the conversations that you will need while working on board**
- **Recognise the documents and certificates necessary for seafarers**
- **Learn how to fill in the required forms for working on board**



1A VESSEL TYPES

AI Vocabulary

A Match the words with the photos.

port

passengers

provision

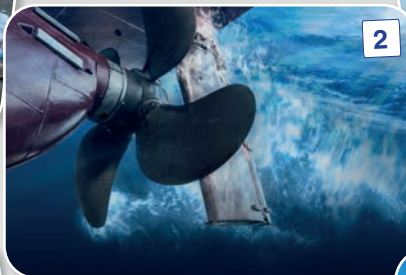
underwater infrastructure

propulsion system

cargo



1



2



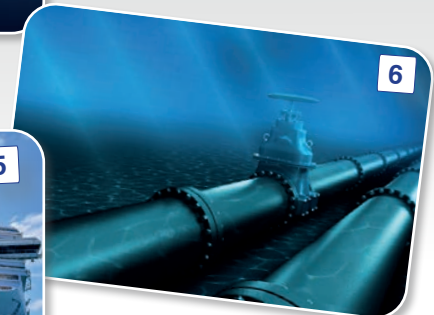
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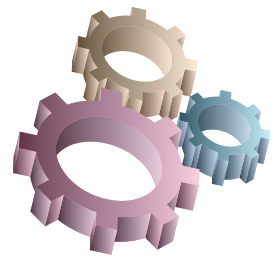


6

B Match the words with their synonyms or definitions.

- 1 purpose ____
- 2 offshore ____
- 3 coastal ____
- 4 provide ____
- 5 facility ____
- 6 route ____
- 7 commercial ____
- 8 assist ____

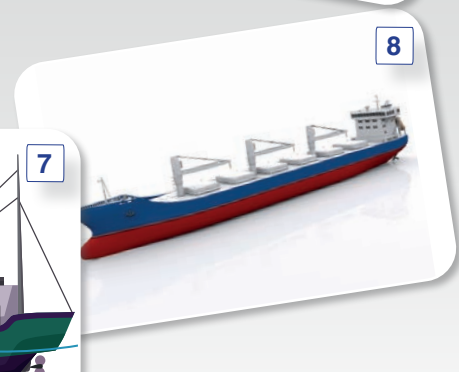
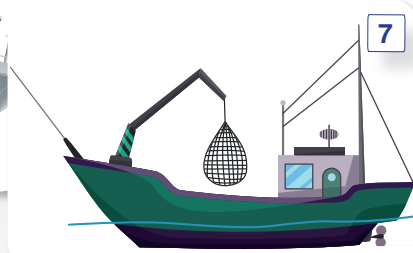
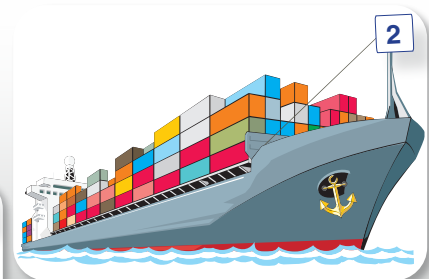
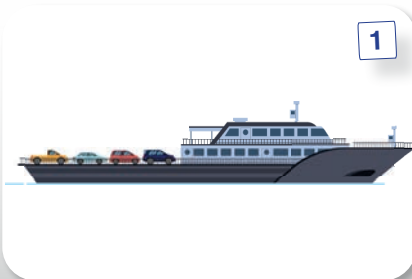
- a supply
- b arranged opportunity for a special activity or a place
- c help
- d distant to the shore
- e profit-oriented
- f aim
- g the way to follow when traveling
- h close to the shore



II Speaking

Discuss the following questions.

- 1 How do you define the term “vessel” with your own words?
- 2 Can you tell the differences between a ship and a boat?
- 3 How many types of vessels do you know? What are they used for?
- 4 What type of vessels can you see in the pictures below? Can you tell what they are used for?





III Listening



41280

A Listen and write four vessels in each column that you have heard.

Cargo Ships

Fishing Vessels

Service Vessels



41280

B Listen again and complete the sentences below.

- 1 A _____ is any watercraft that can be moved on water.
- 2 _____ are large, offshore vessels.
- 3 There are _____ types of commercial vessels.
- 4 _____ carry liquid or liquified cargoes.
- 5 _____ and _____ are widely used passenger ships today.
- 6 Ferries carry _____ and _____ in short cross-water trips.
- 7 Fish _____ vessels make the caught fish ready to sell.
- 8 Service ships _____ larger ships, or they _____ the needs of ships such as provisions, fuel, equipment.

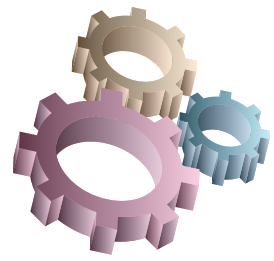


IV Vocabulary

A Match the words with their synonyms or definitions.

- 1 perishable _____
- 2 bulky _____
- 3 leakproof _____
- 4 spherical _____
- 5 cylindrical _____
- 6 stowage _____
- 7 sanitise _____
- 8 explosive _____
- 9 bulk _____
- 10 huge _____

- a round, formed like a sphere
- b very big
- c loading and storing of cargo evenly
- d shaped like a cylinder
- e unpackaged, in mass
- f explodes easily
- g to clean and purify
- h extremely large
- i firmly sealed to prevent liquid outflow
- j spoils easily



B Match the words for **cargo equipment** with the pictures.

crane

cargo tank

corral

grab

cargo hold

spout

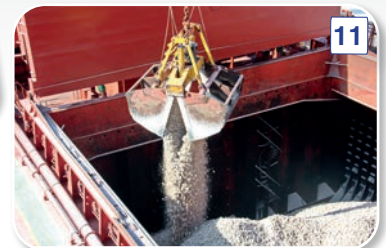
hatch cover

cage

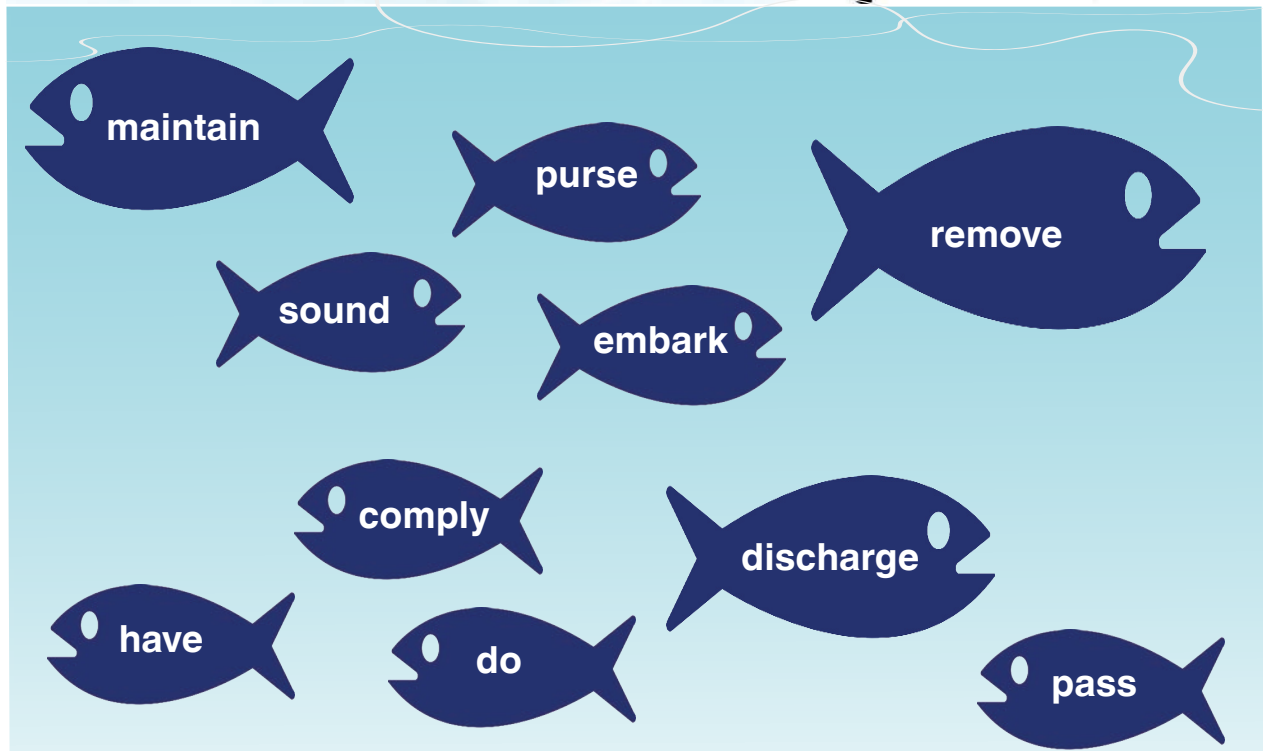
ramp

conveyor belt

pipeline



C Write the best verbs to complete the phrases below.



1 _____ a breakdown

2 _____ a piece of equipment

3 _____ errands

4 _____ a ship

5 _____ with a regulation

6 _____ a tank

7 _____ a net/a bag

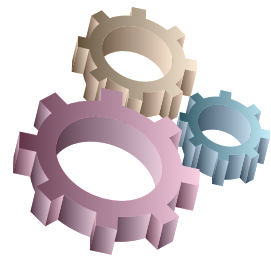
8 _____ cargo

9 _____ through a canal

10 _____ the contaminant crane



V Reading and Writing



A Read the sentences and complete them with the **cargo carriers**.

Bulk carriers
(Bulkers)

General
cargo ships

Livestock
carriers

Container
ships

~~Refrigerated cargo
ships (Reefers)~~

LNG/LPG
carriers

Heavy-lift
cargo carriers

Crude oil
tankers

Chemical
tankers

Ro-Ros

- Reefers have temperature-controlled cargo holds to freeze or chill perishable cargo. They must be fast to deliver the cargo without spoiling it. E
- _____ have large hulls, huge gates and ramps for vehicles. Careful stowage is very important to carry the vehicles without damage. _____
- _____ have leakproof cargo tanks to prevent oil leakage which can pollute the sea. Any spill must be cleaned immediately. _____
- _____ have several holds and large hatch covers for unpackaged cargo. Spouts, conveyor belts and cranes with grabs are used to load and discharge the cargo. Cleaning and sanitising the cargo holds before loading the new cargo is important. _____
- _____ have spherical tanks to load their explosive cargo. _____
- _____ have cages, or open-air corrals for animals. Feeding and watering the animals adequately, and keeping the temperature moderate is important. _____
- _____ have huge cranes to load their bulky cargo. Stowage and cargo handling need an intensive care. _____
- _____ have box-shaped standard containers for various types of cargo. They are fast and cargo handling is practical. _____
- _____ have multiple cranes for loading and discharging various types of packaged cargo practically. _____
- _____ have pumps and pipelines to load and discharge the cargo, and cylindrical slop tanks. The crew have to be very careful to comply with MARPOL, because they carry hazardous chemicals for marine life. _____

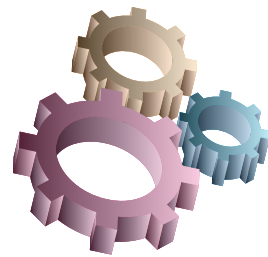
B Read the sentences in Exercise A again, and write the names of the cargo carriers that can carry the goods written on the table below.

1	<input type="text"/>	grain, sugar, ore, rice
2	<input type="text"/>	garment, shoes, cans of good, machinery
3	<input type="text"/>	cars, trucks, lorries
4	<input type="text"/>	oil rigs, industrial machinery, locomotives
5	<input type="text"/>	dairy products, fruit, vegetables, meat
6	<input type="text"/>	cows, hens, sheep
7	<input type="text"/>	liquified gas



C Match the cargo carriers with the pictures below. Write the correct item next to the sentences in Exercise A, Page 21.





D Read the sentences and write the names of the **passenger ships, service vessels** or **fishing vessels**.

cruise ships

trawlers

offshore supply vessels

ferries

seiners

icebreakers

cable layers

fish processing vessels

dredgers

tugs

- _____ break the ice on ice-covered water to clear the way for other vessels.
- _____ use trawling nets to catch a wide array of fish.
- _____ often tow vessels when they have a breakdown, and help large vessels to manoeuvre when they move in and out of ports, or pass through narrow canals.
- _____ carry passengers and vehicles for short cross-water passages on fixed routes.
- _____ meet various needs of ships such as fuel, provision, medical assistance, personnel, etc.
- _____ scrape and remove the sand, the gravel, and other contaminants from the seabed to widen and deepen narrow canals for larger vessels.
- _____ are large passenger ships designed for pleasure trips on cruise destinations with several stops along the coastline.
- _____ use a seine net that surrounds the school of fish first, and when the fish enters in, the net is pursed like a bag.

E Write the name of the vessels under the photos from Exercise D.



1



2



3



4



5



6



7



8



VI Listening and Speaking

Listen to the dialogue between two maritime high school students and practice it with your partner using your own names and choices.



41281

Cemre : What type of a ship would you like to work on in the future?

Murat : I think, I would choose to work on a tanker.

Cemre : Why is that?

Murat : My uncle is an engineer on a tanker and he says that you earn a lot when you work on a tanker. Also, you gain a lot of skills that will be useful for your career.

Cemre : It sounds nice. I have never thought in that way.

Murat : What about you?

Cemre : I suppose I would like to work on a cruise ship. I think voyages among beautiful coastlines would be fun and I love seeing different touristic places.

Murat : That sounds fun. I hope you can spare time to enjoy those places.

Cemre : I hope so.

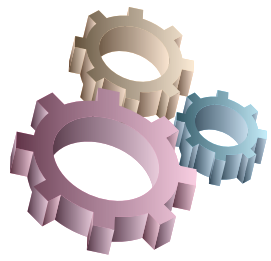


VII Writing

Write a short paragraph about the type of the vessel you would like to work in the future. Give details and explain your reasons.



1B THE CREW



I Vocabulary

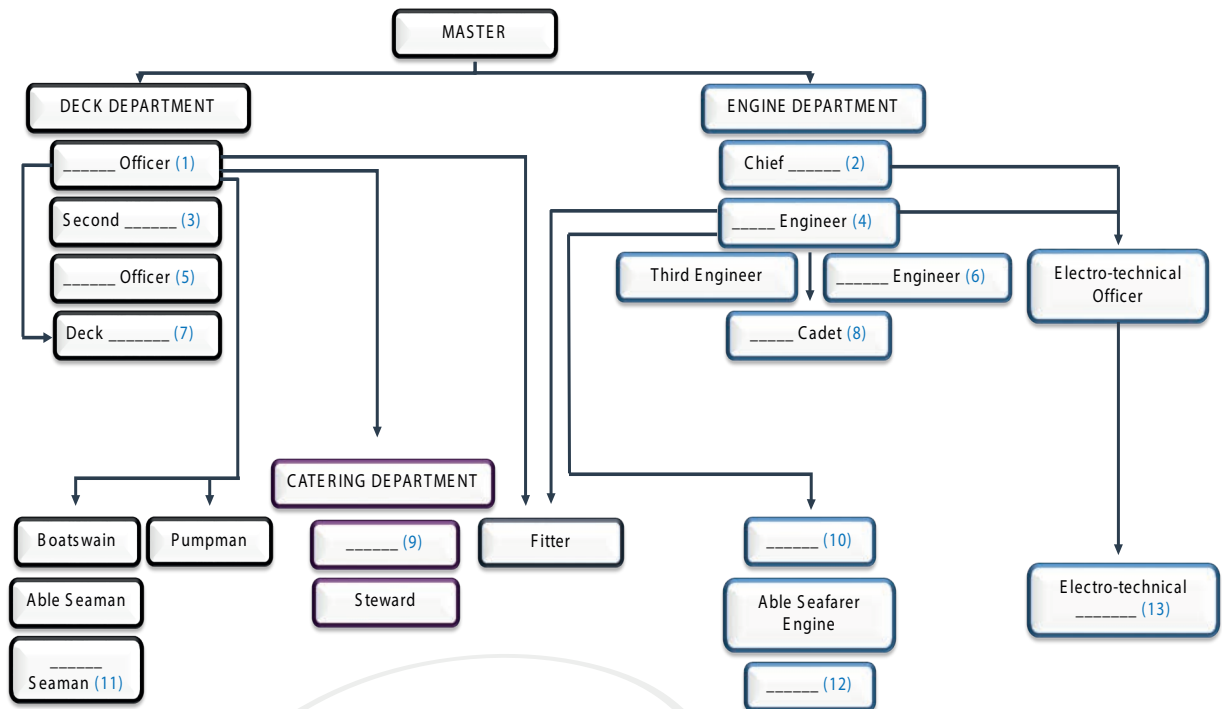
A Work in pairs and match the words with their definitions.

- | | | | | |
|---------|--------------|-------|----------|------|
| rating | in charge of | cadet | training | crew |
| oversee | carry out | duty | seafarer | rank |

- 1 _____: to watch or manage a work to make sure that it is done correctly
- 2 _____: a person who works on a ship
- 3 _____: something you have to do because it is a part of your job
- 4 _____: a group of people who work together on a ship
- 5 _____: a person who is on training for her/his future job on a vessel
- 6 _____: responsible for
- 7 _____: a position in hierarchy of an organisation
- 8 _____: the process of learning skills to do particular job
- 9 _____: to do or complete something
- 10 _____: a skilled seafarer who assists officers and engineers in different departments

B Work in pairs and complete the ranking diagram with the given words.

- | | | | | | | |
|--------|----------|--------|--------|---------|--------|-----------|
| Cadet | Ordinary | Rating | Cook | Officer | Oiler | Donkeyman |
| Fourth | Engineer | Chief | Engine | Third | Second | |





II Speaking and Listening

A Discuss the following questions.

- 1 Who does the crew of a vessel consist of?
- 2 What is the highest rank on a ship?
- 3 Who is the head of the engine crew?
- 4 Do you know the duties of the engine crew? What are they?



41282

B Listen to the recording about **deck** and **catering crew** and write the correct crew ranks to complete the sentences.

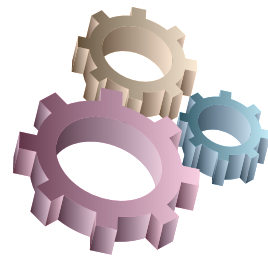
- 1 _____ represents the ship owner or the company during navigation, and he is responsible for everything on board as he holds the highest rank.
- 2 As he is the head of the deck department, _____ schedules and oversees all operations in the deck department.
- 3 _____ is usually designated as the vessel's medical officer, and he also updates the charts and publications.
- 4 _____ assists the chief officer with the check and maintenance of fire-fighting and life-saving equipment.
- 5 _____ is a trainee officer who is learning and practising the necessary skills to be a deck officer in the future.
- 6 _____ is the head of deck ratings; so, he supervises and mostly takes part in the operations at the deck department, and reports to the chief officer about the work.
- 7 _____ is a qualified and experienced member of deck ratings who is able to operate, maintain and repair most of the deck machinery and equipment.
- 8 _____ does not have much experience or high qualifications; so, he assists the able seaman during cargo operations and maintenance work, and has some duties like cleaning, handling ropes, wires.
- 9 _____ is responsible for operating, maintaining and repairing liquid cargo equipment such as pumps and filters on tankers.
- 10 _____ is responsible for preparing a healthy menu for the crew members and preparing the meals on time. He orders and stores the galley supplies and also keeps the galley maintained and clean.
- 11 _____ is responsible for general cleaning of the ship and the master's cabin, assisting the cook in the galley works and keeping the provision store room proper and clean. He also provides the needs of the ship crew such as detergent, soap, paper towel, toilet paper, clean sheets etc from the provision.



41283

C Listen to the ratings in the engine department of a ship and match the ranks with the speakers.

- | | |
|------------------------|------------------------|
| 1 First Speaker _____ | a oiler |
| 2 Second Speaker _____ | b donkeyman |
| 3 Third Speaker _____ | c able seafarer engine |



41283

D Listen to the speakers again and fill in the blanks.

First Speaker: I am the _____ 1 of engine ratings. I assign their duties and manage them to do their work properly. I am responsible for the stocks and the equipment in the engine room and the routine control of the bilge and bilge pumps. I report to the _____ 2 engineer.

Second Speaker: I usually assist maintaining and repairing of main propulsion and auxiliary _____ 3. I usually take part in bilge and ballast _____ 4, bunkering and oil transfer. I handle the stores and clean the tools and equipment in the engine room.

Third Speaker: I am responsible for _____ 5 moving parts and maintaining the oil level. I also clean the engine room and assist the _____ 6 with the maintenance of the machinery.

E Two engine cadets meet at a port. Listen to the dialogue between them and complete the missing parts.



41284

Ahmet : Hi Elif.

Elif : Hi Ahmet. Nice to see you! How are you?

Ahmet : Good. And you?

Elif : I'm fine. You are training on a bulker, right? How is it going?

Ahmet : It is fun. The _____ 1 than other ships, and you have enough time at ports to see around.

Elif : What do you usually do? What is your routine like?

Ahmet : I assist engineers during working hours. I learn a lot from them like _____ 2 and generators, watching the indicators, sounding fuel tanks, _____ 3, changing filters of fuel and lubricating oil. Sometimes I have to do errands, but I still have enough spare time for myself. How about you?

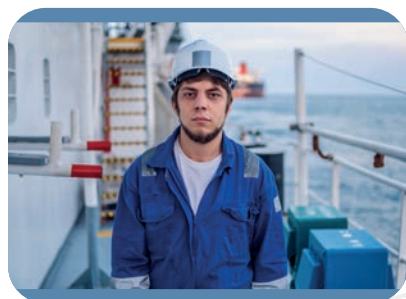
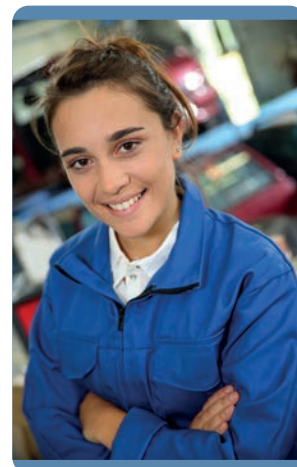
Elif : I'm training on a container ship and practice similar works like you, but our working conditions are a bit different. We have _____ 4 and we drop in _____ 5 during a voyage; so, we don't have much time to see around.

It is tiring for me, but I like being on board. I've made a lot of new friends and we have great time together.

Ahmet : Glad to hear that... Sorry, I got to go now.

Elif : Catch you later!

Ahmet : OK. See you!





III Reading and Vocabulary

A Match the words to form meaningful phrases.

- 1 pollution _____
- 2 planned _____
- 3 sewage _____
- 4 auxiliary _____
- 5 refrigerated _____
- 6 fire _____
- 7 lubricating _____
- 8 bilge _____
- 9 electric _____
- 10 engine _____

- a treatment
- b engine
- c room
- d prevention
- e motor
- f maintenance
- g detector
- h oil
- i water
- j container

B Read the text and fill in the blanks with the given words.

engine cadet

~~fourth engineer~~

electro-technical rating

third engineer

oiler

second engineer

electro-technical officer

chief engineer

Engine crew is responsible for keeping the vessel's machinery operational all the time. The engine department consists of marine engineers and ratings.

The _____ **1** is the head of the engine department. S/he oversees all operations in the engine room and checks the related machinery for a safe voyage. S/he makes sure that the engine crew carry out the routine maintenance of the machinery according to the Planned Maintenance System. S/he is responsible for checking the log books for pollution prevention systems, fuel, lubricating and waste oil regularly.

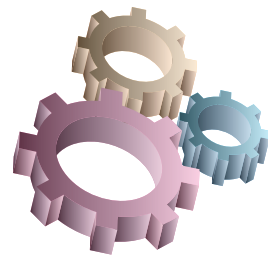
The _____ **2** is the second person in charge in the engine department. S/he is responsible for all routine maintenance and operational activities. S/he keeps watch in the engine room and reports to the chief engineer.

The _____ **3** is generally responsible for the operation of auxiliary engines and systems. S/he keeps watch in the engine room and reports to the second engineer.

The **fourth engineer** **4** is generally responsible for sewage treatment, bilge water, lubricating and waste oil.

The _____ **5** observes, learns, and practices the operations of the engine department while assisting the engineers.

The _____ **6** is responsible for the operation, maintenance and repairs of all electronic and electrical equipment on board such as electronic fittings, switchboards, electric motors, batteries, fire detectors, alarm system, air-conditioning system, navigational equipment, refrigeration unit and refrigerated containers.



The _____ **7** assists the electro-technical officer with the maintenance and repairs of electrical and electronic equipment on board.

An _____ **8** lubricates moving components, checks the oil levels, cleans the engine room and assists the engineers in the maintenance of the machinery.

C Read the text in Exercise B on Pages 28 and 29 and write **T** for **TRUE** or **F** for **FALSE** next to the sentences.



- 1 The chief engineer supervises the work in the engine department. ____
- 2 The engineers keep watch on the bridge. ____
- 3 The third engineer is in charge of applying the planned maintenance system. ____
- 4 The second engineer reports to the chief officer. ____
- 5 The electro-technical rating works with the electro-technical officer. ____

D Match the engine department ranks with their abbreviations.

- 1 engine cadet ____
- 2 electro-technical officer ____
- 3 electro-technical rating ____
- 4 third engineer ____
- 5 chief engineer ____
- 6 second engineer ____
- 7 fourth engineer ____

- a ETR
- b 4/E
- c C/E
- d 2/E
- e E/C
- f 3/E
- g ETO



1C THE DOCUMENTS




I Listening

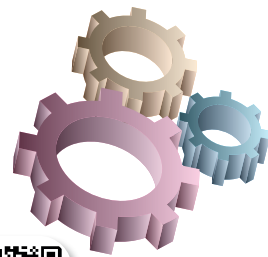
A Listen and fill in the job application form using the information in the dialogue.



41285

SEAMAN'S EMPLOYMENT APPLICATION FORM

Position applied for	1 _____				
Capacity	2 _____				
Family name	3 _____	First name	Deniz		
ID number	280870858165	Date of birth	10/01/1997		
Telephone	90212XXXXX91	Cell phone	0556XXXXX76		
Last graduated from	4 _____	Graduation date	5 _____		
Marital status	6 _____	Military service	Done		
Foreign Language	7 _____	Level	Basic <input type="checkbox"/> Intermediate <input type="checkbox"/> Upper intermediate <input checked="" type="checkbox"/> Advanced <input type="checkbox"/>		
Second Foreign Language	8 _____	Level	Basic <input checked="" type="checkbox"/> Intermediate <input type="checkbox"/> Upper intermediate <input type="checkbox"/> Advanced <input type="checkbox"/>		
Sea service					
Company	Vessel's name	Flag	Position	From (Month/ Year)	To (Month/ Year)
9 _____	M/V SAKA	Turkish	10 _____	06/2019	11 ___ / ___
Documents					
Name	Number	Valid until			
Seaman's Book	1678992344	09/2024			
Civil Travel Passport	T0002233451	12/2023			
Medical Examination Certificate	311186	09/2023			
Yellow Fever	A5533	11/2023			
Register Port	12 _____				
Certificates					
Name of the certificate	<input checked="" type="checkbox"/>	Name of the certificate	<input checked="" type="checkbox"/>		
Personal Survival Techniques	<input checked="" type="checkbox"/>	Proficiency in Survival Craft and Rescue	<input checked="" type="checkbox"/>		
Elementary First Aid Training	<input checked="" type="checkbox"/>	Boats	<input checked="" type="checkbox"/>		
Fire Prevention and Fire-Fighting	<input checked="" type="checkbox"/>	Security-Related Familiarization	<input checked="" type="checkbox"/>		
Personal Safety and Social Responsibility	<input checked="" type="checkbox"/>	Security Awareness	<input checked="" type="checkbox"/>		
		Designated Security Duties	<input checked="" type="checkbox"/>		



B Read the application form and write **TRUE** or **FALSE** for the sentences below.



41285

- 1 The applicant is a college graduate. _____
- 2 The applicant is single. _____
- 3 The applicant knows English well. _____
- 4 The applicant was 21 years old when he first started working on board. _____
- 5 The register port of the applicant is in Türkiye. _____
- 6 The applicant doesn't have all basic certificates for a seafarer. _____



II Reading and Vocabulary

A Complete the dialogue between the new 3/E and 2/O of the ship.

vomited

sweaty

high

pills

nauseous

back

temperature

fever

2/O : Mr. Akdemir! Are you OK?

3/E : I don't feel good. I have a _____ **1** and a severe pain in my _____ **2** and joints.

2/O : All right. I will take your _____ **3** and measure your blood pressure. Do you feel _____ **4** too?

3/E : I've _____ **5** twice this morning and I still feel nauseous.

2/O : Ok. Your temperature is a bit _____ **6**, but your blood pressure is normal. It seems you have a cold.

3/E : I was too _____ **7** on the deck the other day. I think I caught cold because of that.

2/O : Ok. I will give you some _____ **8** to bring down your fever and stop nausea. I also advise you to take a warm shower and have hot drinks.

3/E : Thank you very much.

2/O : I want to see you tomorrow, too. Inform me, if your situation gets worse.

3/E : Thank you Mr. Can. I will see you tomorrow.



B Match the words with their definitions.

- 1 permanently fixed piece of furniture _____
- 2 by this statement, action or law _____
- 3 an important skill needed for a job _____
- 4 the ending time of an official document to be acceptable _____
- 5 an official record containing names and information _____
- 6 to formally send a document to authorities _____
- 7 a written statement that shows something is true or definite _____
- 8 to go on a ship _____

- a confirmation
- b competency
- c embark
- d submit
- e expiration
- f fixture
- g hereby
- h register

C Read the embarking order below and complete it with the given phrases.

PORT OF REGISTRY	EXPLANATIONS	CERTIFICATE OF COMPETENCY
NAME OF THE VESSEL	RANK	DATE AND PLACE OF BIRTH
NAME OF THE CREW	NUMBER OF REGISTRY	SEAMAN'S BOOK NUMBER

DATE :15/01/2022

EMBARKING ORDER

1 _____ : M/V YILDIRIM 5

2 _____ : DENİZ AKDEMİR

3 **RANK** _____ : THIRD ENGINEER

4 _____ : 10.01.1997 İZMİR

5 _____ : THIRD ENGINEER

6 _____ : İZMİR

7 _____ : AA-110

8 _____ : 1678992344

9 _____ : The seafarer will embark the ship
at Genoa on 20.01.2022

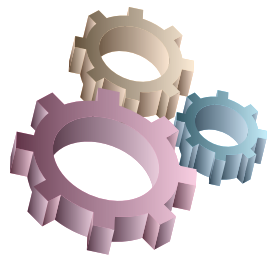
EMBARKED CREW
DENİZ AKDEMİR

PERSONNEL MANAGER
AHMET NEHİR

MASTER'S CONFIRMATION ABOUT EMBARKED CREW :

SIGNATURE

NOTE: THIS FORM IS PREPARED IN 3 COPIES. TWO COPIES WILL BE SENT TO THE VESSEL WITH CREW. AFTER THE CONFIRMATION BY MASTER ONE COPY WILL BE SENT BACK TO COMPANY.



D Read the letters below and fill in the blanks with the given words.

expenses	cabin	order	role	embark
saving	port	register	cash	assigned

EMBARKATION ORDER

DEAR: Deniz AKDEMİR _____ **1** NO: 1122334412

You have been _____ **2** as the third engineer to the M/V YILDIRIM 5.
You are requested to _____ **3** your ship at Genoa _____ **4** and start your duty on board by taking over all related equipment, machinery, devices and documents from _____ Sinan YILMAZ. Wishing you the very best in your assignment.

Embarking at Rotterdam Port

PERSONNEL MANAGER

From the reserve : ()
From the leave : ()
From promotion : ()
From ship-to-ship : ()
Embarkation date : 20/01/2022

Master cash advance (To be delivered to the master) : (\$ is given)
Travel _____ **5** advance : (\$ 1000,00 is given)

TO THE PERSONNEL MANAGER

I hereby submit for your information that, Deniz AKDEMİR, the identified crew in the embarkation _____ **6** above has started his duty on board by taking over his _____ **7** key, life- _____ **8** equipment, his cabin's fixtures and _____ **9** card.

Sincerely

Embarkation Port: Rotterdam

Embarkation Date and Hour: 20.01.2022 - 1300 hours

MASTER of M/V YILDIRIM 5

Note: \$ 1000,00 is given to the crew from the ship's _____ **10** register for his travel expenses and the invoice is attached to this letter.





III Writing

A Study the **application to leave** below and match the phrases with the parts of the application.

To the master of M/V YILDIRIM 5 **1**

I have been working as the third engineer on M/V YILDIRIM 5 since January 20th, 2022. My contract ends on the July 1st, 2022. I would like to take a leave at the first available port upon the expiration of my contract. **2**

Sincerely, **3**

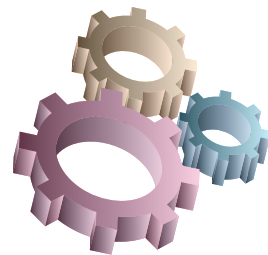
Third Engineer **4**
Deniz AKDEMİR **5**
15/05/2022 **6**

- a** the ending ____
- b** the date ____
- c** the rank ____
- d** the recipient ____
- e** the writer ____
- f** the reason ____

B Put the sentences below in order and write an application to leave. Add the necessary information according to the sample in Exercise A.



















- a** I would like to inform you that I am getting married on May 18, 2022, in İzmir.
- b** I have been working on M/V YILDIRIM 5 as the able seafarer since January 15, 2022.
- c** I request to take a leave from May 10, 2022 to May 25, 2022 for this occasion.
- d** Thanks for your concern.
- e** My contract ends on July 15, 2022.





Work in groups and choose different types of vessels. Find out the advantages and disadvantages of working on those types of vessels. Present your findings and ideas in your class. You can visit the ships, prepare questions, interview the crew members, take photos and videos if it is allowed for your presentation.

SELF ASSESSMENT 1

			
I can recognise the terms about vessels and vessel types.			
I can name the crew members and their duties.			
I can understand and take part in conversations while working on board.			
I can recognise the documents and certificates necessary for seafarers.			
I can fill in the required forms for working on board.			

REVISION 1

A Choose the correct option.

- Steering a vessel through its route is _____.
 a widening b escorting c deepening d manoeuvring
- _____ are used to open a wider and deeper seabed for large vessels.
 a Tugs b OSVs c Dredgers d Icebreakers
- _____ precautions are very important both on commercial and passenger ships.
 a Pollution b Safety c Operation d Emergency
- Controlling the temperature is the most important point for the perishable cargo on _____.
 a bulk carriers b livestock carriers c gas tankers d reefers
- _____ are used to catch fish on longliners.
 a Baited hooks b Seine nets c Purse nets d Trawling nets
- The money you pay for transportation is _____.
 a schedule b destination c passage d fare
- Dangerous cargo is carried on _____.
 a chemical tankers b container ships c livestock carriers d bulk carriers
- OSVs are usually used for _____.
 a catching pelagic species
 b provision supply
 c vehicle transportation
 d pleasure trips
- _____ plan is used to place the cargo on the ship properly.
 a Discharging b Loading c Stowage d Storage
- _____ are used to transport wheeled vehicles.
 a Tugs b Dredgers c Ro-Ros d OSVs



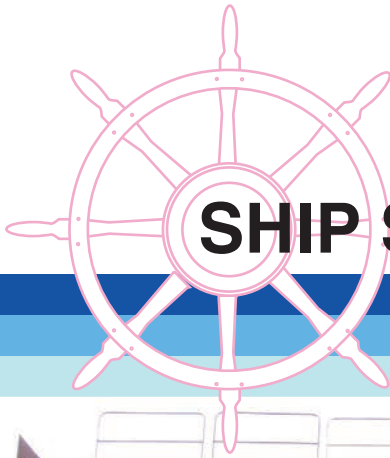
B Who is this?

- 1 responsible for the meals _____
- 2 head of the engine department _____
- 3 in charge of the deck ratings _____
- 4 responsible for everybody and everything on board _____
- 5 head of the engine ratings _____
- 6 head of the deck department _____

- a donkeyman
- b boatswain
- c the master
- d the chief engineer
- e the chief officer
- f cook

C Pick the odd word out.

- | | | | | |
|---|---------------|----------|-----------------|-------------|
| 1 | gillnetter | seiner | tanker | trawler |
| 2 | able seaman | oiler | ordinary seaman | boatswain |
| 3 | deck | engine | catering | technical |
| 4 | cruise | tug | dredger | cable layer |
| 5 | seaman's book | passport | letter | certificate |
| 6 | maintain | command | manage | oversee |
| 7 | cadet | rank | fitter | steward |
| 8 | engineer | oiler | donkeyman | cook |



SHIP STRUCTURE



- Get familiar with the main parts of a vessel
- Recognise the direction terms used on board
- Get familiar with the main fittings and equipment with different functions
- Learn the measurement of dimensions, tonnage and displacement
- Practice the conversations describing the positions and locations of the things on and around a ship



2A MAIN PARTS OF A SHIP

Vocabulary

A Match the words with the photos.

1 lighthouse ____

2 nautical chart ____

3 wreck ____

4 buoy ____



A



C



B



D

B Match the words with their antonyms.

1 imaginary ____

2 lengthwise ____

3 charted ____

4 main ____

5 fore ____

a aft

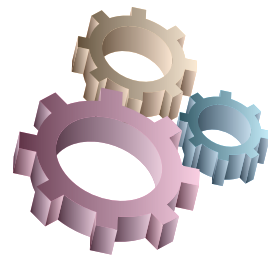
b uncharted

c real

d athwart

e auxiliary

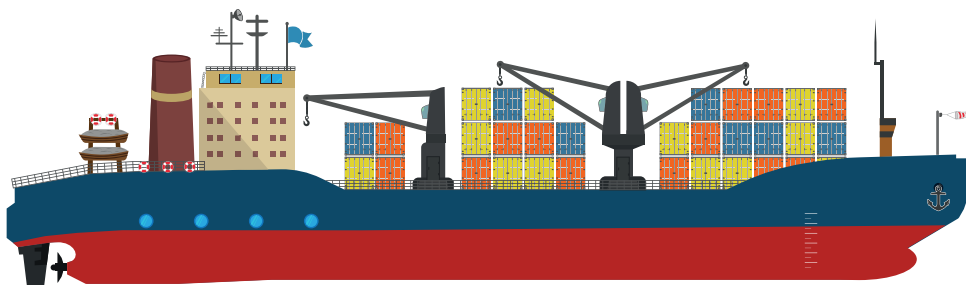
- When we talk about vessels, we say Motor Vessel, and we use the abbreviation M/V.
e.g., M/V Bluebird.
- We also use the pronoun she or her when we talk about a certain ship.
e.g., Her cargo is crude oil.



II Speaking

Discuss the following questions.

- 1 What type of a ship do you see in the picture below?
- 2 Can you name any parts, compartments, fittings or equipment on her?
- 3 Do you know how to tell the locations of the things around your ship?



III Listening

Listen to the recording about the **parts of a vessel**, and complete the text below.



41286

The main structure of a ship consists of the hull and the machinery. The _____ 1 is the main body of the ship. It consists of various structural elements. The _____ 2 includes all devices and _____ 3 that help the ship move. A ship can roughly be divided into _____ 4 parts, and there are many compartments located on these parts. We can use the names of these parts or compartments when we talk about the _____ 5 of something on a ship. We can say “The propeller is at the _____ 6.” or “The bridge is above the accommodation.” _____ 7 terms also help us to say the exact locations or _____ 8 of something around our ship. For example, we can say “Motor Vessel (M/V) BLUEBIRD is _____ 9 of us.” or “There is a wreck on our _____ 10 abeam.”

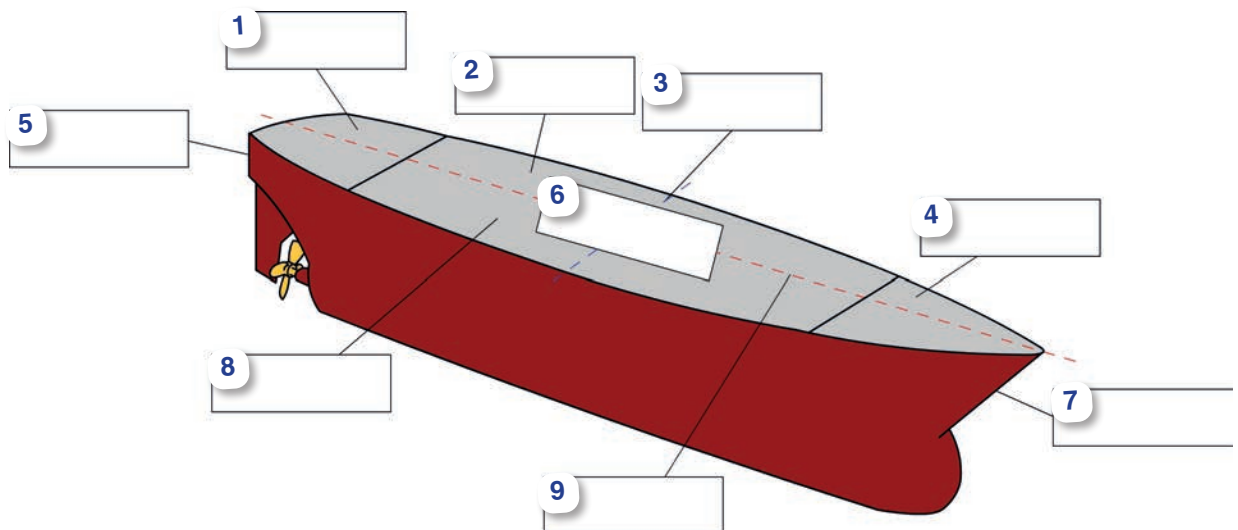


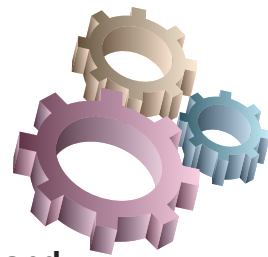


IV Reading and Vocabulary

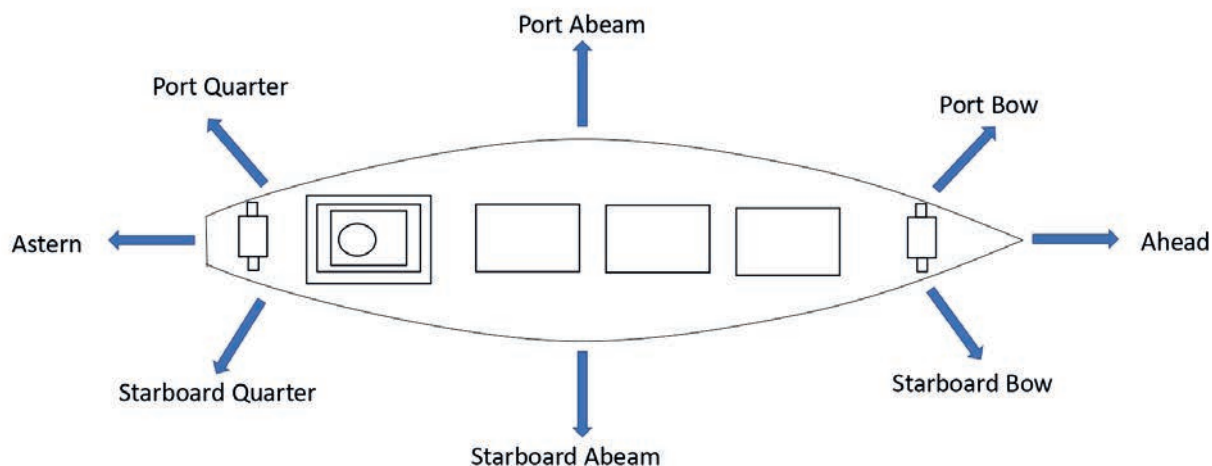
A Read the sentences describing the main parts of a ship, and write the words in bold on the picture below.

- An imaginary line dividing a ship into two equal parts lengthwise is the **centre line**.
- When you stand at the centre line facing forward, right-hand side is **starboard**, left-hand side is **port**.
- The front part of a ship is **forepart**.
- The back part of a ship is **after part**.
- The middle part between the after part and the forepart is called **amidships**.
- The widest part of a ship is called **beam**.
- The rear end of a ship is **stern**.
- The fore end of a ship is **bow**.





B Read the information about the **directions of a ship** on the picture and complete the table below.



When we want to describe the direction ... We use ...

towards a ship's bow ... 1 ahead

towards the left side of a ship ... 2 _____

towards the right-front of a ship ... 3 _____

towards a ship's stern ... 4 _____

towards the left-front of a ship ... 5 _____

towards the right-back of a ship ... 6 _____

towards the right side of a ship ... 7 _____

towards the left-back of a ship ... 8 _____





V Listening and Speaking



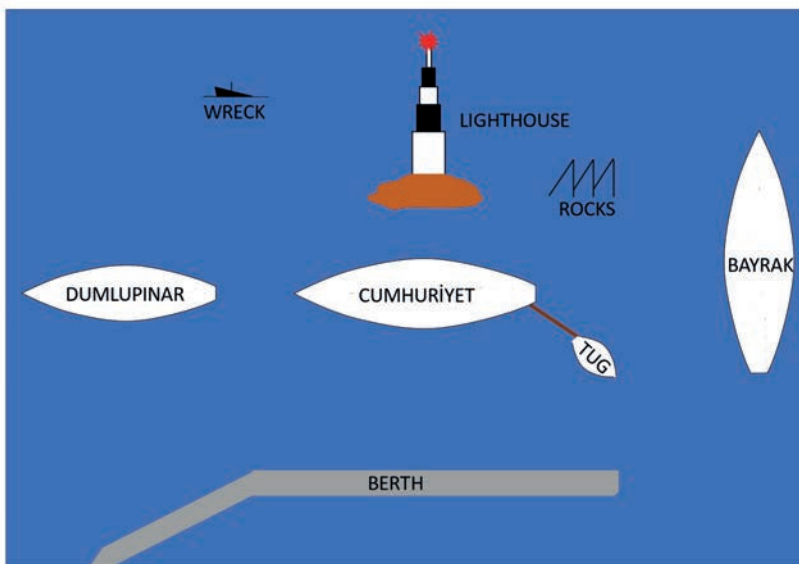
41287

A Listen and complete the sentences with the words you hear.

- 1 Be careful! There are uncharted rocks _____ of you.
- 2 Keep clear of the wreck on your _____.
- 3 The tug is towing M/V BLUELINE 7 towards the _____.
- 4 There is a buoy on your _____.
- 5 A tanker is passing _____ of the container ship.
- 6 I see a fishing boat on our _____.
- 7 Look! There is a whale on _____.
- 8 We can see Cape of Good Hope is on our _____ now.

B Look at the picture and make sentences as in the example.

e.g., *There is an empty berth on port abeam of M/V CUMHURİYET.*

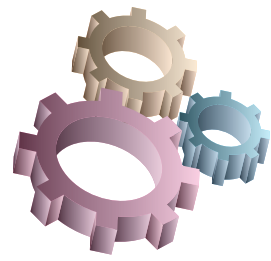


C Complete the sentences with the terms describing the positions and directions using the information on the picture in Exercise B.

- 1 M/V DUMLUPINAR is one nautical mile (nm) _____ of M/V CUMHURİYET.
- 2 We can see a/an _____ on port abeam of M/V CUMHURİYET.
- 3 M/V BAYRAK is passing _____ of M/V CUMHURİYET.
- 4 The tug is towing M/V CUMHURİYET to _____.
- 5 There are rocks on the starboard quarter of _____.
- 6 There is a/an _____ on starboard bow of M/V CUMHURİYET.
- 7 The lighthouse is on _____ of M/V CUMHURİYET.
- 8 The wreck is on starboard quarter of _____.



VI Reading and Writing



A Read the sentences about the **main compartments** of a ship, and complete them with the given words by looking at the pictures.

accommodation

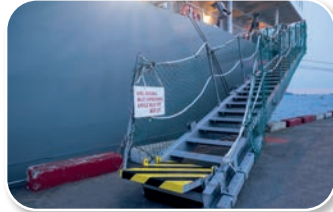
decks

bridge room

gangway

engine room

1 A _____



is a walkway or a raised platform on the side of a ship. You can embark or disembark a ship using it.

2 _____



are open spaces on a ship for the crew to walk from one place to another.

3 The _____



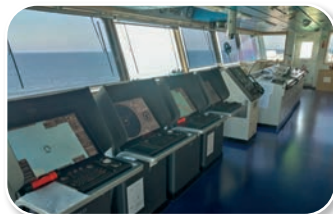
involves the main engine and auxiliary machinery. The ship is propelled from this room.

4 The _____



holds the living spaces in it. The crew sleep, eat and rest in these spaces.

5 The _____



is the commanding room of a ship. Navigation is controlled from this room.

B Write names of the **rooms in the accommodation** of a ship under their photos.

galley

laundry room

hospital

mess room

cabin

provision store



1 _____



2 _____



3 _____



4 _____



5 _____



6 _____

C Work in pairs. Complete the sentences using the phrases from the boxes.

A

rest and sleep

are kept

are washed and dried

eat their meals

prepares and cooks the meals

take medical care

B

in the galley

in the mess room

in the provision store

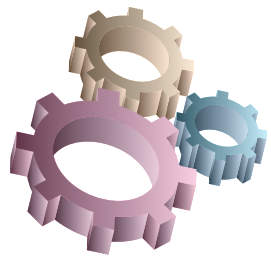
in their cabins

in the laundry room

in the hospital

- 1 The crew **eat their meals in the mess room** _____
- 2 The cook _____
- 3 Injured or ill crew members _____
- 4 All crew members _____
- 5 Food and beverages _____
- 6 Clothes, towels and sheets _____

2B STRUCTURAL COMPONENTS



I Vocabulary

A Match the words with their antonyms.

- 1 lengthwise _____
- 2 external _____
- 3 outer _____
- 4 reduce _____
- 5 inlet _____
- 6 rise _____

- a outlet
- b inner
- c fall
- d athwart
- e increase
- f internal

B Work in pairs. Write the required forms of the words below.

- 1 watertightness (noun) _____ (adj.)
- 2 strengthen (verb) _____ (noun)
- 3 extension (noun) _____ (verb)
- 4 collide (verb) _____ (noun)
- 5 effect (noun) _____ (verb)
- 6 attach (verb) _____ (adj.)

C Write the correct words to complete the definitions below.

skin

ribs

rolling

fins

pitching

collision

- 1 _____ is rising and falling motion of the starboard and port sides of the ship.
- 2 _____ are curved bones around the chest that protect internal organs.
- 3 _____ is the marine accident in which two vessels crash.
- 4 _____ is a thin layer of tissue which forms the outer cover of the body.
- 5 _____ are wing-like organs at two sides of a fish's body which helps it balance.
- 6 _____ is rising and falling motion of the bow and the stern of the ship.





II Speaking

Discuss the following questions.

- 1 Have you ever visited a shipyard and seen the building process of a ship? If yes, what was it like?
- 2 Can you name any structural components of a ship?



III Listening and Reading

A Read the paragraph and complete it with the given words or phrases.

joints

waves

skin

components

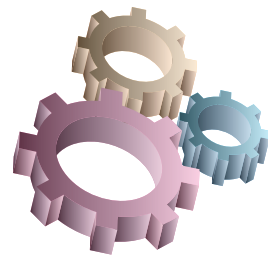
human body

bone

skeleton

hull

The _____ 1 is the body of a vessel. It consists of various structural _____ 2. If we think the hull of a ship as a _____ 3, we can say that it has a _____ 4 with a backbone and ribs. It has _____ 5 connecting these _____ 6 together, and it has a _____ 7 protecting the body against the damaging effects of external forces like _____ 8 and bad weather condition.



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B Read and listen to the sentences about the structural components of a ship and complete it with the given words in the box.

prevent	connect	reduces	consists	strengthen	are	support
protect	cross	provide	has	extends	encloses	increases

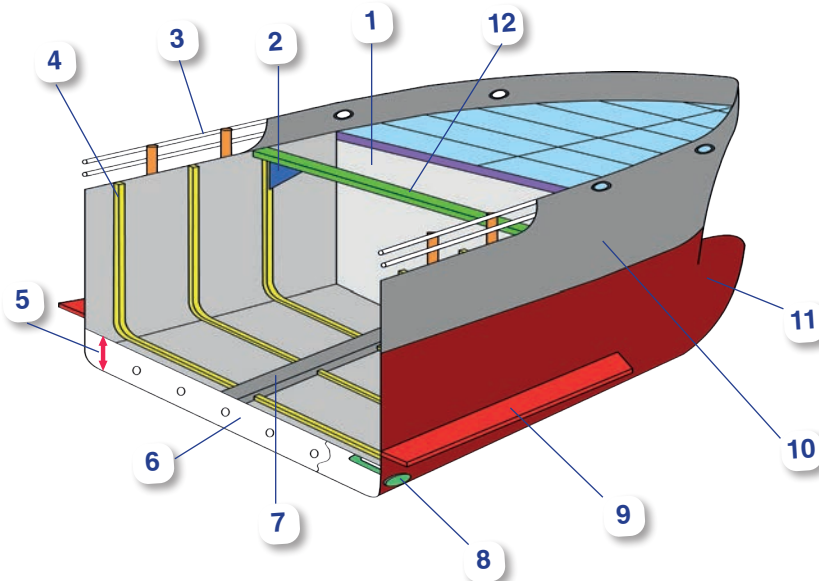
- The **keel** _____ **1** from the bow to the stern along the hull. It is the backbone of the vessel. It supports the hull and holds all other things forming the skeleton.
- **Frames** _____ **2** the keel like ribs in human body. They support the hull together with the keel.
- **Beams** are attached to the top ends of frames. They _____ **3** the hull against pressure of the water from the sides.
- **Brackets** are metal joints. They _____ **4** frames and beams.
- **Bulkheads** are watertight walls. They _____ **5** isolated sections to protect the cargo from external effects and damage.
- The **shell plating** is the outer skin of a vessel usually made of steel. It _____ **6** the hull and protects it from external effects like a shell.
- The **bulbous bow** is a bulb-like extension at the vessel's bow. It _____ **7** pitching and protects the vessel's bow when there is a collision.
- **Bulwarks** form the sidewalls and rails around the decks. They _____ **8** seawater entry and protect the crew or passengers against falling from the deck.
- The **double bottom** _____ **9** of two watertight layers leaving a space between the inner bottom and shell plating. It prevents cargo holds and the engine room from flooding when there is a bottom damage. It also _____ **10** the longitudinal strength of the vessel.
- **Floors** are plates at the bottom with holes. They _____ **11** the ship to hold the weight of the cargo, the machinery, and the tanks. They also _____ **12** the ship against crashes.
- The **sea chest** is a box attached to the inside bottom of the shell. It _____ **13** inlet valves and strainers to take seawater for various purposes such as ballast, cooling, or fire-fighting etc.
- **Bilge keels** _____ **14** fin-like plates at two sides of the vessel. They reduce rolling.



C Listen to the text in Exercise B again and match the numbers on the picture with the structural components.



41288



- Bulwark _____
- Beam _____
- Frame _____
- Keel _____
- Double bottom _____
- Floor _____
- Sea chest _____
- Bilge keel _____
- Bulbous bow _____
- Shell plating _____
- Bulkhead _____
- Bracket _____

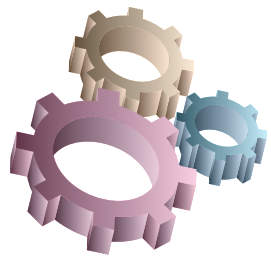


IV Writing

Work in groups. Complete the table using the information about the structural components of a ship on Page 47.

STRUCTURAL COMPONENT	FUNCTION
1 _____	Protecting people against the risk of falling into the water
2 _____	Supporting the hull against the pressure of the water from sides
Frames	3 _____
Bilge keel	4 _____
5 _____	Attaching beams and frames to each other
6 _____	Forming watertight sections to protect the cargo
Shell plating	7 _____
Bulbous bow	8 _____
9 _____	Strengthening the hull as the backbone of the ship
Sea chest	10 _____
11 _____	Strengthening the bottom of the ship to help her carry all the load
Double bottom	12 _____

2C BASIC FITTINGS



Vocabulary

A Work in pairs and match the words with their definition.

- 1 steer ____
- 2 manoeuvre ____
- 3 anchor ____
- 4 moor ____
- 5 discharge ____
- 6 transmit ____
- 7 rotate ____
- 8 wind ____
- 9 heave up ____
- 10 trim ____

- a to send out something from somewhere, unload
- b to move in a circular axis
- c to twist something around a cylindrical object
- d to lift or pull up a heavy object
- e to tie a ship or a boat somewhere like a pier by a rope
- f to turn or direct a vessel to another route
- g to adjust the balance of a ship
- h to control the movement of a vessel
- i to fix a vessel to the sea bottom with an anchor
- j to cause something pass from one place to another, send

B Complete the sentences with the words in Exercise A.

- 1 It is difficult to _____ at narrow straits for large ships; so, a tugboat usually assists them.
- 2 Cables _____ electrical power from the source to the devices so that they can run.
- 3 Bulk carriers use cranes and conveyor belts to _____ their cargo.
- 4 _____ the anchor! We are setting off.
- 5 It is necessary to _____ for maintaining fore and aft balance of a ship.
- 6 We are going to _____. Stand by for letting go the port anchor.
- 7 M/V BLUEBIRD, please _____ to the pilot station.
- 8 The cruise ship will _____ at the passenger terminal to disembark the passengers.
- 9 We must _____ these ropes on the coil soon. They look untidy here.
- 10 The compass needle seems to _____ continuously. I can't read the direction well here.

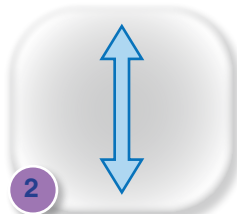
C Match the words with the figures.

vertical ____

rotating ____

horizontal ____

curved ____



D Read the definitions of the words and write the missing letters of them.

- | | |
|---|---------------------------|
| 1 a long connecting rod | sh _ _ t |
| 2 a large mechanical equipment or a part of a machine | g _ _ r |
| 3 the state of being fixed or balanced | st _ b _ l _ ty |
| 4 a physical harm to a vessel or an equipment | d _ m _ g _ |
| 5 assisting or supporting | a _ x _ li _ ry |
| 6 the state of not allowing water flow | w _ t _ _ t _ gh _ n _ ss |



II Listening and Writing



41289

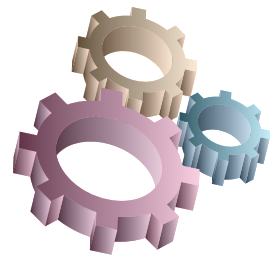
A Listen and complete the text with the names of the basic fittings on a ship.

There are some basic fittings on each ship with various functions such as creating the propulsion power, supporting manoeuvring, anchoring, mooring, or maintaining the stability.

On almost all ships, there are two masts: The _____ **1** is situated at the after part of the ship, on the bridge; and the _____ **2** is on the forecastle deck. They hold navigational lights, flags, radio antennas etc. Another fixed basic fitting is the _____ **3**. It is normally at the after part, next to the accommodation. It is used to discharge exhaust gasses coming from the engines and generators like a chimney.

The fittings that produce or support the propulsion power are the propeller, the bow thruster and the stern thruster. The _____ **4** has curved, rotating shafts to transmit the power of the engine which helps the ship move. It is at the stern. The _____ **5** and the _____ **6** are like propellers enclosed by a tunnel. They ease moving to starboard and port sides, and help manoeuvring. The bow thruster is at the bow, and the stern thruster is at the stern. There is also a vertical device at the stern of the ship, next to the propeller called _____ **7**. It is used to steer and manoeuvre the ship.

Anchor, windlass and capstan are among basic anchoring and mooring equipment. The _____ **8** is a heavy object tied by a chain and hanged from the _____ **9**. It is usually at the bow of the ship, and used to moor the vessel to the sea bottom and hold it still. The _____ **10** is a horizontal cylinder rotated by a mechanical power to make the anchor cable wind around it. It can be at the forecastle or at the poop deck. It is used for heaving up or letting go the anchor. The _____ **11** is a vertical cylinder rotated by a mechanical power. It has a similar function with the windlass. It is usually at the poop deck.



B Look at the photos and write the names of **basic fittings** from Exercise A Page 50.



1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
9	_____

C Write the correct **cargo equipment or space** to complete the sentences.

hatch coamings

cranes

pumps

cargo holds

cargo tanks

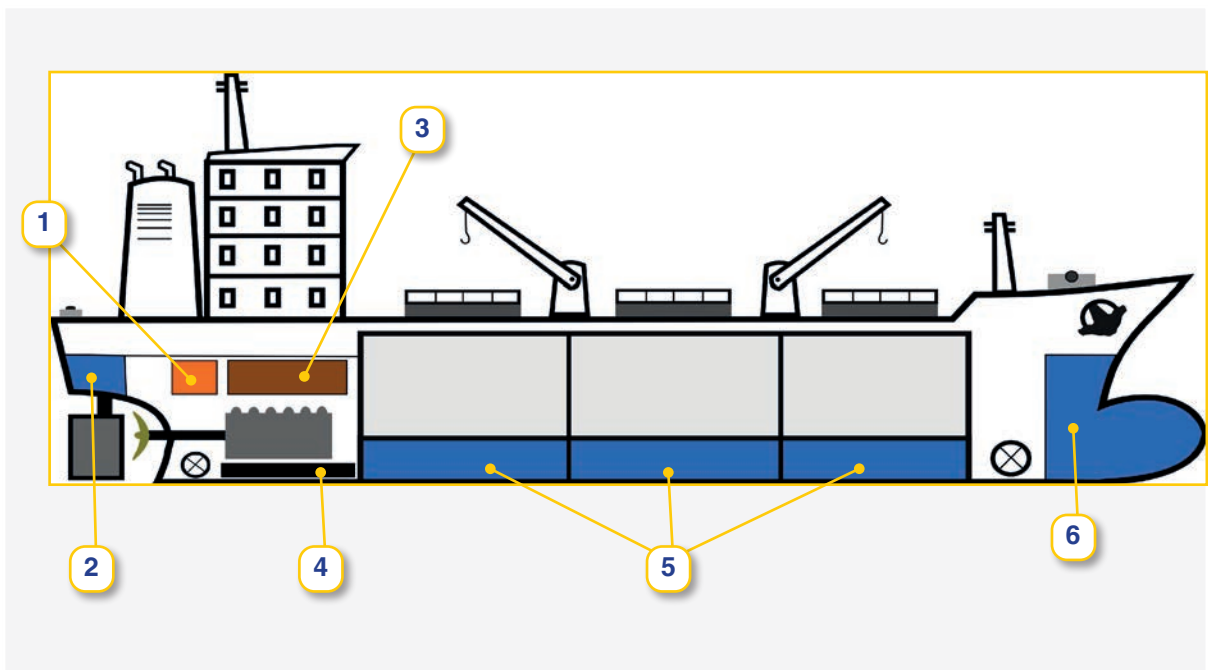
hatch covers

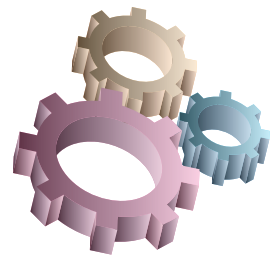
- The cargo is loaded into _____ **1** between the forepart and the after part on dry cargo ships.
- _____ **2** cover the cargo holds and protect the cargo from external damage.
- _____ **3** are like frames between the cargo holds and hatch covers providing watertightness.
- The cargo is usually loaded into the cargo holds via large gears called _____ **4** on dry cargo carriers.
- The cargo is loaded and discharged via _____ **5** and pipelines into/out of the _____ **6** on liquid or liquefied cargo carriers.

III Reading

Read the sentences, and write the numbers of the **tanks** on the picture next to the sentences.

- Ballast tanks are at the bottom of the ship, and they contain sea water to maintain the balance. ____
- Forepeak tank is at the bow of the ship. It contains seawater to adjust the trim. ____
- Aft peak tank is at the stern. It contains sea water for trimming, or fresh water for domestic use. ____
- Bilge tank is below the engine room, and used to contain fuel oil and lube oil wastes. ____
- Fuel oil tank is usually located in the engine room, and it contains fuel oil. ____
- Lube oil tank is the smaller tank located in the engine room. It contains lubricating oil used for the maintenance operations. ____





Vocabulary

A Work in pairs. Write the required forms of the words below.

- | | | | |
|----|---------------------|-------|--------|
| 1 | high (adj.) | _____ | (noun) |
| 2 | width (noun) | _____ | (adj.) |
| 3 | long (adj.) | _____ | (noun) |
| 4 | depth (noun) | _____ | (adj.) |
| 5 | measurement (noun) | _____ | (verb) |
| 6 | displacement (noun) | _____ | (verb) |
| 7 | distance (noun) | _____ | (adj.) |
| 8 | permission (noun) | _____ | (adj.) |
| 9 | buoyancy (noun) | _____ | (adj.) |
| 10 | determine (verb) | _____ | (adj.) |

B Work in pairs. Match the words with their definitions.

shallow ___	dimensions ___	perpendiculars ___	docking ___	distance ___
tonnage ___	determine ___	displacement ___	permit ___	buoyancy ___

- 1 a measurement that shows the carrying capacity of a vessel
- 2 the ability to float on water
- 3 the measurement of length, width and height of something
- 4 to allow
- 5 a measurement that shows how far something/somewhere is from another
- 6 to come to a decision about something
- 7 not deep
- 8 mooring a ship to a particular place to maintain it
- 9 imaginary posts at the forepart and the afterpart showing the total volume of cargo spaces
- 10 the weight of the water that a ship displaces when seated in the water

C Write the **measurement units** given in the box on the table below.

metre (m)	cubic feet (ft ³) /cubic metre (m ³)	metric ton (mt)
-----------	--	-----------------

MEASURED FEATURE	MEASUREMENT UNIT
1 weight	
2 width	
3 volume	
4 length	
5 height	
6 depth	





II Listening and Speaking



41290

A Listen to the recordings and fill in the blanks with a word. First letters are given.

Ship Measurement

Before a ship starts her navigation, several things are measured. These measurements are very important to determine maximum cargo **c** _____ **1** and berthing costs, **m** _____ **2** in shallow waters and narrow canals, passing under the bridges, **d** _____ **3** operations, or maintaining the **s** _____ **4**.

Measuring the **d** _____ **5** and the **h** _____ **6** of a ship is necessary for having an idea about her **b** _____ **7** and stability with maximum **p** _____ **8** load. These **v** _____ **9** are also important for a safer voyage in **s** _____ **10** waters, and passing under **b** _____ **11** safely.

The measurement of the **d** _____ **12**, including the **l** _____ **13** and the **w** _____ **14** of a ship is also important for the **s** _____ **15**, safe manoeuvring in narrow canals, berthing and **d** _____ **16** operations, and determining the cargo capacity.

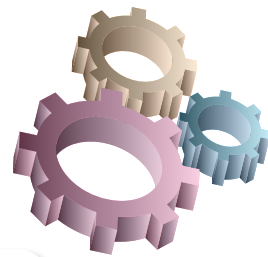
Measuring the **w** _____ **17** and the **v** _____ **18** is also necessary when deciding how much load that she can carry safely.

B Read the text and listen to the recording again, and discuss the following questions in groups.



41290

- 1** What do you think the purpose of measuring the lengths of a ship is?
- 2** In what situations can the measurement of heights and the depth of a ship be useful?
- 3** Why do you think the weights and the volume of a ship is measured?



C Listen to the conversation between a vessel and a Vessel Traffic Service (VTS), and complete the missing information on the table below.



41291

Name of the vessel:	_____ 1
Destination port:	_____ 2
ETA (Estimated Time of Arrival):	December, 5 th at _____ 3 UTC.
LOA (Length Over All):	_____ 4 m.
_____ 5 :	14,5 m.
LBP (Length Between Perpendiculars):	_____ 6 m.
Maximum _____ 7 :	12 m.
Loaded Displacement:	_____ 8 mt.
Light Displacement:	_____ 9 mt.
_____ 10 :	50.000 mt.
GT (Gross Tonnage):	_____ 11
_____ 12 :	17.000



III Reading and Writing

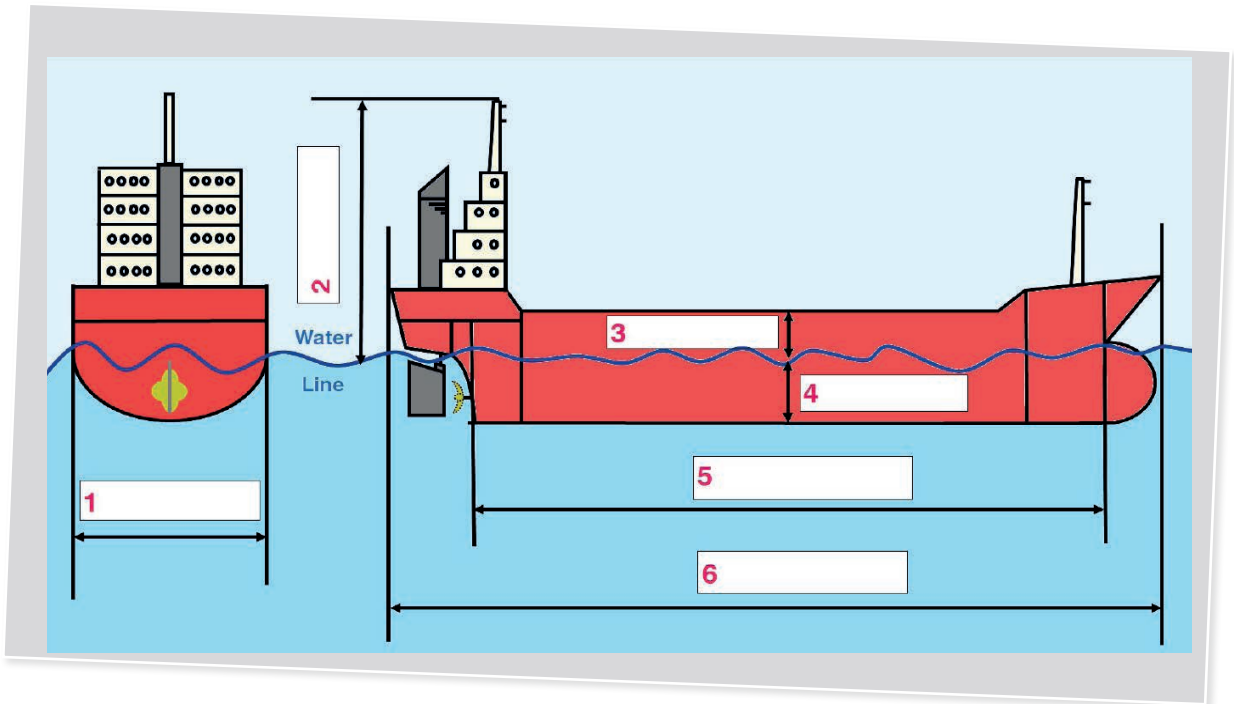
A Read the definitions of the terms used for the measurement of the **dimensions** and the **depth** of a ship, and write them in the correct column in the table below.

- 1** LOA shows the distance between the after and fore ends of a ship.
- 2** Air draught is the distance between the waterline and the top point of the main mast.
- 3** LBP shows the distance between fore and aft perpendiculars.
- 4** Freeboard is the distance between the waterline and the ship's upper deck.
- 5** Draught is the distance from the waterline to the deepest part of the ship's bottom.
- 6** Beam is measured at the widest part of the ship, and it shows how wide the ship is.

Depth	Height	Width	Length

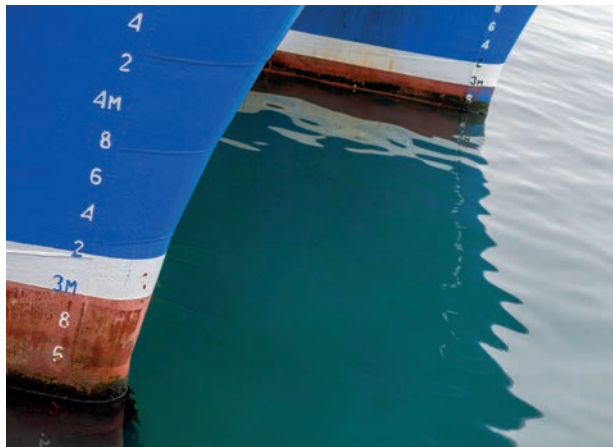


B Write the measurements you have learned in Exercise A on the picture below.

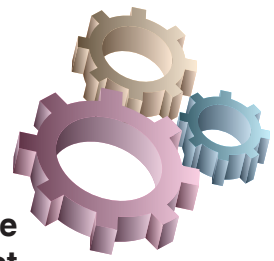


C Read the paragraph about **draught markers** and complete it with the given words.

bow	shell plating	amidships	markers	scales
-----	---------------	-----------	---------	--------



Draught of a ship is measured by the help of draught _____ 1. They are the _____ 2 showing the draught of a ship when it is seated on water at particular situations. They are placed on the _____ 3 at both sides of the _____ 4, the stern and the _____ 5.



D Read the definitions of the terms used for the measurement of the **volume** and the **weight** of a ship, and write them under the correct column on the table below.

- 1 **Light Ship** is a ship's own weight with her basic fittings when she is completely empty.
- 2 **Light Displacement** is the ship's weight with the fuel, lubricating oil, ballast water, provisions without the cargo.
- 3 **Loaded Displacement** is the ship's weight with everything loaded including fuel, lubricating oil, provisions, ballast water and the cargo and/or passengers.
- 4 **Deadweight (DWT)** is the maximum weight a ship can carry with everything loaded, including the cargo and/or passengers.
- 5 **Gross Tonnage (GT)** is the whole internal volume of a ship with her stores, tanks, holds, bridge, accommodation etc.
- 6 **Net Tonnage (NT)** is the volume of a ship used for transporting cargo or passengers; in other words, it is the profit-making volume of a ship.

Volume	Weight



Visit a shipyard and do research in groups. View the structural components that you have learned in this unit closely, talk to the people working there and observe their work. Take photos and videos if you are allowed to. Prepare a presentation sharing your experiences with your classmates.

SELF ASSESSMENT 2



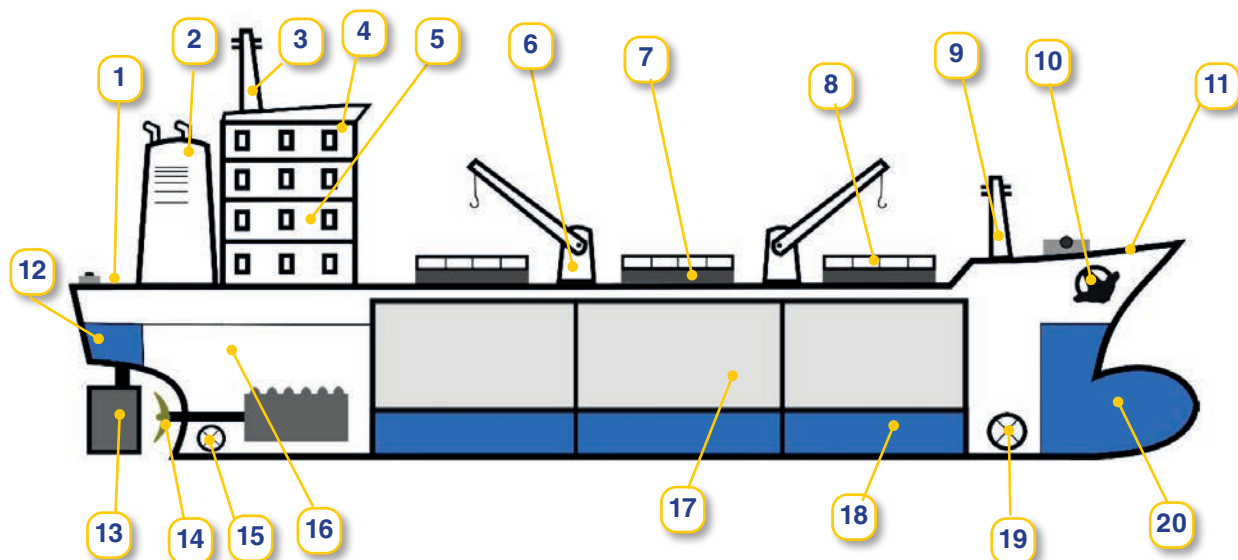
I can talk about the main parts of a ship.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can tell the position of the things around a ship using direction terms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can talk about basic structural components used while building a ship.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can tell the names of basic fittings, equipment, and their function on a ship.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can talk about what is measured on a ship?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can understand and take part in the conversations related to ship structure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



REVISION 2

A Write the correct numbers next to the words for the ship's structure by looking at the picture below.

forepeak tank ___	funnel ___	forecastle deck ___	bow thruster ___	cargo hold ___
poop deck ___	rudder ___	aft peak tank ___	ballast tank ___	propeller ___
stern thruster ___	crane ___	hatch coaming ___	engine room ___	main mast ___
bridge room ___	anchor ___	accommodation ___	hatch cover ___	head mast ___



B Choose the correct option.

- 1 The engine room is _____ the accommodation.
a next to b behind c below d on
- 2 _____ contains sea water to maintain stability of the ship.
a Cargo hold b Ballast tank
c Sea chest d Cargo tank
- 3 _____ is NOT in the accommodation.
a Messroom b Galley
c Hospital d Engine room
- 4 _____ is a mooring equipment.
a Windlass b Crane
c Propeller d Rudder
- 5 _____ is NOT related to cargo.
a Crane b Hatch coaming
c Rudder d Hatch cover
- 6 The _____ is the backbone of the ship.
a double bottom b beam c bulwark d keel
- 7 _____ are the strengthening components with holes on them.
a Floors b Frames c Beams d Brackets
- 8 When a ship moves towards its bow, we say that it moves _____.
a astern b ahead
c starboard abeam d port bow
- 9 If you see something at the left back of the ship, you say it is at the _____.
a starboard bow b port bow
c starboard quarter d port quarter
- 10 _____ is the maximum weight a ship can transport.
a Gross tonnage b Deadweight
c Net tonnage d Loaded displacement



SAFETY AND EMERGENCY



- Recognise work-related risks
- Learn about the precautions taken to prevent occupational accidents on board and at the ports
- Get familiar with personal protective equipment used on board
- Learn about immediate actions taken in case of a marine accident
- Recognise life-saving appliances and fire-fighting equipment
- Learn basic emergency signs, distress signals and what they are used for
- Practice some basic dialogues that can occur in emergencies
- Get familiar with medical emergencies and injuries that can happen on board
- Talk about first aid actions in certain medical emergencies
- Practice basic dialogues about asking for help in medical emergencies



3A WORK SAFETY AND PERSONAL PROTECTIVE EQUIPMENT

I Speaking

Look at the word cloud and discuss the following questions.

- 1 Do you know any of these words or phrases? If yes, tell what they are related to.
- 2 Can you group the words or phrases under the categories below?

- a Personal protective equipment (PPE)
- b Occupational accidents
- c Risk factors



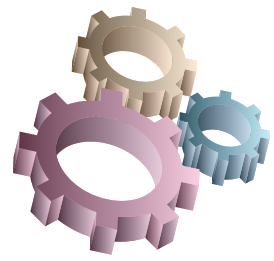
II Writing and Vocabulary

A Match the halves to form meaningful collocations.

- | | |
|---|--|
| <ol style="list-style-type: none"> 1 running ____ 2 confined ____ 3 cargo ____ 4 chemical ____ 5 slippery ____ 6 working ____ 7 electrical ____ 8 hot ____ 9 lifting ____ 10 snap-back ____ | <ol style="list-style-type: none"> a substance b floor c weights d devices e handling f work g zone h spaces i aloft j machinery |
|---|--|

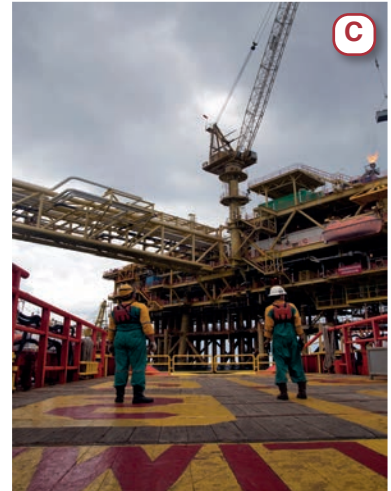
B Complete the sentences with a collocation from Exercise A.

- 1 Engine crew may need to protect their ears from the noise of _____ by using earmuffs or earplugs.
- 2 Falls may often happen if the safety harness is not worn while _____.
- 3 _____ are enclosed places with limited access and may contain a harmful atmosphere.
- 4 Being exposed to a _____ may cause harm to the human body.
- 5 _____ includes the process of loading and discharging the load of the vessels.
- 6 The seafarer was standing in the _____ when a rope hit him.
- 7 Seafarers must be careful while walking on a wet or _____.
- 8 _____ means operations such as welding and flame cutting that include open flames and high-degree heat.
- 9 _____ should be performed with the correct technique to avoid back problems.
- 10 _____ do not work without electric energy.



C Match the risk factors for occupational accidents or injuries with the photos below.

Working in confined spaces ____	Cargo handling ____	Bunkering /Working in oil tankers ____
Working near running machinery ____	Working aloft ____	Handling chemical substances ____
Working with electrical machinery/ devices ____	Hot work ____	Embarking/ Disembarking ____
Slippery or untidy floors ____	Painting and cleaning ____	Working in the galley ____



D Write the given risk factors on the basic precautions taken to prevent the accidents that might be caused by them.

**Mooring Operations / Working in Confined Spaces / Handling Chemicals
Lifting Weights / Working Aloft / Cargo Operations**

1

- Be careful about the safe working load of any equipment.
- Do not carry out any other work in the area of the loading operation.
- Leave the hatches in a safe condition when the the work has been stopped.

2

- Maintain mooring lines carefully, and inspect them for damage and defects regularly.
- Always stand in a safe place from snap-back zone because ropes or wires may break.
- A watchman should regularly inspect the mooring line.

3

- Wear a safety harness.
- Examine the condition of all equipment carefully (ropes, straps, hooks, etc.).
- Make sure that somebody on the ground is supervising or observing you during the work.

4

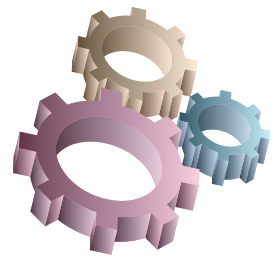
- Consider all confined spaces as unsafe.
- Maintain continuous ventilation throughout the work.
- Use breathing apparatus when needed.

5

- Before handling the substance, always look at Material Safety Data Sheet (MSDS) to understand possible hazards.
- Handle the substance carefully and follow the manufacturer's instructions.
- Make sure that the space you work in has been ventilated enough.

6

- Make sure that the area of the load is not slippery.
- Carry the load without blocking your own view.
- Lift and put down the load by bending your knees.



III Listening and Speaking

A Listen to the recordings and find the missing words. First letters are given for you.



41292

Entanglement

Employees working near powered machinery may have a high risk of entanglement. They risk being pulled into the moving danger points of **m** _____ 1. The risk of entanglement with machinery can occur during operations, **m** _____ 2, repairs, inspection and **c** _____ 3 activities. Entanglement can result in injuries, loss of **l** _____ 4 or death. **C** _____ 5, hair, jewellery, cleaning brushes can be easily entangled. Entanglements can be controlled by using guards and placing adequate **w** _____ 6 signs.



Working in the Galley

Working in the **g** _____ 1 can be challenging because of various reasons. For instance, the rolling and pitching of the ship may cause burns, **c** _____ 2, and other injuries because of hot oil, **s** _____ 3 tools and machines in the galley. It is important to wear safety **s** _____ 4 and keep the floors clean in order to prevent **s** _____ 5.

B Look at the cartoons below and talk about the possible **reasons of the accidents** with your partner.

not wearing personal protective equipment / working aloft / slippery decks
poor housekeeping / not maintaining personal protective equipment
not following procedures / working in confined spaces / lack of training



e.g., In picture A, the crew member enters in a confined space without measuring the atmosphere for oxygen and gas content; so, he probably faints because of asphyxiation. Not following the procedures is the main reason of this accident.



IV Vocabulary

A Solve the puzzle about **human body parts** and find the hidden sentence.

1

2

3

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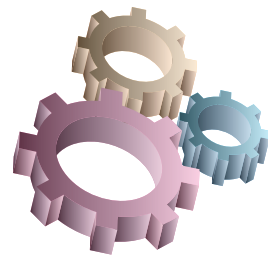
18

19

20

Grid letters: P, V, T, T, O, T

Hidden sentence: _____



B Draw a line to form the name of PPE and write them under the pictures.

- | | | | |
|-------------------|---------------------|---------------|----------|
| 1 walkie- | net | 6 safety | mask |
| 2 hair | clothing | 7 chemical | clothing |
| 3 high-visibility | talkie | 8 ear | harness |
| 4 self-contained | shield | 9 face | suit |
| 5 welding | breathing apparatus | 10 protective | plug |

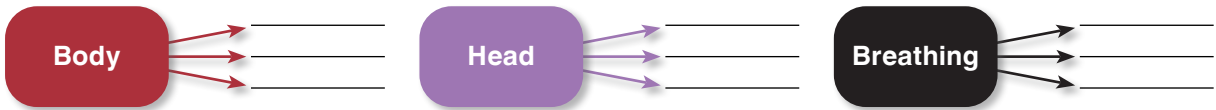


C Fill in the blanks with the correct PPE. Use plural forms if necessary.

safety helmet / goggles / safety shoes / earmuffs / ear plugs / gloves
 safety harness / face mask / protective clothing / respirator / chemical suit

- Without _____, crew members may be exposed to hot oil, welding sparks and other substances that can cause damage on their body.
- _____ are important because they can protect the head against external impacts.
- _____ protect seafarers' feet during their work on board.
- _____ are useful in protecting eyes against chemicals, dust, welding sparks and other external hazards.
- _____ must be worn on hands to protect the skin from exposure to chemicals, infectious substances, heat, cold and cutting objects.
- _____ and _____ protect ears from high levels of machinery sounds.
- _____ are vital for preventing the falls of crew members and other maintenance workers who work aloft.
- _____ are worn to avoid inhaling harmful particles during works such as painting and cleaning.
- Wearing a _____ protects your body from hazardous chemicals.
- _____ are worn over the nose and mouth to allow somebody to breathe in a place where there is a lot of smoke, gas, etc.

D Write three appropriate PPE.



V Reading and Writing

A Read the paragraph and answer the questions.

BASIC SAFETY PRINCIPLES

Safety must be the priority when transporting cargo and/or passengers by sea since it might involve various risks for accidents. In particular, accidents and injuries resulted from human error are frequently encountered on board or at the ports. Not following safety procedures, not wearing PPE as instructed, lack of training and competence of the crew, poor maintenance and housekeeping are among the reasons for the work-related accidents. One or more of these reasons can lead to an accident that results in injuries or death of the crew.

To carry out safe operations some basic actions mustn't be skipped. Following safety procedures precisely, wearing personal protective equipment as instructed, continuous training of crew members and frequent safety meetings for updating their knowledge, tidying and cleaning workplaces well, maintaining the equipment regularly are among the precautions that have to be taken for safe working on board. If these actions are taken as required, accidents can be prevented to a great extent. The principle for every seafarer must be "Safety first, prevent the worst".

- 1 Why are safety precautions important in maritime industry?

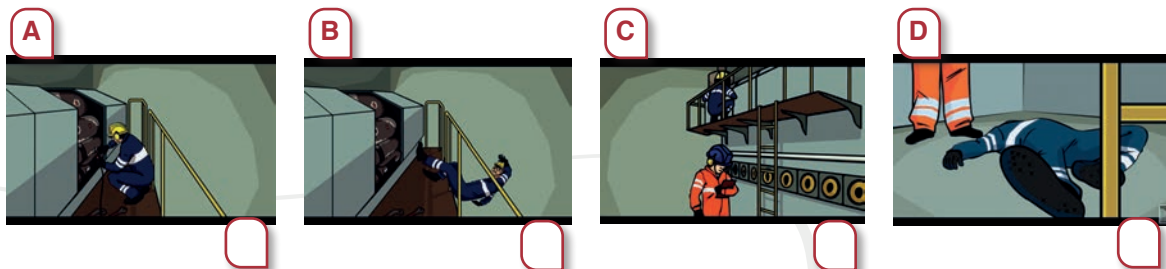
- 2 What are the causes for the injuries or deaths during the operations?

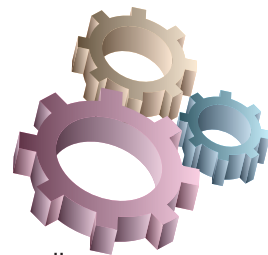
- 3 What kind of actions can be taken to prevent work-related accidents on board or at the ports?

- 4 What should be the slogan of the crew or the personnel involved in maritime work?

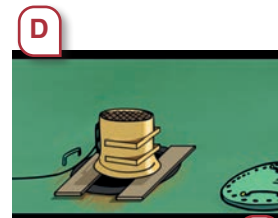
B Read the paragraphs below and order the pictures according to the incidents.

- 1 The second engineer and the oiler were repairing a diesel generator. While the engineer was using compressed air to clean dust and dirt, he leaned back to protect his face. The railings behind him were not firm enough to protect him. So, he lost his balance and fell from the platform onto the floor. He broke his collarbone.





- 2 For periodical maintenance of a confined space, the chief officer and the bosun put a small **ventilation** fan over the opening. Then, the chief officer completed the permit-to-work in his office, and went down. After the chief officer reached the bottom of the confined space, he did not answer to the bosun's calls on walkie-talkie. When the bosun tried to help and reached the bottom, he also became **dizzy** and fell. Although the bosun was saved, the chief officer lost his life.



- 3 During the maintenance of the steam valves, the chief engineer noticed a steam **leakage**. He told the second and the third engineers to stop the **boiler** system. He thought the boiler operation was stopped and removed the **valve** bonnet. High pressure steam and hot water splashed around and caused serious burns to the engineers' face and body.



- C Put the words into correct order to form titles for the paragraphs in Exercise B and match them with the paragraphs.

- a fatality / confined / space / chief / of / officer _____
 b to / burn / engineer / chief / injury _____
 c from / second / falling / platform / engineer / generator _____

- D Match the definitions with the highlighted words in Exercise B.

- 1 _____: liquid or gas escaping through a hole in something
 2 _____: the movement of fresh air around a closed space
 3 _____: a machine that produces electricity
 4 _____: fence or barrier generally made of iron sticks
 5 _____: the part of a steam engine where water is heated to provide power
 6 _____: a device that controls the passage of fluid or air through a pipe
 7 _____: air under pressure greater than that of the atmosphere
 8 _____: feeling as if everything is turning around

E Circle the correct form of the words in bold.

- 1 Being exposed to high level noises too long may cause **hear/hearing** disorders.
- 2 **Generator/Generate** is known as the heart of the ship since they supply the necessary power.
- 3 There are a lot of **warning/warn** signs on a ship to warn the crew against dangers.
- 4 Working aloft may lead to **dizzy/dizziness** for some of the crew members.
- 5 Make sure that the confined space is **ventilation/ventilated** before entering.
- 6 The second engineer is carrying out routine **maintain/maintenance** of the auxiliary engine.

F Here are some lessons that can be learned from the accidents in Exercise B on Pages 66 and 67. Write them under the correct category.

- 1 All confined spaces must be thought to be dangerous.
- 2 Crew must identify and record every measure about steam and hot fluid systems.
- 3 Never assist a casualty alone. Always raise the alarm and perform a team rescue drill beforehand.
- 4 Suitable personal protective equipment such as safety harness and mask must be worn while performing the task.
- 5 Crew must be familiar with operations and maintenance procedures when working with heated machine systems.
- 6 Middle railings are important for platforms in height.

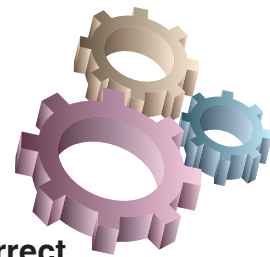
confined spaces	maintenance of heated machine system	repairment of generator platform
<ul style="list-style-type: none"> • Follow the shipboard procedures for Confined Spaces Entry. 	<ul style="list-style-type: none"> • Crew must ensure that valves on each side of the work are properly closed, locked and labelled to prevent mistakes. 	<ul style="list-style-type: none"> • Seafarers should take into account the necessity of working aloft when a ship is rolling and pitching in a seaway.
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •

G Think about what other lessons could be learned from the accidents and write them.

1 _____

2 _____

3 _____



H Study the first part of **permit-to-work form** below, and write the correct information to complete it.

Responsible Officer	Location	Description of the Work
Date	Personnel Details	Hours

CONFINED SPACE ENTRY PERMIT		
1 _____ :	Tank check	
2 _____ :	Water ballast tank Starboard 3	
3 _____ :	C/O and A/B	
Permit Validity :	5 _____ : 04.12.2021	6 _____ : 1500 LT/1600LT
4 _____ :	C/O	

I Complete the second part of the form with the given words in the box below.

responsible	assesment	communication	PPE	insulated
ventilated	lighting	condition	rescue	gas content

REQUIREMENTS	Checked
Has the atmosphere and _____ 1 been tested and found safe?	YES
Has the confined space been _____ 2 adequately?	YES
Are the _____ 3 and recovery equipment ready in place?	YES
Is the safety standby person ready in place?	YES
Is the _____ 4 adequate?	YES
Has the appropriate _____ 5 been worn?	YES
Has the breathing apparatus been checked, and it is in good _____ 6?	YES
Is the personnel familiar with the breathing apparatus?	YES
Is the _____ 7 officer ready in the entrance?	YES
Has the _____ 8 of the personnel with the outside been arranged?	YES
Has the confined space been _____ 9 from the electricity?	N/A (No electricity)
Has the risk _____ 10 been completed?	YES
* A copy of this form must be kept on the ship for supervisions.	
Responsible Officer	Master



3B MARINE ACCIDENTS AND EMERGENCIES



I Speaking

Discuss the following questions with your friends.

- 1 What can be the emergency situations on board?
- 2 Do you know the marine accidents and life-saving appliances used in these accidents?
- 3 What kind of signs can you see on a vessel?



II Reading

A Match the collocations with their definitions.

emergency escape routes	emergency drills	muster station	muster list
life-saving appliances	emergency signs	distress signals	first aid

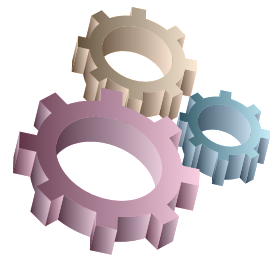
- 1 _____: equipment used to save someone's life in case of an accident
- 2 _____: signals sent from a vessel in emergency
- 3 _____: planned ways for safe evacuation of crew and passengers
- 4 _____: a gathering place for crew and passengers; assembly station
- 5 _____: practices of procedures applied in case of an emergency
- 6 _____: signs on a vessel that guide you in emergency situations
- 7 _____: a basic urgent care applied to an injured person
- 8 _____: a duty list for crew members to fulfil in an emergency

B Use the phrases below to complete the sentences in the text.

- 1 be applied immediately in case of an accident
- 2 to apply first aid and use fire-fighting equipment
- 3 fire, flooding, grounding, collision, serious injuries, loss of life and environmental hazards
- 4 the locations of life-saving appliances (LSA) and fire-fighting equipment (FFE) on board
- 5 when it is necessary

EMERGENCY ON BOARD

Bad weather conditions, machinery malfunction, human error or piracy may cause emergencies on board. These incidents can lead to _____ **A**.
Emergency procedures and first aid must _____ **B**.
Distress signals and messages must be sent _____ **C**.
Each crew member must know the emergency escape routes, the shortest ways to the nearest muster station, _____ **D**. They must also understand standard safety, warning and emergency signs and learn their assigned duties on the muster list. All crew members must know how _____
_____ **E**. For this reason, the crew must have the necessary training, attend regular safety meetings and take place in emergency drills regularly.

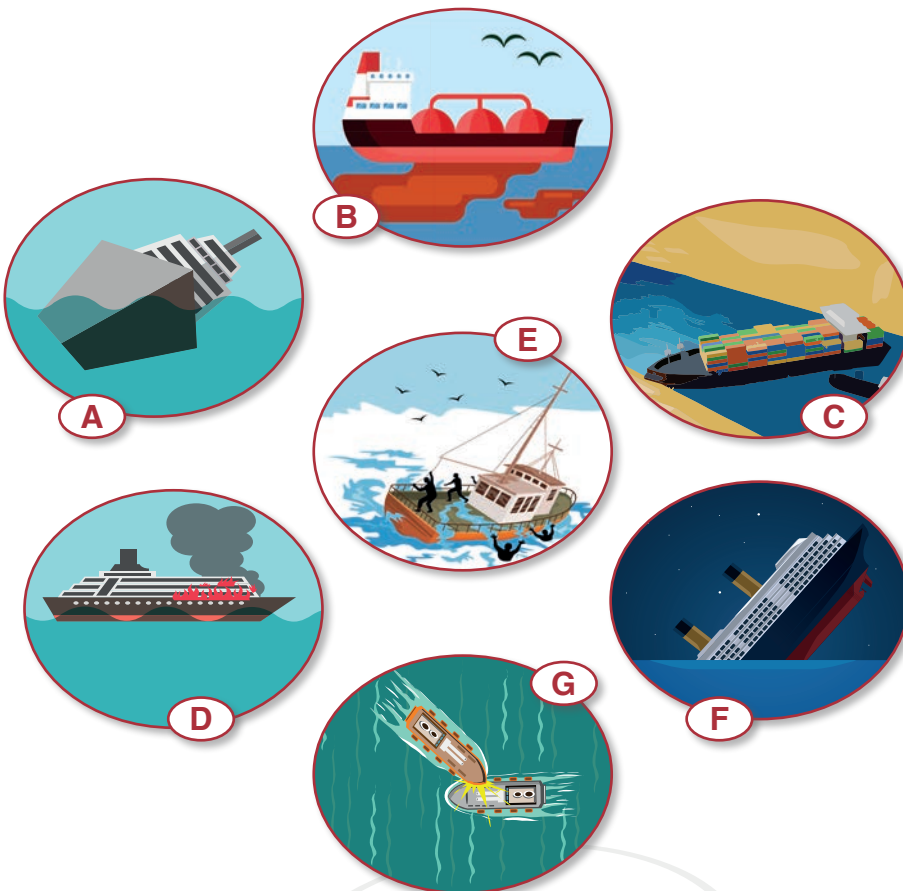


C Match the two halves of the sentences defining marine accidents.

- 1 Collision is the impact of two vessels ____
- 2 Listing is the leaning of a vessel to one side ____
- 3 Grounding is the impact of a vessel's bottom ____
- 4 Fire on board is burning of ____
- 5 Sinking is flooding of a vessel ____
- 6 Oil spill is oil leakage from the vessel's tanks ____
- 7 Man overboard is falling of a person ____

- a that causes marine pollution.
- b to the seabed or a shallow rock.
- c over one side of a vessel into the water.
- d that ends in going down to the sea bottom.
- e a vessel's surface or equipment.
- f that ends in damage.
- g because of unstable cargo stowage, bad weather conditions or collision.

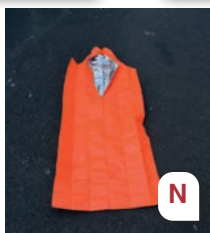
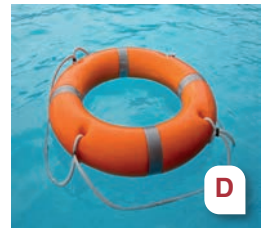
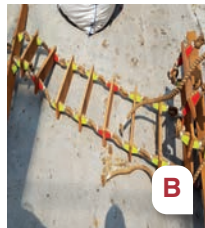
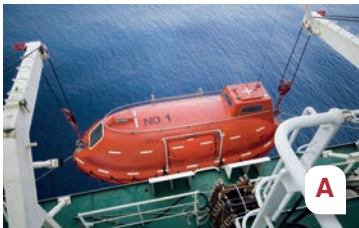
D Match the marine accidents with their pictures.

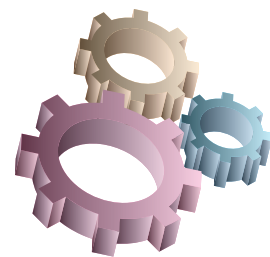


- 1 oil spill ____
- 2 sinking ____
- 3 grounding ____
- 4 listing ____
- 5 man overboard ____
- 6 collision ____
- 7 fire on board ____

E Match the life-saving appliances with their pictures.

- | | |
|---|---|
| <input type="checkbox"/> inflatable life jacket | <input type="checkbox"/> liferaft |
| <input type="checkbox"/> search and rescue radar transponder (SART) | <input type="checkbox"/> life jacket |
| <input type="checkbox"/> buoyant smoke signal | <input type="checkbox"/> lifeboat |
| <input type="checkbox"/> thermal protective aid (TPA) | <input type="checkbox"/> lifebuoy |
| <input type="checkbox"/> GMDSS handheld VHF radio | <input type="checkbox"/> first aid kit |
| <input type="checkbox"/> embarkation ladder | <input type="checkbox"/> rescue boat |
| <input type="checkbox"/> free-fall lifeboat | <input type="checkbox"/> immersion suit |
| <input type="checkbox"/> emergency position indicating radio beacon (EPIRB) | |





F Write the correct **life-saving appliance** from Exercise E next to its usage.

LIFE SAVING APPLIANCE:	HOW AND WHY IT IS USED:
1 <i>Lifeboat/Liferaft</i>	to abandon the vessel when emergency evacuation is necessary
2 _____	to get on and off board
3 _____	to detect radar signals from rescue ships and reflect back signals to them
4 _____	to float in water in case we cannot swim
5 _____	to take person overboard and board the ship
6 _____	to send a distress signal to the shore
7 _____	to locate survival crafts in daylight
8 _____	is thrown to help a man overboard immediately
9 _____	is filled with CO ₂ to float when we pull the cord on it
10 _____	to communicate on survival crafts
11 _____	to protect our body in cold waters
12 _____	slides out from a ramp on board into the water
13 _____	to keep the injured warm after an accident
14 _____	to help the injured immediately

G Complete the actions taken in case of a marine accident with the given words.

valves	lights	shipboard	seawater	lifebuoy	kit
rescue	pump	manoeuvre	connection	spill	circuit
check	leakage	stop	damages	seabed	bottom

FIRE	<ul style="list-style-type: none"> Shut down the electrical _____ 1 of the area. Close all fire dampers, fuel pumps and fuel _____ 2. Attach International Shore Connection 3 properly.
OIL SPILL	<ul style="list-style-type: none"> Close the valves and stop the _____ 4. Bring oil spill _____ 5 immediately. Contain and clean up the _____ 6.
COLLISION	<ul style="list-style-type: none"> Activate 'Not under command' shape and _____ 7. _____ 8 the stability of the vessel. Record the identification of the vessels, _____ 9 and other details.
GROUNDING	<ul style="list-style-type: none"> Sound the water depths from various sides of the _____ 10. Detect where the _____ 11 of the ship touches the seabed. Check the nature of the _____ 12.
FLOODING	<ul style="list-style-type: none"> Detect the source of the _____ 13 entrance. _____ 14 the seawater entering to the ship. _____ 15 out seawater from the ship.
MAN OVERBOARD	<ul style="list-style-type: none"> Throw a _____ 16 with a light and smoke marker. Lower down a _____ 17 boat. Start a Williamson turn _____ 18 considering the casualty's side.





III Vocabulary

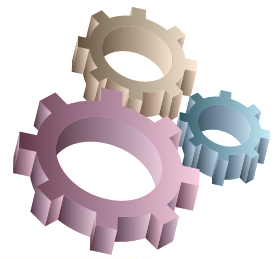
A Match the words and make collocations.

- 1 lifted ____
- 2 emergency ____
- 3 protective ____
- 4 distress ____
- 5 unauthorised ____
- 6 muster ____
- 7 survival ____
- 8 environmental ____
- 9 radio ____
- 10 breathing ____

- a craft
- b entry
- c exit
- d hazard
- e load
- f device
- g clothing
- h beacon
- i signal
- j station

B Use the collocations from Exercise A to complete the sentences.

- 1 They couldn't rescue the ship from sinking because the _____ wasn't sent.
- 2 _____ into the engine room is forbidden, so everyone cannot go in there freely.
- 3 The firefighter put his _____ on in order not to suffocate because of the smoke.
- 4 The _____ was locked so people couldn't escape from the building.
- 5 The worker wasn't wearing a _____, so he got burned at the fire.
- 6 The _____ was too heavy so the lines broke off during the discharging operation.
- 7 The survivors were located by following the _____ sent from their lifeboat.
- 8 There must be first aid kit in every _____.
- 9 If a tanker collides with another vessel, it may cause a/an _____.
- 10 The passengers gathered in the _____ after the collision.



C Write numbers of signs next to their meanings.

- | | | | |
|---|--|--|---------------------------------------|
| <input type="checkbox"/> no unauthorised entry | <input type="checkbox"/> wear safety harness | <input type="checkbox"/> muster station | <input type="checkbox"/> fire blanket |
| <input type="checkbox"/> line throwing appliance | <input type="checkbox"/> hot work prohibited | <input type="checkbox"/> fire extinguisher | <input type="checkbox"/> no smoking |
| <input type="checkbox"/> wear protective clothing | <input type="checkbox"/> wear welding shield | <input type="checkbox"/> explosion hazard | <input type="checkbox"/> lifeboat |
| <input type="checkbox"/> rocket parachute flare | <input type="checkbox"/> fire alarm call point | <input type="checkbox"/> emergency exit | <input type="checkbox"/> first aid |
| <input type="checkbox"/> survival craft distress signal | <input type="checkbox"/> slippery surface | <input type="checkbox"/> fire hose reel | <input type="checkbox"/> 10 EPIRB |
| <input type="checkbox"/> environmental hazard | <input type="checkbox"/> lifted load hazard | <input type="checkbox"/> stretcher | <input type="checkbox"/> 16 SART |
| <input type="checkbox"/> emergency escape breathing device (EEBD) | | | |



D Write the numbers of signs from Exercise C in the sentences below.

- a** _____, _____ and _____ show that something is prohibited.
b _____, _____, _____ and _____ warn us about a danger.
c _____ and _____ show the places of pyrotechnic equipment.
d _____, _____ and _____ show where we can find personal protective equipment.
e _____, _____, _____ and _____ show the places of fire-fighting equipment.



E Complete the words and match them with the elements in the fire triangle.

- a C _ M B _ ST _ BL _
 b _ X Y G _ N
 c H _ _ T



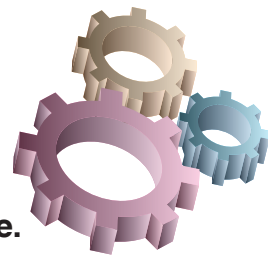
F Complete fire prevention measures on board with the given words.

loading	room	extinguishing	forbidden
leakages	drills	equipment	pipes

- Don't leave oil-**soaked** rags around, especially in the engine _____ 1.
- Detect fuel oil, lubricating oil, **exhaust gas** and steam _____ 2.
- Check and maintain the _____ 3 for leakage.
- Keep electrical _____ 4 maintained.
- Never smoke in _____ 5 areas and **dispose of** tobacco products properly.
- Take necessary precautions during _____ 6 and discharging of **combustible** cargo.
- Check the fire **detectors** (flame, smoke, heat), fixed fire _____ 7 systems (CO₂, foam, dry powder, sprinkler) and fire-fighting equipment regularly.
- Attend safety meetings and practice fire _____ 8 at least once a month.

G Match the highlighted words with their synonyms.

- 1 extremely wet _____
 2 flammable _____
 3 sensors _____
 4 waste gas _____
 5 get rid of _____



H Circle the correct verb to complete the actions taken in case of fire.

- 1 **Sound/Open** the fire alarm.
- 2 **Call out/Inform** the bridge team.
- 3 **Collect/Muster** the fire team.
- 4 **Isolate/Put out** the fire by closing ventilation system, skylights, doors, etc.
- 5 **Do/Apply** boundary cooling.
- 6 **Try on/Wear** a fire fighter's suit and breathing apparatus before entering the fire area.
- 7 **Use/Open** the appropriate fire extinguisher according to the type of the fire.

I Match fire-fighting equipment (FFE) with their pictures.

fire extinguisher _____ fire hydrant _____ fire blanket _____
 firefighter's outfit _____ fire alarm button _____ fire hose _____
 fixed CO₂ fire extinguishing system _____
 emergency escape breathing device (EEBD) _____



J Write the names of the FFE from Exercise I.

- 1 We wear a/an _____ to provide us 10-15 minutes oxygen where it is dangerous to inhale the smoke, gas or fumes while escaping.
- 2 A/An _____ eases to extinguish fires by releasing CO₂ into the air to reduce oxygen level.
- 3 We warn the crew and passengers about a fire by activating the _____ to sound the alarm.
- 4 We use a/an _____ to transfer water from the hydrant to the fire area.
- 5 We use a/an _____ to spray water, foam, dry chemical powder or CO₂ on the flames.
- 6 We release water from _____ via a valve and a hose connection.
- 7 A/An _____ is made of non-flammable cloth, to block oxygen and stop small fires in the galley.
- 8 A/An _____ protect the firefighter's body from the flames.



IV Listening and Speaking



41293

A Listen and write the missing parts of the urgency and distress calls from the vessels. Then practice with your partner.

- | | |
|--|--|
| a What is the state of the injured person? | f Report injured persons. |
| b I require fire-fighting assistance. | g Fire on board. |
| c There is massive bleeding. | h I require medical assistance. |
| d Is fire under control? | i Where is the fire? |
| e I will send a helicopter with a doctor to pick up the injured person. | j Fire-fighting tugs will reach you within ten minutes. |

DIALOGUE 1

M/V FAREND: MAYDAY MAYDAY MAYDAY. This is M/V FAREND TCA18 (one eight). Position FOUR ONE DEGREES THREE FIVE MINUTES NORTH- ZERO ONE EIGHT DEGREES ZERO SIX MINUTES EAST (41° 35' N-018° 06' E).

_____ **1** Over.

Turk radio: M/V FAREND. This is Turk Radio. _____ **2** Over.

M/V FAREND: Turk radio. This is M/V FAREND. Fire is in the accommodation. Over.

Turk radio: M/V FAREND. This is Turk Radio. _____ **3** Over.

M/V FAREND: Turk radio. This is M/V FAREND. No, fire is not under control.

_____ **4** Over.

Turk radio: M/V FAREND. This is Turk Radio. _____ **5** Over.

M/V FAREND: Turk radio. This is M/V FAREND. No injured persons. Over.

Turk radio: M/V FAREND. This is Turk Radio. Two fire-fighting tugs are coming to your assistance. _____ **6** Over.

DIALOGUE 2

M/V FELIXIN: PAN-PAN PAN-PAN PAN-PAN. ALL STATIONS. ALL STATIONS. ALL STATIONS.

This is M/V FELIXIN. Position FOUR ONE DEGREES THREE ZERO MINUTES NORTH- ZERO TWO NINE DEGREES ONE EIGHT MINUTES EAST (41° 30' N-029° 18' E). I have one injured person on board. _____

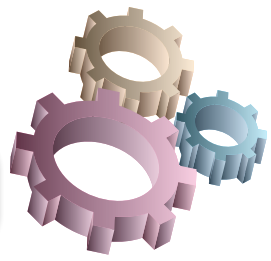
_____ **7** Over.

Turk radio: M/V FELIXIN. This is Turk radio. _____ **8** Over.

M/V FELIXIN: Turk radio. This is M/V FELIXIN. He has serious injuries. _____

_____ **9** We cannot stop bleeding. Over.

Turk radio: M/V FELIXIN. This is Turk radio. _____ **10** Over.



41294

B Listen to the dialogue and circle the correct option.

- 1 The third officer and the cadet are checking the **pyrotechnic/fire-fighting** equipment.
- 2 They need to look at the **bridge deck/navigation bridge**.
- 3 The cadet will report the numbers and **expiration dates/purchase dates** of the equipment.
- 4 There are six **hand flares/rocket parachute flares**.
- 5 The equipment won't be useful after two **weeks/months**.
- 6 They will add the necessary equipment to the **check list/requisition list** next month.



41295

C Listen to the announcement and fill in the blanks.

All crew members and passengers, attention please! This is your _____ **1** speaking. This is not a _____ **2**. (x3 times) Ship will be _____ **3**. (x3 times) All crew members and passengers must wear life jackets, take _____ **4** suits and go to _____ **5** stations. All passengers must _____ **6** the given orders. Keep calm. There is no reason to panic.



V Writing and Speaking

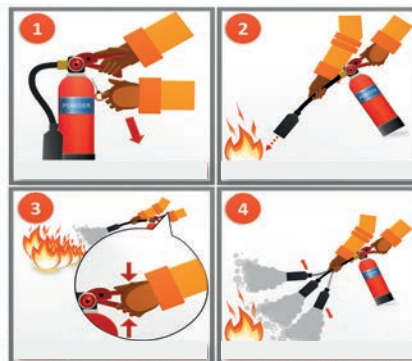
A Match the words with their meanings.

sweep	nozzle	base	aim	handle	squeeze
-------	--------	------	-----	--------	---------

- 1 _____: to point or direct an object toward someone or something
- 2 _____: a part of an object designed for holding, moving, or carrying it easily
- 3 _____: a narrow piece at to the end of a tube used to direct the liquid or air in a particular way
- 4 _____: to press something firmly from all sides in order to remove liquid from it
- 5 _____: to move in a particular direction, especially in a fast and powerful way
- 6 _____: the lowest part of something

B Complete the instructions of how to use a fire extinguisher by putting the words into correct order. Then practice the instructions.

- 1 the / pin / pull
P _____
- 2 nozzle / the / base / at / aim / fire / the / of
A _____
- 3 the / handle / squeeze
S _____
- 4 side / from / sweep / to / side
S _____



REMEMBER PASS WHEN USING A FIRE EXTINGUISHER!



C Study the table showing types of fires and fire extinguishers. Ask and answer about the usage of fire extinguishers as in the example.



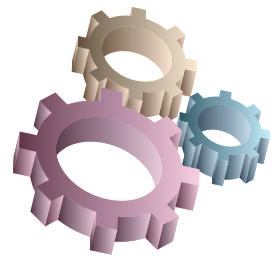
 A WOOD, PAPER, FABRICS, ETC.	✓	✓	✓	✓
 B FLAMMABLE LIQUIDS	✗	✓	✓	✓
 C FLAMMABLE GAS	✗	✓	✓	✗
 D METAL ALLOYS	✗	✓	✗	✗
 F COOKING OIL, FATS	✗	✓	✓	✗

e.g., Student A: What type of extinguishers do we use to put out type A fires?
 Student B: We use all kinds of fire extinguishers to put out type A fires.

1 _____
 2 _____
 3 _____
 4 _____

D Put the words into correct order to make meaningful commands and practise them. These command orders are taken from SMCP, Section B safety on board.

- 1 general / operate / alarm / the / emergency _____
- 2 place / first / provide / at / aid / safe / a _____
- 3 with / life jackets / take / you _____
- 4 assembly / all / to / members / stations / crew _____
- 5 report / the / check / escape / and / routes _____
- 6 alarm / overboard / sound / man _____



I Writing

A Read the sentences and fill in the gaps with the given words.

- 1 First _____ is the immediate care given to an injured person until s/he gets a full medical assistance.
- 2 First _____ is a person who is trained to give first aid.
- 3 First _____ is a small box including items such as bandages, plasters, and antiseptic wipes.

- aid kit
- aid
- aider

B The first thing about first aid is to know **first aid's ABC**. Read the definitions below and find out the words they stand for.



- 1 The area in the throat which enables inhaling and exhaling air. (**a-y-i-r-a-w**) _____
- 2 Taking air into your lungs and releasing it. (**e-t-a-h-r-i-n-g-b**) _____
- 3 The movement of blood around the body. (**u-c-i-c-a-r-i-t-l-o-n**) _____

C1 Complete the sentences with the following **instructions on first aid's ABC**.

- a unresponsive and breathing; put him/her in the **recovery position** by lying the casualty slightly to one side and facing the body downwards.
- b apply **head-tilt/chin-lift manoeuvre** by placing one hand on the forehead and use two fingers from the other hand to lift the chin.
- c **feel the breathing** by placing your ear above the casualty's mouth for 10 seconds and watch the chest movements.

- 1 First, be sure that airway is open and clear. To open the airway, _____
- 2 Second, control if the casualty is breathing regularly. You can _____
- 3 Finally, check the casualty's body for severe bleeding. If there is not, but s/he is _____

C2 Write the correct highlighted word from Exercise C1 under the pictures below.



1



2



3

D One of the basic steps of first aid is to understand the **consciousness level** of the casualty by using **AVPU** scale. Read the sentences and write them in the correct place in the chart.

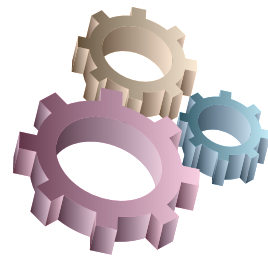
DEFINITIONS

- 1 The patient will only respond when his/her body or organs ache.
- 2 The patient can answer the first aider's questions.
- 3 The patient does not speak, react or move.
- 4 The patient is aware of the first aider and can follow what is happening around.

SITUATIONS

- a The second engineer was unconscious after falling down in the engine room. He did not move or speak.
- b Seriously injured donkeyman was not responding to voices but moving his body whenever the first aider strongly poked his shoulder.
- c The able seaman was responsive and watching around after the accident.
- d The master did not seem completely awake but reacting to the first aider's questions.

	Alert	Verbal	Pain	Unresponsive
Definition				
Situation				



II Vocabulary

A Complete the table with required forms of given words.



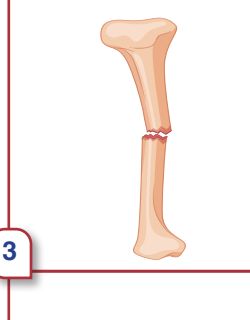
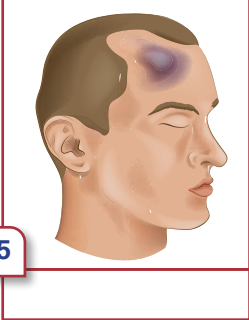
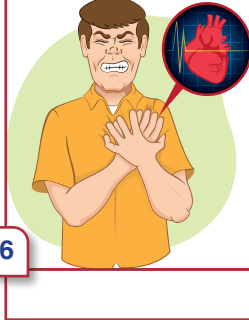

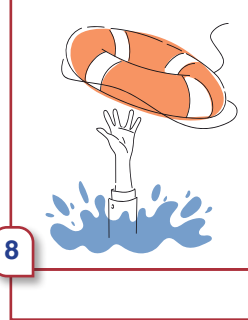
VERB / ADJECTIVE	NOUN	REQUIRED FORM
medicate	1 _____	noun
2 _____	recovery	verb
3 _____	pressure	verb
treat	4 _____	noun
5 _____	injury	adjective
drown	6 _____	noun
7 _____	resuscitation	verb
block	8 _____	noun
9 _____	circulation	adjective
weak	10 _____	noun

B Choose the correct word form from the table to complete the sentences.

- 1 The chief engineer is taking _____ for high blood pressure.
- 2 A life jacket or a lifebuoy can protect you from _____.
- 3 The 2/E will probably _____ from his burns after spending a few more weeks in hospital.
- 4 A person having a full airway _____ can be saved by carrying out Heimlich Manoeuvre.
- 5 The heart is the major organ of the _____ system.
- 6 The _____ crew member was safely evacuated to a hospital in Valencia.
- 7 Studies show that most people don't _____ the chest hard enough during CPR.
- 8 When the work finished, A/B felt a sudden _____ in her legs and couldn't walk for a while.

C Write the names of **injuries** or **medical emergencies** under the photos and match the numbers with their definitions.

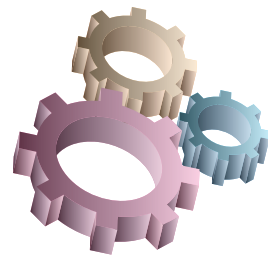
fracture	drowning	bruise	burn
asphyxiation	loss of limb	choking	cardiac arrest

1 	2 	3 	4 
5 	6 	7 	8 

- a _____ : a break in a bone
- b _____ : experiencing a **serious** difficulty in breathing because of inhaling water
- c _____ : a dark and **hurting** area on your skin that is caused by an injury
- d _____ : an injury or a scar caused by exposure to heat or flame
- e _____ : a sudden loss of heart function
- f _____ : the loss of a body part such as legs, arms, fingers
- g _____ : **inability** to breathe because of something that blocks the airway
- h _____ : poisoning caused by inhaling large quantities of **toxic** fumes

D Find the synonyms of the highlighted words from Exercise C.

- a poisonous _____
- b severe _____
- c painful _____
- d failure _____

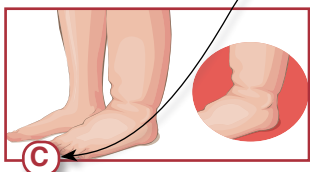


E Complete the sentences with the words or phrases related to first aid.

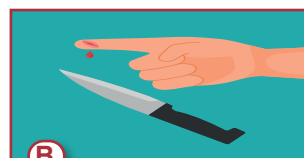
cardiopulmonary resuscitation (CPR)	Heimlich Manoeuvre	symptoms	shock
blister	blood pressure	wound	pulse

- 1 After the accident, the chief engineer put his fingers on the oiler's neck to understand if he had a _____.
- 2 Every seafarer must learn how to understand and treat the _____ of gas poisoning.
- 3 A _____ is a painful swelling on the skin that contains liquid.
- 4 _____ is a procedure used to help a choking person who is unconscious and unable to talk.
- 5 A person having a _____ may seem confused or look like they are staring at something that isn't there.
- 6 See a doctor if your _____ level is often higher than 130/80.
- 7 We must perform _____ if we can't get a pulse of the casualty.
- 8 _____ is a medical condition caused by severe injury, pain, bleeding, or fear that slows down the blood flow around the body.
- 9 You must apply pressure on the _____ to stop the bleeding.

F Unscramble the letters of injuries or symptoms and then draw lines to the correct pictures.



- 1 e-l-i-g-n-w-s-l
swelling
- 2 t-c-u
c
- 3 t-g-u-e-f-a-i
f
- 4 m-g-i-t-n-i-o-v
v
- 5 e-v-e-r-f
f
- 6 s-e-n-a-u-a
n
- 7 r-o-t-s-b-t-e-i-f
f
- 8 b-e-d-e-l-e-s-o-n
n



G Write the words from Exercise F on Page 85 next to their definitions.

- 1 _____: a medical condition in which body temperature is higher than normal
- 2 _____: a feeling of being extremely tired, usually because of hard work or exercise
- 3 _____: a part of your body that has become bigger because of illness or injury
- 4 _____: the feeling that you have when you want to vomit
- 5 _____: an injury on your skin caused by sharp objects
- 6 _____: bringing food from the stomach back out through the mouth
- 7 _____: a flow of blood that comes from the nose
- 8 _____: a medical condition in which parts of the body, especially the fingers and toes, become damaged as a result of extremely cold temperatures

H Match verbs and phrases to form collocations.

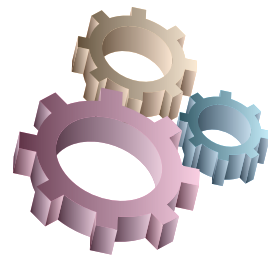
- | | |
|--------------|----------------------------|
| 1 make _____ | a someone's blood pressure |
| 2 have _____ | b a complete recovery |
| 3 take _____ | c an allergy to something |
| 4 give _____ | d advice to someone |

I Work in pairs. Write **body parts or **organs** that may be affected by the given medical emergency situations. You can use a body part or organ more than once.**

<p>Choking → <u>throat</u></p> <p>→ <u>lungs</u></p>	<p>Cut → _____</p> <p>→ _____</p>
<p>Fracture → _____</p> <p>→ _____</p>	<p>Cardiac Arrest → _____</p> <p>→ _____</p>
<p>Burn → _____</p> <p>→ _____</p>	<p>Asphyxiation → _____</p> <p>→ _____</p>

J Choose the correct form of the words in bold.

- 1 The cadet's pulse was weak, and his body was covered with **blood/bleeding**.
- 2 To check the **breathing/breathe** of the casualty is one of the first steps of first aid.
- 3 Crew members brought the **injury/injured** seaman to the hospital.
- 4 Young steward **broke/broken** his wrist while cleaning the galley.
- 5 An **explode/explosion** followed the accident that happened during the discharge.



III Speaking

Work in groups of three and discuss the following questions.

- What can be the most common injuries on board? Why?
- What qualities do you think a first aider must have?
- Why do you think carrying out first aid is important on board?



IV Listening and Writing

A Listen to the **first aid kit** content and put a tick on the left of the items you hear. Then, look at picture and write the number of the objects into the list.



41296

___ aspirin	<input type="checkbox"/>	___ plasters	<input type="checkbox"/>	___ tweezers	<input type="checkbox"/>
___ antiseptic wipes	<input type="checkbox"/>	___ first aid manual	<input type="checkbox"/>	___ medical gloves	<input type="checkbox"/>
___ antibiotic ointment	<input type="checkbox"/>	___ eye drops	<input type="checkbox"/>	___ adhesive tape	<input type="checkbox"/>
___ torch	<input type="checkbox"/>	___ scissors	<input type="checkbox"/>	___ thermometer	<input type="checkbox"/>
___ hydrocortisone cream	<input type="checkbox"/>	___ roller bandage	<input type="checkbox"/>	___ safety pins	<input type="checkbox"/>
___ gauze pads	<input type="checkbox"/>	___ triangular bandage	<input type="checkbox"/>	___ instant cold pack	<input type="checkbox"/>
___ foil blanket	<input type="checkbox"/>	___ medical mask	<input type="checkbox"/>		



B Complete the sentences with the correct first aid kit items from Exercise A.

- 1 _____ prevents swelling when applied to an injury.
- 2 Digital _____ are becoming more and more popular because it is easier to measure the temperature using them.
- 3 We only applied a _____ on his hand because the second engineer's cut was small.
- 4 _____ are necessary to keep in a first aid kit as they might be needed to cut bandages or gauzes.
- 5 _____ can be worn in order to prevent infection while touching the casualty.
- 6 The master's left shoulder was wrapped around with a _____ after his fall from the bulwark ladder.
- 7 The safest way to remove a sting or a tick is a clean pair of _____.
- 8 A/An _____ is used to prevent and treat minor skin infections caused by small cuts, scrapes, or burns.
- 9 The use of _____ helps the body retain its own heat by reflecting the heat from the body.
- 10 The aim of having _____ in a first aid kit is to secure wraps and bandages.



C Complete the conversation with the phrases in the box.

- Thank you very much
- I will immediately measure your blood pressure
- Are you OK?
- It is a bit high.
- I don't feel good.



2/O: Mr. Mitchell! _____ 1

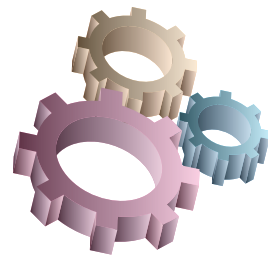
C/E: _____ 2. I have a pain in my chest.

2/O: All right. _____ 3. Can you feel your arms?

C/E: I feel a mild pain.

2/O: All right. I've checked your blood pressure. _____ 4. I'll loosen the collar of your vest.

C/E: _____ 5.



D Put the sentences in order to make a dialogue.

A

- a **Engine Cadet:** Ouch! It hurts.
- b **First Aider:** All right, let's stop the bleeding first.
- c **E/C:** It have cut it while working.
- d **FA:** No, not for the wound but we can clean around the wound with soap.
- e **E/C:** Do we need soap?
- f **FA:** What is the matter with you? Your hand is bleeding.
- g **E/C:** Thanks a lot.
- h **FA:** I see, we should press the wound with a gauze pad.
- i **FA:** The bleeding stopped. Now it's time to wash the wound.

B

- a **First Aider 1:** We should watch his pulse and breathing. If he is unresponsive, we should carry out CPR.
- b **First Aider 2:** The chief officer fell overboard. He might have hypothermia.
- c **FA 1:** You are right, a warm drink can be useful later.
- d **FA 2:** I hope it won't be necessary.
- e **FA 1:** OK, Let's remove wet clothes first. Bring a blanket or something dry to wear.
- f **FA 2:** All right, it is not good to warm him too quickly as far as I know.
- g **FA 1:** What's the problem?
- h **FA 2:** Do we need to do anything else for now?

E Listen to the recordings and choose the correct option.



41297

IN CASE OF A BLEEDING

1 Apply direct pressure to the wound only with your palms.	✓	✗
2 Keep pressing for 5 minutes.	✓	✗
3 If bleeding is from the arm or leg, raise the limb above the level of the heart.	✓	✗
4 Close and dress the wound when the bleeding has stopped.	✓	✗
5 Check the casualty's pulse and blood pressure.	✓	✗

IN CASE OF A FRACTURE

6 Check if the fracture is simple or compound.	✓	✗
7 Apply an ice pack to the injured area for 10 minutes.	✓	✗
8 Keep the injured part below the level of the heart.	✓	✗
9 Keep the casualty warm with a blanket or clothing to prevent shock.	✓	✗
10 If it is a major fracture, seek for medical assistance.	✓	✗

F Listen to the recordings again and fill in the blanks with the correct words.



41297

- 1 You should not stop **p** _____ on the wound during the first 10 minutes.
- 2 You should not **r** _____ a dressing if it is full of blood.
- 3 You should not use a **t** _____ or attempt to apply pressure to large arteries.
- 4 You should not **m** _____ the injured area.
- 5 You should not try to force a fracture or **d** _____ back into place.





V Reading and Writing

A Write the phrases into the correct places to complete the text.

- a you should perform the Heimlich Manoeuvre
- b cool it with ice packs in order to prevent or reduce swelling
- c you should get the casualty out to fresh air
- d CPR should be carried out
- e you can give the patient one aspirin tablet
- f the affected area should be **rinsed** with cool running water

Basic first aid treatments provided by seafarers may save lives or reduce the effects of injuries. Therefore, being familiar with these can be helpful when someone comes across a medical emergency.

In case of a minor burn, for example, _____

_____ **1** no

less than fifteen minutes. If blisters appear on the skin, do not **pop** or damage them. In a major burn, you can cover the area with a wet cloth or bandage after calling for the emergency medical service. Do not remove clothing if it sticks to the skin. Fracture is also one of the most common injuries on board. When a crew member has one, do not move the affected area but _____

_____ **2**. Asphyxiation (e.g., gas, smoke or chemical poisoning) is also an emergency situation. In such situations, _____ **3** as soon as possible.

As s/he may vomit, you had better turn the her/him head to the side to prevent choking.

When a crew member has a heart attack, call the medical assistance immetely. _____

_____ **4** and ask the casualty to **chew** it slowly. **Monitor** the casualty's level of response until emergency help arrives. If s/he becomes unresponsive at any point, _____

_____ **5**. You can carry out first aid to a choking person. There are two scenarios for choking. If there is a partial blockage in the casualty's airway, s/he should keep on coughing. If the person is unconscious, _____ **6**. Accidents

will always happen. It is essential to know how to act correctly in case of a medical emergency. If you perform the first aid right, you can make the difference between life and death.

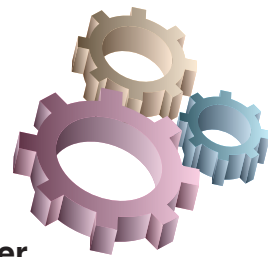


B Read the text again and choose the correct title.

Causes of Onboard Injuries

First Aid Basics

Qualities of a First Aider



C Write the correct highlighted word from Exercise A on Page 90 under the photos.



1



2



3



4

D Choose the correct answers according to the text.




- 1 How long should the burned area be rinsed?
 - a less than 15 minutes
 - b a few minutes
 - c It should not be rinsed.
 - d at least 15 minutes
- 2 When should CPR be carried out?
 - a When the casualty cannot speak but respond to the pain.
 - b When the airway is totally blocked with something.
 - c When the casualty is not breathing and has no pulse.
 - d When it is understood that the casualty is having a heart attack.
- 3 When is it correct to perform Heimlich Manoeuvre?
 - a When the casualty is unconscious because of a full airway blockage.
 - b When the casualty is coughing.
 - c When the casualty is holding his throat.
 - d When the casualty calls for help.
- 4 Which one is not among the possible first aid steps in case of asphyxiation?
 - a to seek emergency medical assistance
 - b to tilt the head back
 - c to arrange the casualty's position to prevent choking
 - d to move the casualty to an open space



Work in groups of four. Imagine an emergency scenario on board and present it to your class. Make sure your presentation includes these points:

- Write the details of your scenario including the place, crew members and the emergency situation.
- Take a role as a crew member, assign duties for each member and present them to your class including precautions, PPE and LSA you use for the scenario.
- Prepare a conversation about the first aid you apply to the casualty if there is a casualty in your scenario.

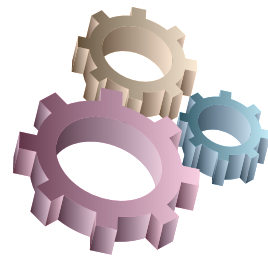
SELF ASSESSMENT 3

			
I can talk about the work risks on board.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can talk about PPE and the type of work they are used on board.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can talk about emergency situations and marine accidents on board.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can tell some of the emergency actions and basic emergency signs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can tell the names and usage of fire-fighting equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can talk about fire types and fire extinguishers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can tell the basics of first aid and the items in a first aid kit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can tell common injuries and medical emergencies on board.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REVISION 3

A Choose the correct option.

- _____ zone is the dangerous area during cargo-handling operations.
a Snap-back **b** Stand-back **c** Forbidden **d** Restricted
- The crew and the passengers gather at the _____ in case of an emergency.
a accommodations **b** deck **c** bridge **d** muster station
- When a marine accident occurs, you must send _____ signals and messages immediately.
a radio **b** safety **c** distress **d** communication



- 4 Emergency situations, precautions and their planning are considered at _____ meetings.
a safety **b** emergency **c** drill **d** training
- 5 In cold waters, you wear a/an _____ suit to keep your body warm.
a inflatable **b** immersion **c** thermal **d** protective
- 6 Which one is a pyrotechnic equipment?
a distress signal **b** urgency signal **c** warning signal **d** smoke signal
- 7 Stowing the cargo evenly and immobilising them can prevent _____.
a listing **b** sinking **c** grounding **d** collision
- 8 SART stands for search and rescue radar _____.
a transformer **b** transfer **c** transporter **d** transponder
- 9 We use _____ to put out all types of fires.
a foam **b** water **c** powder **d** CO₂
- 10 When you put out a fire, you have to wear a _____.
a immersion suit **b** protective clothing **c** chemical suit **d** fire fighter's outfit

B Pick the odd word out.

- 1 ear / eye / mouth / hand
- 2 overall / welding shield / protective clothing / safety harness
- 3 gloves / goggles / face mask / earmuffs
- 4 location / name of vessel / description of work / responsible officer
- 5 maintenance of equipment / personnel training / ignoring procedures / taking precautions



C Find the mistakes and replace them with correct words or phrases.

- 1 Consider all confined spaces as safe. _____
- 2 Stand back from snap-back-zone during cargo handling. _____
- 3 Working near running machinery has a low risk of entanglement. _____
- 4 Risk assessment must be done after starting the work. _____
- 5 Safety helmet protect seafarer's feet during their work on board. _____

D Find the numbers in the box and write the illnesses or symptoms.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
		26		16	24			2										14	6						

- 1 F I T I
24 10 2 1 6 2 1 12
- 2 I T I
20 21 9 2 6 2 1 12
- 3 C T
26 18 6
- 4 F T I E
24 10 6 2 12 18 16
- 5 T E I
15 22 25 21 6 15 16 7 9 2 10
- 6 F S T I T E
24 7 21 14 6 4 2 6 16
- 7 F E E
24 16 20 16 7
- 8 S E I
14 11 16 5 5 2 1 12
- 9 S E
1 10 18 14 16 10
- 10 S E E E
1 21 14 16 4 5 16 16 19

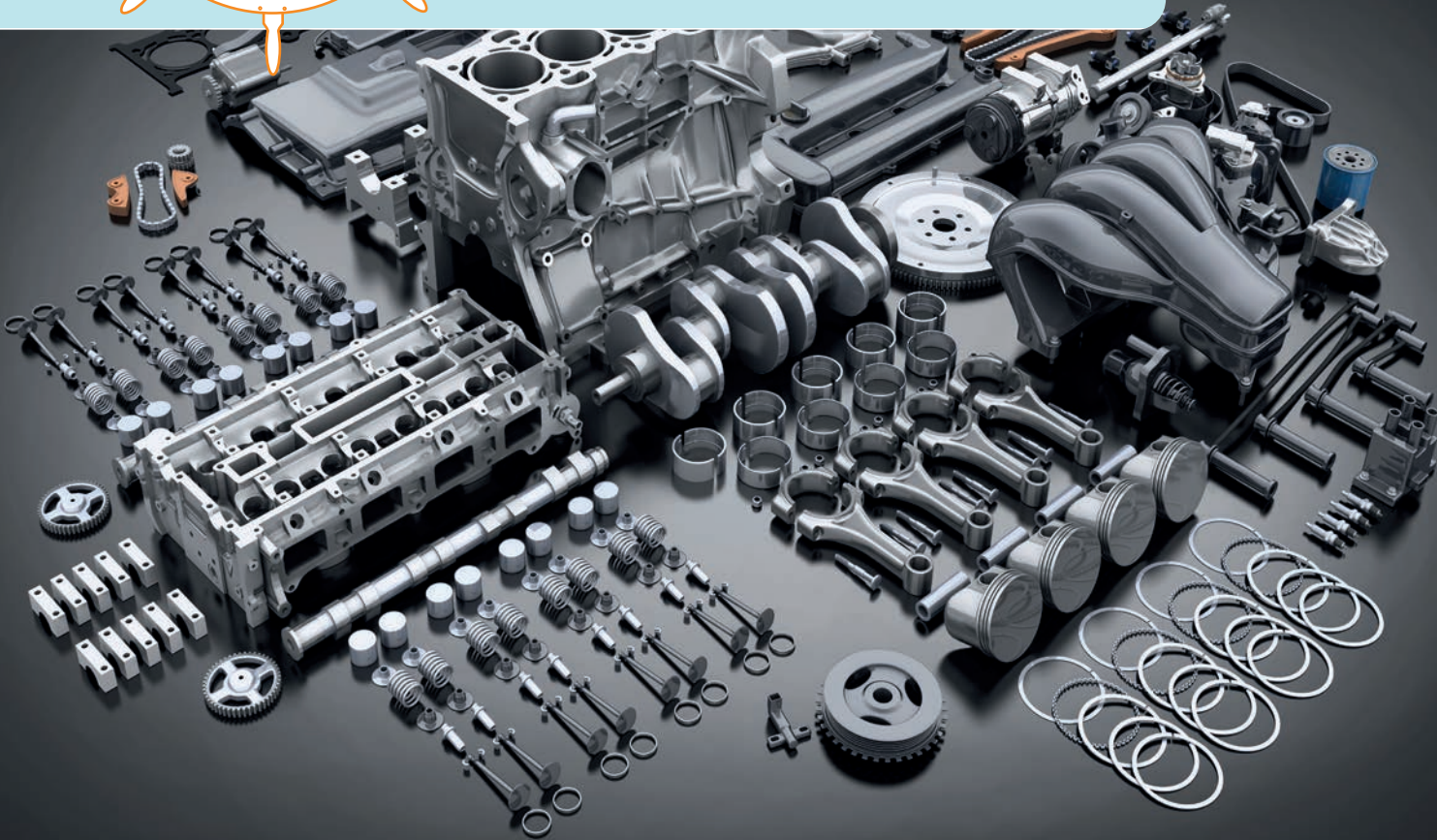
E Match the phrases with medical emergencies.

- 1 Apply ice pack _____
- 2 Rinse affected area with running cool water _____
- 3 Get casualty into fresh air _____
- 4 Perform CPR to unconscious person _____
- 5 Make him/her keep on coughing _____

- a asphyxiation
- b fracture
- c heart attack
- d choking
- e burn



INTRODUCTION TO MARINE ENGINEERING



- Learn basic terms related to stationary and moving parts of marine engines
- Describe the functions of stationary and moving parts of marine engines
- Talk about the places of stationary and moving parts of marine engines

STATIONARY AND MOVING PARTS OF AN ENGINE



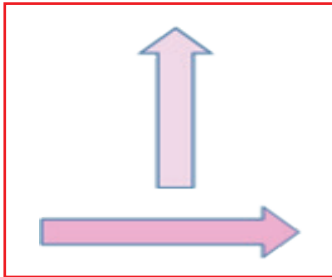
Vocabulary

A Match the words with the **types of motions**.

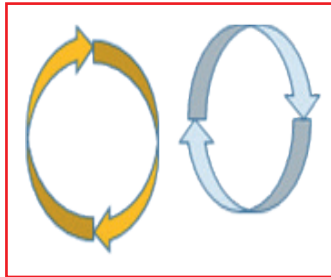
circular

reciprocating

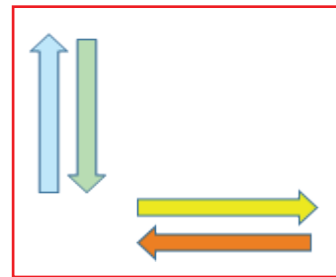
linear



1



2



3

B Match the words with their synonyms.

1 leakproof ____

2 layout ____

3 ignite ____

4 trigger ____

5 convert ____

6 contaminant ____

7 wear ____

8 intake ____

a activate

b pollutant

c inflame

d placement

e damage/corrosion

f leak tight

g taking in

h transform

C1 Use the given suffixes to form meaningful nouns and adjectives with the words from the box.

combust	extern	arrive	slide	emit	compress
press	reciprocate	move	depart	intern	temperate

1 arrival

2 _____ -al

3 _____

4 departure

5 _____ -ure

6 _____

7 emission

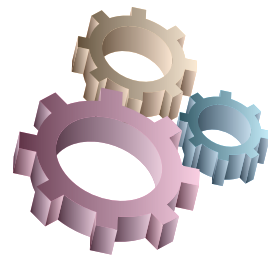
8 _____ -ion

9 _____

10 reciprocating

11 _____ -ing

12 _____



C2 Complete the sentences with the words in Exercise C1.

- 1 The _____ of the cargo ship was postponed due to the problems in cargo loading so the _____ will be later than planned.
- 2 Thermal energy is transmitted into mechanical energy by the _____ movement.
- 3 Environmentally friendly engines have low _____ rates of exhaust gases.
- 4 We must apply _____ on the cuts to stop bleeding immediately.
- 5 Both stationary and _____ parts of an engine play an important role in producing the propulsion power.
- 6 In an _____ combustion engine, the air is compressed to provide the necessary _____ and increase the temperature to produce energy.
- 7 Unexpected increase in air _____ in this area may cause harm to the harvest.
- 8 The _____ door of the galley was broken.
- 9 The _____ of the fuel produces the necessary energy to run machines.
- 10 _____ effects like seawater may give harm to the vessel.

D Match the two halves to form meaningful phrases.

- 1 reciprocating _____
- 2 external _____
- 3 internal _____
- 4 gas/liquid _____
- 5 scavenge _____
- 6 compression _____
- 7 air _____
- 8 combustion _____
- 9 exhaust _____

- a power
- b ports
- c impact
- d space
- e chamber
- f gases
- g movement
- h leakage
- i combustion

E Match the two halves of sentences defining the **stationary** and **moving parts** of a main engine.

- 1 A rod is a straight metal bar _____
- 2 A piston is one of the moving parts of the main engine _____
- 3 A gasket is a piece of soft material, like rubber, _____
- 4 A tappet is a kind of lever which is moved by another part of the engine, _____
- 5 A cylinder is the space _____

- a which is used to seal a junction to prevent leakage of any liquid or gas.
- b in which the piston of an engine travels.
- c and has a function in the transmission of the motion.
- d that is used connect two parts of something like an equipment or a machine.
- e which travels in the cylinder and produces mechanical energy from thermal energy.





II Listening



41298

A Listen to the definitions of stationary parts of a main engine and write their names.

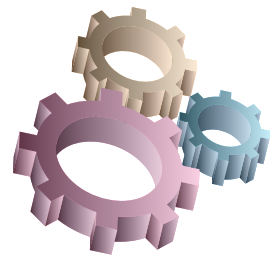
- 1 _____ is the main body of the internal combustion engine.
- 2 _____ is a kind of cover on the top of the cylinder.
- 3 _____ is the leakproof part placed between the cylinder head and the cylinder block.
- 4 _____ is a kind of inner wall of the cylinder block with a sliding surface in which piston moves. It has scavenge ports on it in two stroke engines.
- 5 _____ is the component which separates the crankcase and the scavenge air space and prevent leakage.
- 6 _____ is a part of the main body.
- 7 _____ is at the bottom of the engine.
- 8 _____ are the canals which let the air in, and out of the engine.
- 9 _____ is the middle part of the engine
- 10 _____ is the fixed structure on the frame, usually consisting of two vertical rails.

B Listen to the sentences telling the functions of the stationary parts of a main engine, and write the missing parts. Then, write the correct number to match them with the names of these parts in Exercise A.

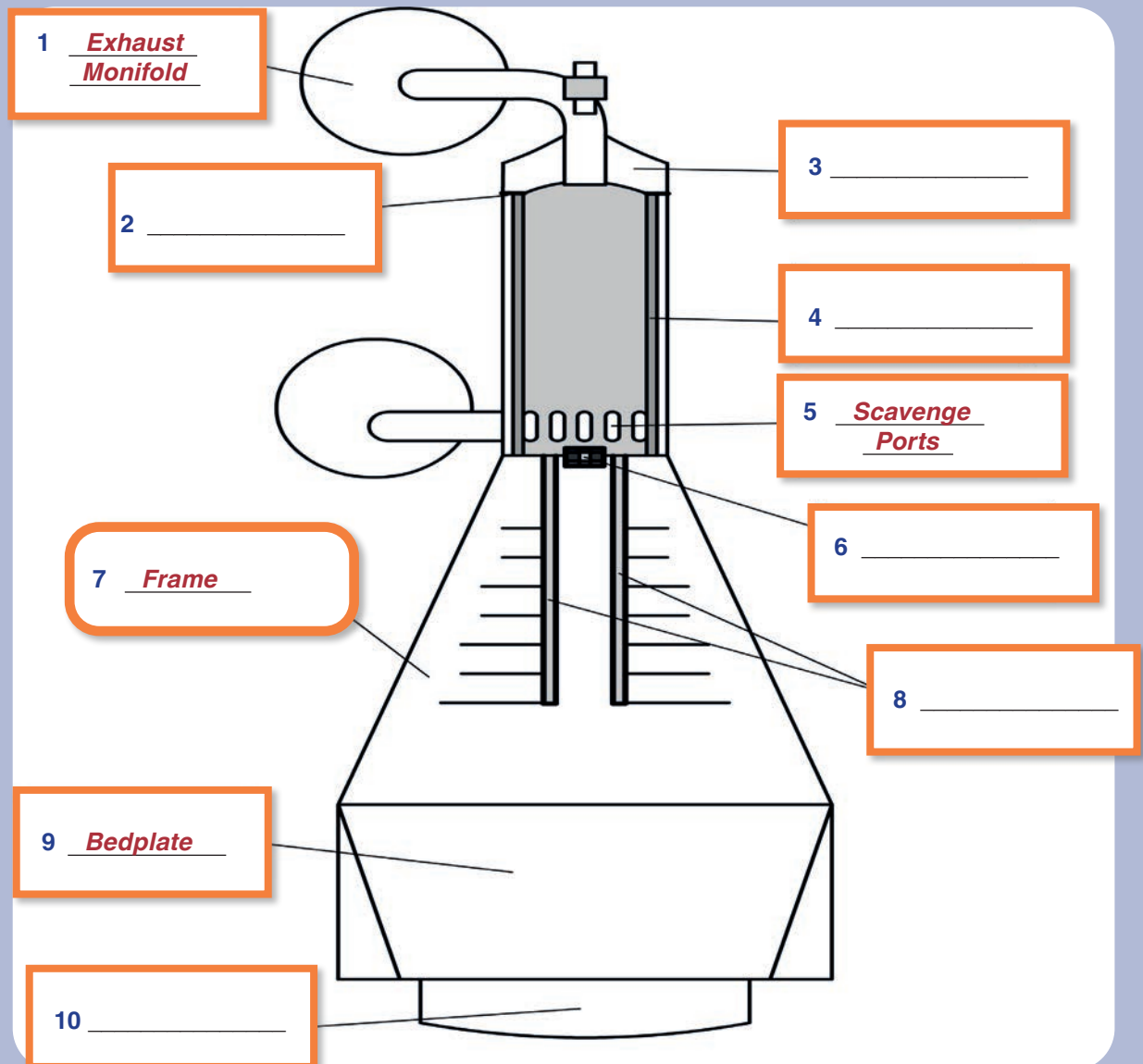


41299

- a It protects the crankshaft from _____.
- b It eases the _____ in the cylinder and reduces wear due to friction.
- c It holds all the _____ on it directly or indirectly.
- d 6 It holds the _____ in it.
- e They let the fresh air in, and _____ equally out.
- f It covers the cylinder and forms the _____ in the cylinder.
- g It helps the crosshead move in the _____, with a correct alignment.
- h It forms a seal between the cylinder head and the cylinder block and prevents gas or _____.
- i It prevents _____ steam from entering in the scavenge air space. Piston rod works in it.
- j 9 It supports the engine structure and holds _____ on it.



C Write the names of the **stationary parts of a two-stroke engine** in the picture below. Use the information you have learned in Exercise A and B on Page 98.





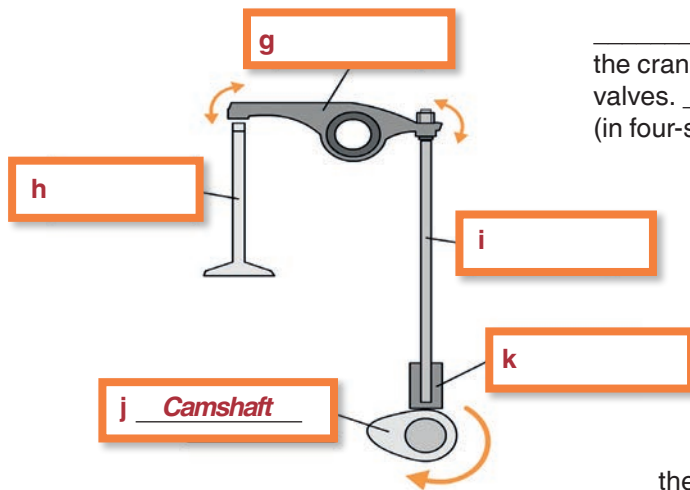
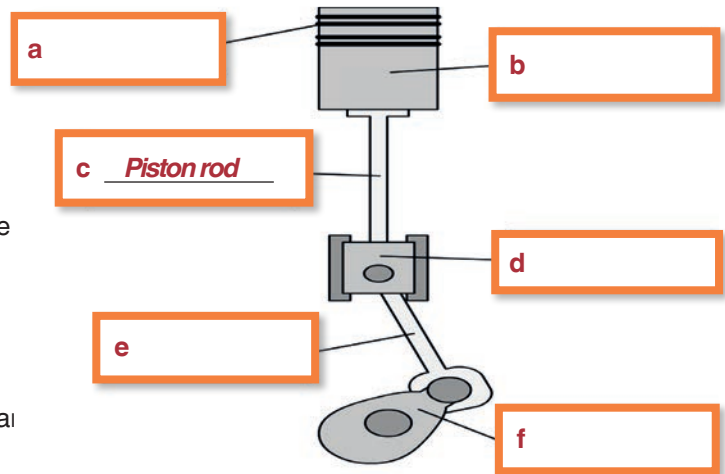
41300

D1 Listen and complete the text about moving parts of a two-stroke engine with the words or phrases in the box. Then, write them in the correct place on the pictures.

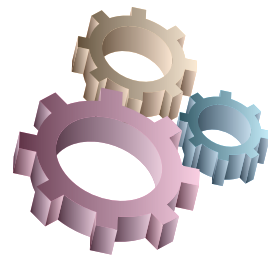
crosshead	camshaft	push rod	valves	crankshaft	connecting rod
piston rings	piston	rocker arm	piston rod	tappet	rod

Moving engine parts are circular or linear moving parts of an engine. The interaction between these parts enables power transmission within the main engine. _____ 1 is the linear moving part of a main engine by which the interaction between the moving parts is triggered. It transforms the thermal energy into mechanical energy. _____ 2 are leakproof components on the piston, which prevent leakage of air during compression or power strokes.

_____ 3 and _____ 4 transmit the motion of the piston to the crankshaft. There is a connecting rod alone in small engines; however, in larger, twostroke engines there is a _____ 5, which connects piston rod and connecting rod. It eliminates the lateral pressure of the piston within the cylinder. Then, the motion is transmitted to the _____ 6, which transforms the linear motion into circular motion and transfers it to the related parts of the engine.



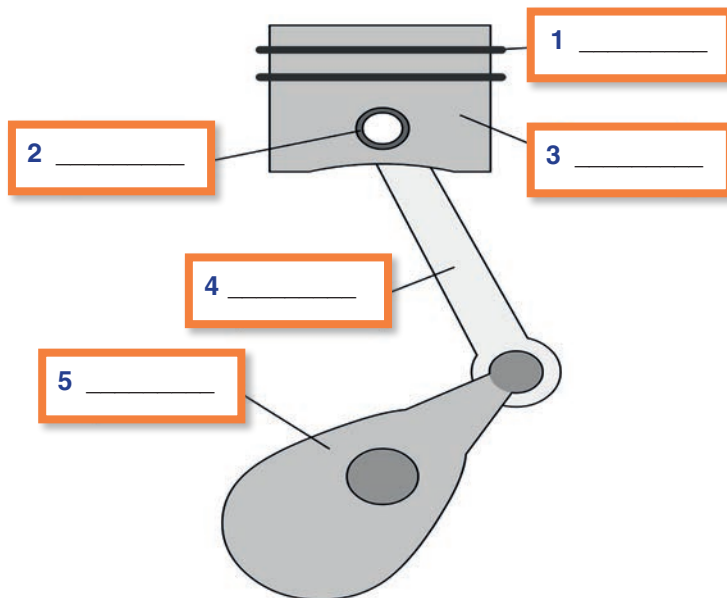
_____ 7 takes over the circular motion from the crankshaft, and it opens and directs the timing of the valves. _____ 8 enable fresh air intake (in four-stroke engines) into the cylinder and exhaust scavenge. In two-stroke engines, there are ports instead of an intake valve. If the camshaft is not directly connected to the valves, there is a mechanism which transmits the motion from the camshaft to the valves. This mechanism consists of a tappet, a push rod and a rocker arm. The motion is transmitted from the camshaft to the _____ 9 first, then to the _____ 10 and finally to the _____ 11. The rocker arm changes the direction of the motion and opens the valves.



D2 Write the **moving parts of a four-stroke engine** in the correct place on the picture below.

connecting rod	gudgeon pin	piston rings	crankshaft	piston
----------------	-------------	--------------	------------	--------

Moving parts of a four-stroke engine is more or less similar to a two-stroke engine. There are minor differences between the two. For example, unlike two-stroke engines, in a four-stroke engine there is no piston rod; and naturally, there is no crosshead, either. In a four-stroke engine, there is a gudgeon pin to connect the piston with the connecting rod, and connecting rod is directly connected to the crankshaft.



III Speaking

A Look at the pictures of two-stroke and four-stroke engines and make sentences about the differences between them.

e.g., A four-stroke engine doesn't have a crosshead as a connecting part between the piston rod and connecting rod like a two-stroke engine.

B Work with your partner. Ask and answer as in the example.

e.g., What/piston/do?

***Student A:** What does a piston do?*

***Student B:** It triggers the interaction between the moving parts and transforms thermal energy into mechanical energy.*

- 1 Where / piston / move?
- 2 How / valves / open?
- 3 What / gudgeon pin / do?
- 4 What / connecting rod/ do?
- 5 What kind of engines / have / crosshead?



Work in groups, make a basic model of stationary and moving parts of a main engine. Then make a presentation of the functions and working of these parts on your model to your classmates.

SELF ASSESSMENT 4



I can tell names of the basic stationary and moving parts of an engine.



I can talk about the functions of stationary and moving parts of an engine.



I can tell the places of stationary and moving parts of an engine.



REVISION 4

A Choose the correct option.

- 1 Which does NOT complete the phrase correctly; cylinder _____ ?
 a block b head c box d liner
- 2 To _____ basically means to catch fire.
 a ignite b trigger c convert d transform
- 3 Crankcase is at the _____ of an engine.
 a middle b top c bottom d sides
- 4 Two-stroke engines have scavenge _____ instead of intake and outlet valves.
 a canals b ways c boxes d ports
- 5 _____ may cause harm to the engine and environment.
 a Contaminants b Fuel c Lubricating oil d Water
- 6 Which is NOT a stationary part of an engine?
 a cylinder head b piston rod c stuffing box d frame
- 7 Which is NOT a moving part of an engine?
 a camshaft b piston c crankshaft d bedplate
- 8 _____ decreases the effect of friction to the piston due to its movement.
 a Cylinder head b Cylinder liner c Cylinder block d Cylinder head gasket
- 9 Crankshaft transforms _____ motion into circular motion.
 a reciprocating b diagonal c linear d circular
- 10 Which does NOT belong to the motion transmitting mechanism from the camshaft to the valves?
 a piston rod b tappet c push rod d rocker arm

B Unscramble the letters to find out the parts of the engine.

- 1 SCEKRCAAN _____
- 2 PDBALEET _____
- 3 OLDIMASNF _____
- 4 RLINYCED _____
- 5 AMERF _____



MARINE ENGINES



- Learn basic terms related to marine engines
- Describe the principles of two-stroke and four-stroke engines
- Talk about basics principles of engine operations
- Recognise the types of engines used in maritime sector
- Learn the hand tools used for the maintenance of marine engines

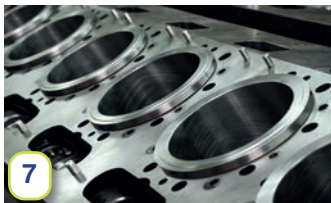
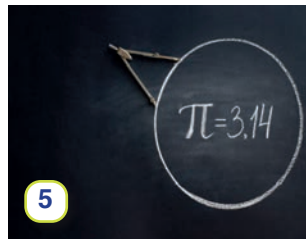
5A HAND TOOLS



Vocabulary

A Match the words in the box with their photos below.

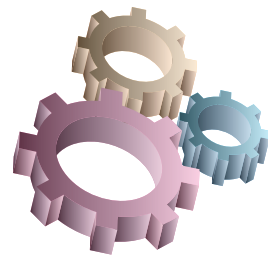
gears <u>4</u>	bearings _____	diameter _____	a piston _____	a nut and a bolt _____
a screw _____	a shaft _____	nails _____	cylinders _____	



B Write the best verbs from the box to complete the phrases meaningfully.

replace	rub	drive	measure	tighten
---------	-----	-------	---------	---------

- 1 _____ a nut or a bolt
- 2 _____ a nail in the wall
- 3 _____ an old piece of machinery
- 4 _____ a rough surface to smoothen it
- 5 _____ the diameter of an object



C Work in pairs and match the words for **hand tools** with their photos.

1



2



3



4



micrometre 5

wrench _____

screwdriver _____

file _____

mechanical puller _____

pliers _____

hammer _____

calliper _____

steel wire brush _____

hacksaw _____

5



7



6



8



10



9





II Listening and Speaking



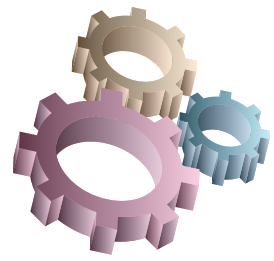
41301

A Listen to the sentences and complete them with the hand tools you hear.

- 1 We tighten or loosen bolts and nuts using different types of _____.
- 2 We need a _____ if we want to screw or screw off.
- 3 A _____ helps us to drive nails in the smoother surfaces.
- 4 A _____ will be helpful when we need to remove the rust or residues from surfaces.
- 5 We can use a _____ to cut the iron.
- 6 A _____ is used to pull and replace heavy parts such as bearings or gears.
- 7 We use _____ to grip, tighten, loosen, or cut small pieces of metals.
- 8 _____ are used to measure inside and outside diameters, and the depths of objects.
- 9 We rub metal surfaces via a _____ to remove small pieces of metal to get a smoother surface.
- 10 _____ make precise measurements of objects with different geometrical shapes such as pipes, shafts, and piston etc.

B Close your books, ask and answer questions in pairs as in the example.

e.g., Student A: What do you use to tighten a bolt?
Student B: I use a wrench to tighten a bolt.



III Reading and Vocabulary

A Write the names of the correct **wrench** types under their photos.

open-end wrench	box-end wrench	combination wrench	adjustable wrench
allen wrench	socket wrench	torque wrench	pipe wrench



1



2



3



4



5



6



7



8

B Read the statements below, and write the correct wrench from Exercise A.

I use a/an 1 if I want to tighten the nuts or the bolts of a machine in an equal strength.

I use a/an 3 for pipe connections.

I use a/an 2 when I want to loosen or tighten a hexagon socket head bolt.



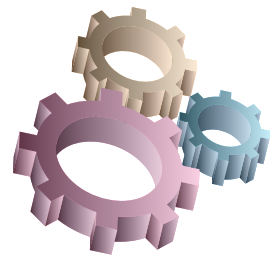
I can use both sides of a/an 4 to tighten or loosen nuts and bolts.

C Draw lines to match the pliers with their pictures.

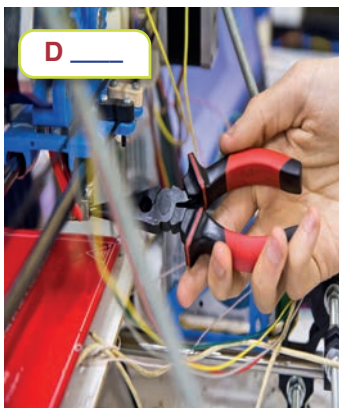


- 1 Combination Pliers
- 2 Snap Ring Pliers
- 3 Cutting Pliers
- 4 Needle Nose Pliers
- 5 Parrot Pliers
- 6 Locking Pliers





D Write the numbers of the pliers from Exercise C on Page 108 on the photos below, and then complete the sentences by looking at the photos.



- 1 We grip or twist small pieces of metals like nails or wires using _____ pliers.
- 2 We can strip cables, or cut wires via _____ pliers.
- 3 We can use _____ pliers to grip small things in awkward places difficult to reach.
- 4 We use _____ pliers to replace or remove snap rings.
- 5 We can use these strong-jaw _____ pliers to grip, remove or replace seized or deformed pieces which is hard to grip via other pliers.
- 6 _____ pliers can be adjusted and locked to hold something strongly for a while.



5B TYPES OF MAIN ENGINES



Vocabulary

A Match the definitions with the terms related to engine processes.

a stroke

b combustion

c cycle

d scavenge

- 1 the sequence of processes repeating in an engine's cylinder which is the basis for the operation of the engine: ____
- 2 one full travel of the piston along the cylinder in the phase of an engine cycle: ____
- 3 the process of taking fresh air in the cylinder pushing the exhaust gases out: ____
- 4 the chemical process in which a substance (e.g., fuel) ignites as a reaction when it contacts with oxygen, also known as burning: ____

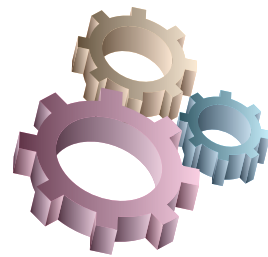
B Match the words to form meaningful terms for diesel engines.

- 1 mechanical ____
- 2 exhaust ____
- 3 combustion ____
- 4 scavenge ____
- 5 propulsion ____

- a gases
- b power
- c ports
- d chamber
- e energy

C Complete the sentences using the phrases in Exercise B.

- 1 The engine cylinder produces the _____ for the movement of the vessel by transmitting thermal energy into _____.
- 2 _____ take place of intake valves in two-stroke engines.
- 3 _____ are pushed out from the cylinder exhaust valves.
- 4 The combustion takes place in the _____ which is a separate room at the top of the cylinder.



II Listening and Reading

- A** Listen to the recording and fill in the blanks with a word to complete the phrases in the paragraph about **internal combustion diesel engines** below.



41302

The main engine provides necessary _____ **1** power for the vessel to move on water. Today, _____ **2** combustion, _____ **3** diesel engines are used on the majority of vessels. The combustion happens in the cylinder as a result of the _____ **4** movement. These engines convert _____ **5** energy into thermal energy, and then thermal energy into mechanical _____. **6**. We classify internal combustion engines in two categories in terms of their cycles: _____ **7** -stroke engines and _____ **8** -stroke engines.

- B** Read the paragraph in Exercise A, and write the phrases describing energy transmission in internal combustion diesel engines in the diagram below.



- C1** Listen to the paragraph about **working principle of an internal combustion diesel engine** and fill in the blanks with a word to complete the phrases in it.



41303

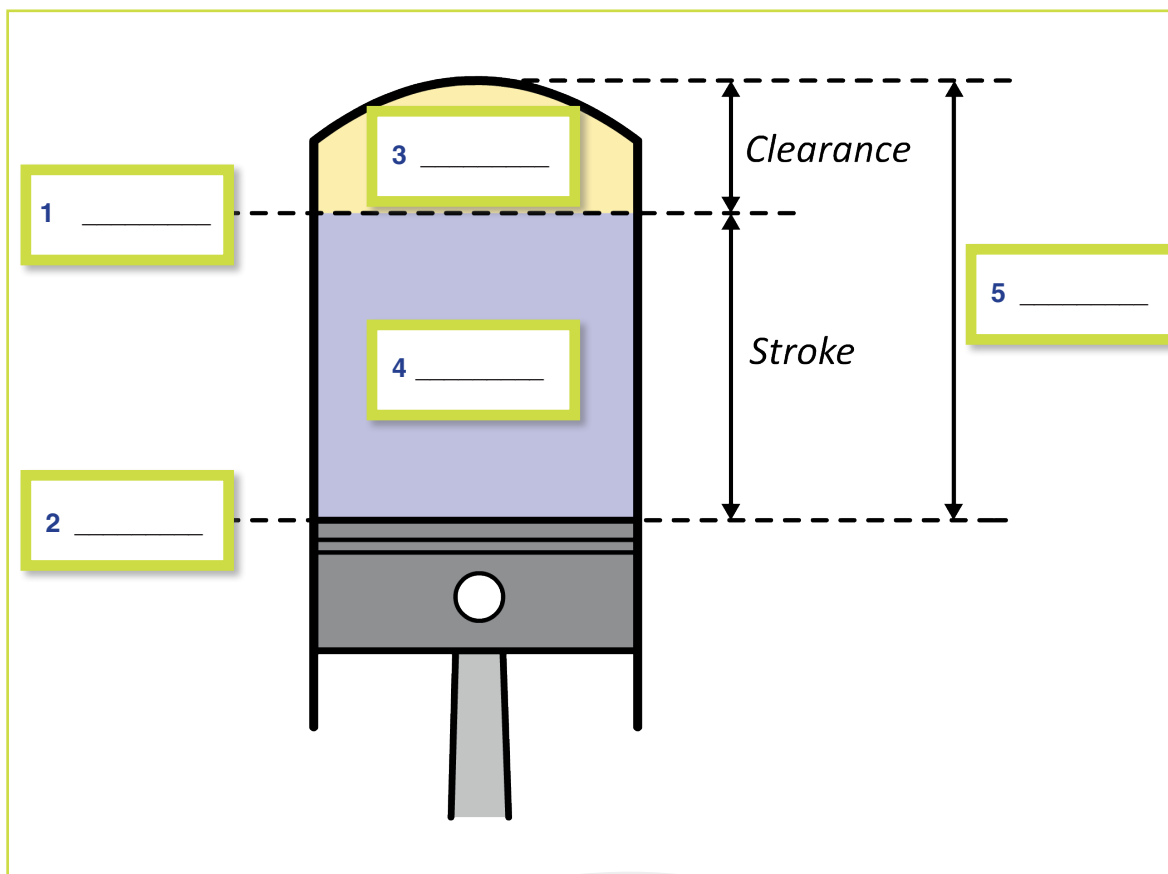
In an internal combustion engine, the piston moves in a reciprocating motion, and it pauses at two points to change its direction. These points are called dead centers. The uppermost point that the piston can go is _____ **1 dead centre**, and the lowermost point is called _____ **2 dead centre**. The volume between the two dead centres is called _____ **3 volume**. When the piston is at the top dead centre, the volume between the cylinder cover and the top point of the piston head is called _____ **4 volume**. The total volume of the two gives the _____ **5 volume**.

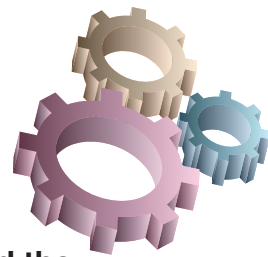


C2 Read the paragraph in Exercise C1 on Page 111 again and write the phrases in bold next to their abbreviations below.

- 1 Vs _____
- 2 BDC _____
- 3 Vt _____
- 4 TDC _____
- 5 Vc _____

C3 Read the paragraph in Exercise C1 on Page 111 again and write the abbreviations from Exercise C2 in the correct place on the picture below.





D1 A cycle consists of four strokes in a **four-stroke diesel engine**. Read the paragraphs, and write the names of the correct strokes from the box. Then match the paragraphs with the pictures.

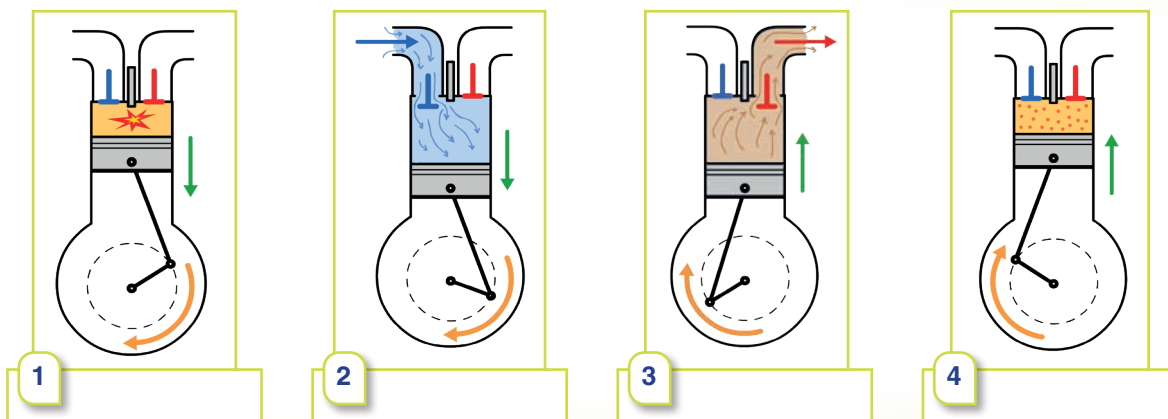
Compression Stroke	Intake Stroke	Exhaust Stroke	Power Stroke
--------------------	---------------	----------------	--------------

A _____ The piston moves up. Both intake and exhaust valves are closed. The air is compressed in the cylinder, thus its temperature and pressure increases. The fuel is injected into the cylinder, and it ignites due to its contact with the high temperature, compressed air.

B _____ The piston moves up. The exhaust valve is open, and exhaust gases are pushed out of the cylinder.

C _____ The piston moves down. The intake valve is open and fresh air is taken into the cylinder. The cylinder is filled with air when the piston reaches at the BDC.

D _____ The piston is pushed down by the combustion power in the cylinder and the power which runs the engine is produced in this way.



D2 Listen to the recording describing the cycle of a four-stroke diesel engine, and put the paragraphs in Exercise D1 in the correct order.



41304

1 2 3 4





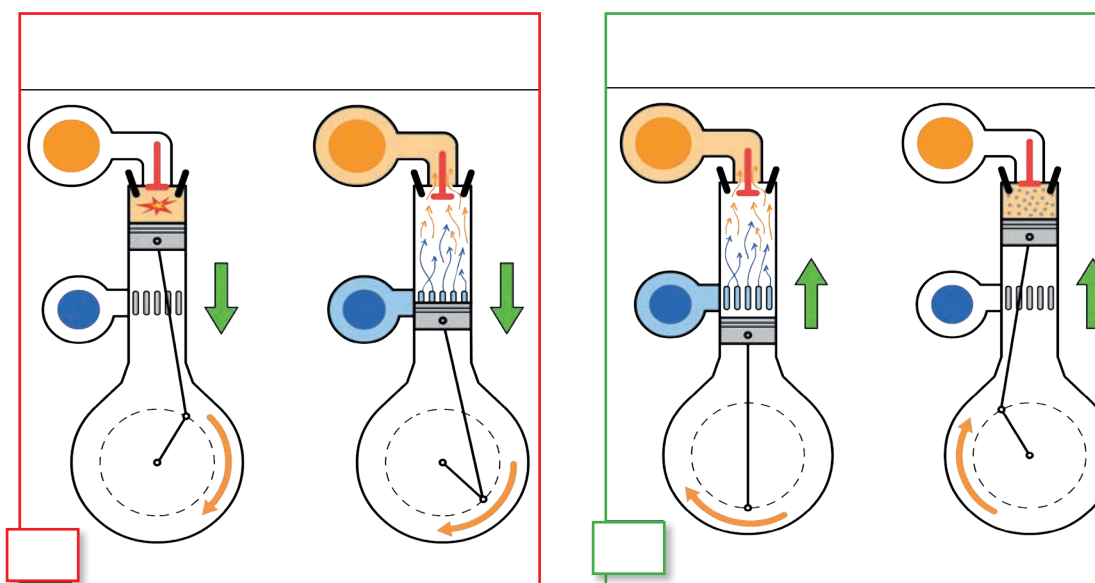
41305

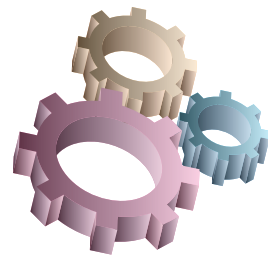
E1 Listen and complete the paragraphs describing the two strokes in the cycle of a two-stroke diesel engine; **compression stroke** and **power stroke**.

A As the piston moves from the BDC towards the TDC, both _____ **1** and _____ **2** are open, and intake and exhaust processes continue. Before the piston arrives at the TDC, first scavenge ports, and then the exhaust valve are closed; thus, _____ **3** starts.

B Through the end of the compression stroke, the _____ **4** is sprayed and ignited due to its contact with the _____ **5** and _____ **6**. The piston is pushed down to the BDC with the effect of the combustion in the cylinder; thus, _____ **7** takes place. Before the piston arrives at the BDC, first exhaust valve, and then scavenge ports are opened, and scavenging takes place.

E2 Read paragraphs in Exercise E1 again and match them with the pictures below.





III Writing and Speaking

Read the sentences describing a cycle in a **four-stroke** and a **two-stroke engine** and write the sentences under the correct title with your partner.

FOUR-STROKE ENGINE	
1	
2	
3	
4	
5	

TWO-STROKE ENGINE	
1	
2	
3	
4	
5	

- A cycle is completed by four separate strokes of the piston.
- A cycle is completed when crankshaft completes a tour (360°).
- There is not an intake valve; there are scavenge ports instead.
- There is a piston rod and a crosshead to connect it to the connecting rod.
- Connecting rod is attached to the piston via a gudgeon pin.
- There is an intake valve to take fresh air in.
- A cycle is completed when crankshaft completes two combined tours (720°).
- A cycle is completed by two strokes of the piston.
- Fresh air intake and exhaust gas scavenge processes take place at different strokes.
- They take the fresh air in and emit the exhaust gas out of the cylinder at the same time.



Work in pairs, make research about the parts of a two-stroke engine and a four-stroke engine in detail, and prepare a brochure telling the functions of these parts. Take or find photographs of them to use in your brochure.

SELF ASSESSMENT 5



I can talk about basic terms related to marine engines.



I can tell the principles of two-stroke and four-stroke engines.



I can talk about basics principles of engine operations.



I can recognise the types of engines used in maritime sector.



I can tell the hand tools used for the maintenance of marine engines.



REVISION 5

A Choose the correct option.

- 1 Different types of _____ are used to tighten or loosen bolts and nuts.
a hammers **b** wrenches
c pliers **d** screwdrivers
- 2 Micrometres are used to make precise _____ of different shaped objects.
a replacement **b** adjustment
c measurement **d** instalment
- 3 We can use a _____ to remove the rust or residues from surfaces.
a steel wire brush **b** file
c hammer **d** hacksaw
- 4 Both sides of a/an _____ wrench can be used to tighten or loosen nuts and bolts.
a adjustable **b** combination
c box-end **d** open-end
- 5 A/An _____ is used to loosen or tighten a hexagon socket head bolt.
a pipe **b** allen
c pen-end **d** socket
- 6 A/An _____ is NOT one of the strokes in four-stroke engines.
a separation **b** exhaust
c compression **d** intake
- 7 The propulsion is produced during _____ stroke.
a intake **b** compression
c power **d** exhaust
- 8 There are _____ and _____ strokes in two-stroke engines.
a intake/exhaust
c power/exhaust
b intake/compression
d compression/power
- 9 Two-stroke engines have _____ ports.
a compression **b** scavenge
c exhaust **d** intake
- 10 A cycle is completed at a _____ tour in a four-stroke engine.
a 360° **b** 540°
c 720° **d** 900°

B Odd one out.

1	linear	reciprocating	circular	diagonal
2	snap ring	pipe	needle nose	locking
3	parrot	torque	socket	adjustable
4	combust	inflammable	trigger	ignite
5	mechanical	physical	thermal	chemical



AUXILIARY ENGINES



- Learn the components of the fuel system and describe their purposes
- Learn the components of the oil system and describe their purposes
- Learn the components of the cooling system and describe their purposes
- Learn the components of the compressed air system and describe their purposes

6A THE FUEL SYSTEM



I Reading and Vocabulary

A Match the words with their definitions.

centrifugation	pollutant	auxiliary	pump	particle
1 _____:	an extremely small piece of something			
2 _____:	a piece of equipment that forces liquid or gas to move from one place to another			
3 _____:	a harmful substance that causes dirt or damage on something			
4 _____:	giving help or support to a more important thing			
5 _____:	the process of spinning a container very quickly to separate fluids of different densities or liquids from solids inside it			

B Choose the correct form of the words.

- 1 Dust in the air **pollutants/pollutes** the fuel and causes clogging in the filters.
- 2 Blockage in the **injectors/injects** affect the performance of the engine.
- 3 The **pump/pumping** was delayed due to the problems in the valves.
- 4 **Centrifugation/Centrifugal** is an effective method to separate other substances from the fuel.
- 5 All the fuel was **filtered/filter** and was ready to use.

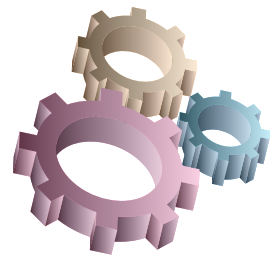
C Read the paragraph about the **fuel system** and write the given components into the correct places.

Filters	Fuel pump	Injectors	Transfer pumps	Fuel tanks	Centrifuge
---------	-----------	-----------	----------------	------------	------------

THE FUEL SYSTEM

The fuel system on ships works with the stages of supplying the fuel, storing it, and making it fit for use. Heavy fuels such as fuel oil and diesel oil are used on ships. The fuel system consists of the following elements:

- 1 _____ are the parts where the fuel is stored.
- 2 _____ are the pumps that provide the transfer of fuel within the system.
- 3 _____ are the components that clean various pollutants within the fuel system.
- 4 _____ is the pump that sends the fuel to the injectors at a high pressure.
- 5 _____ or separator is the machine that separates the water and particles in the fuel with the effect of centrifugation.
- 6 _____ are the components that send the high-pressure fuel coming from the fuel pump into the cylinder at the required time and way.



II Listening and Writing



41306

A Listen to the descriptions and write the missing words to complete them.

A
The fuel is first _____ 1 and stored into this tank and sent to the _____ 2 tank.

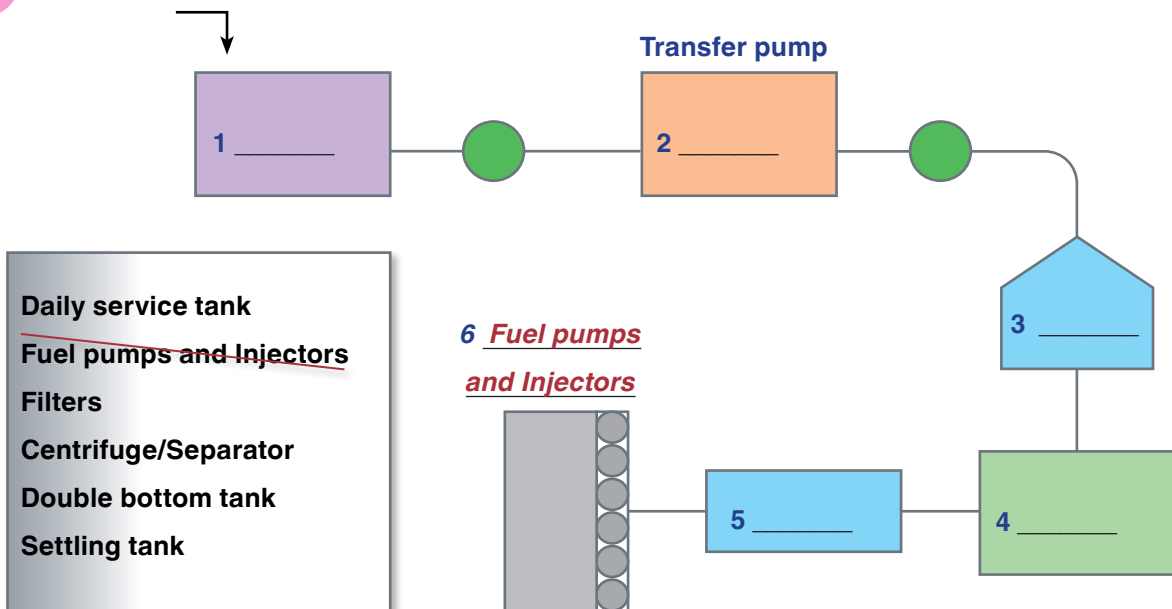
B
The fuel is _____ 3 and rested in this tank. After it is cleaned in this tank, fuel is sent to the _____ 4 service tank.

C
The clean fuel necessary for the _____ 5 of the main and _____ 6 engines is stored in this tank.

B Listen to the descriptions of **fuel tanks** again and write their names in the correct place in Exercise A.

Daily service tank	Double bottom tank	Settling tank
--------------------	--------------------	---------------

C Write the names of **the fuel system components** on the diagram.



III Speaking

Close your books, say the functions of the fuel system components with your partner.

e.g., Student A: A fuel pump sends fuel to the injector.

Student B: Daily service tank keeps the fresh fuel necessary for the engine.



6B THE LUBRICATION SYSTEM



I Vocabulary

A Form meaningful words matching with their definitions.

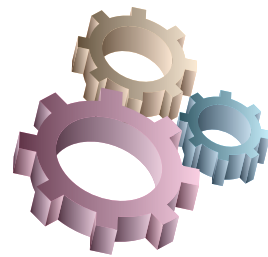
- 1 to turn in a circle, especially around a fixed point: **t-o-t-a-e-r** _____
- 2 a liquid such as oil that is used to make the parts of an engine move easily together: **a-l-n-b-i-r-u-t-c** _____
- 3 to cause something to become slightly cold: **o-c-l-o** _____
- 4 a device that is used to put the necessary energy or substance into another device to make it work: **g-a-c-h-e-r-r** _____
- 5 the force that makes it difficult for one object to slide along the surface of another: **i-f-o-t-c-i-r-n** _____

B Work with your partner and write the correct form of the words.

VERB	NOUN	ADJECTIVE
rotate	1 _____	2 _____
3 _____	4 _____/lubricant	lubricating
operate	operation	5 _____
6 _____	charger	charging
cool	7 _____	8 _____

C Circle the correct word form to complete the sentences.

- 1 Biodiesel has better **lubricant/lubricating/lubricate** properties than other fuels.
- 2 **Operation/Operate/Operating** auxiliary engine systems properly is very important to make the main engine work safely and efficiently.
- 3 The **rotated/rotation/rotating** engine parts enables the movement.
- 4 **Cooling/Cool/Cooler** the oil enables to cool down the engine parts too.
- 5 The **charger/charged/charging** stopped working due to the power cut.



II Listening and Writing



41307

A Listen and complete the paragraph about the lubrication system.

THE LUBRICATION SYSTEM

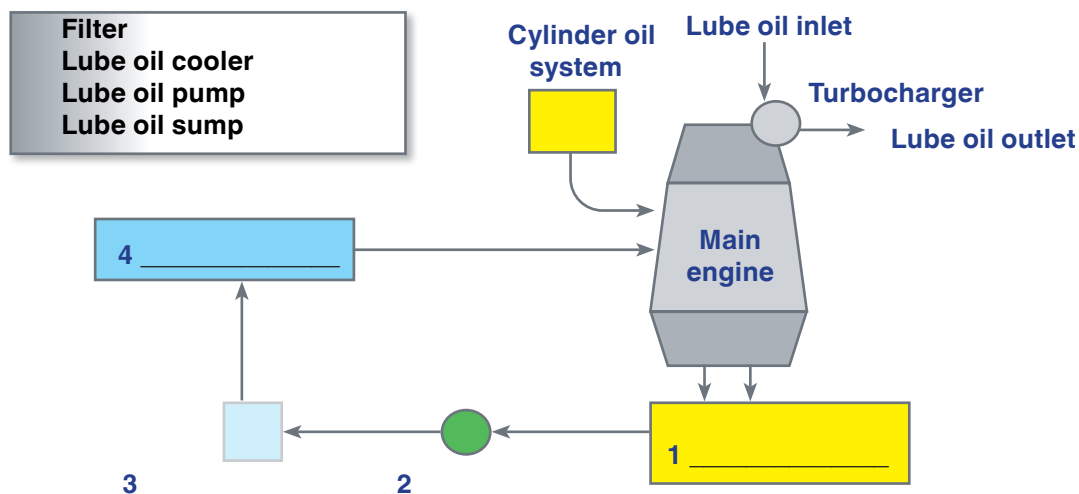
The lubrication system minimises _____ 1 in rotating engine parts and prevents heating and wear. A properly functioning lubrication system ensures long-lasting and efficient _____ 2 of the engines. There are three separate lubrication systems on ships; _____ 3 lubricating oil system, _____ 4 oil system, and the _____ 5 lubricating oil system.

The lubrication system usually consists of lube oil sump, **lube oil pump**, **filters** and **lube oil cooler**.

B1 Order the sentences to find out the working system of the lubrication system circuit.

- a Lube oil cooler ensures to keep the lubrication oil at the appropriate temperature before it enters the main engine. ____
- b Lube oil pump draws the lubrication oil from the lube oil sump and sends it to the filter. ____
- c Lubrication oil is cleaned from contaminants passing through the filter and goes to the cooler. ____
- d Lube oil sump is the tank where lubrication oil is stored in. ____

B2 Write the names of the lubrication system components on the diagram.



III Speaking

Close your books, ask and answer questions in pairs as in the example.

e.g., Student A: *What does lube oil sump do?*

Student B: *It stores the oil in the lubrication system.*



6C THE COOLING SYSTEM



Vocabulary

A Match the words with their definitions.

accumulation

circuit

deaerator

circulate

expansion

- 1 _____: the increase of something in size or number
- 2 _____: a piece of equipment that separates air from water
- 3 _____: a closed system of pipes through which liquid can flow
- 4 _____: a mass or quantity of something that has gradually gathered
- 5 _____: to move in a circuit

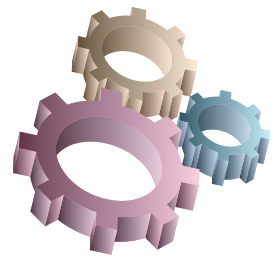
B Choose the correct form of the words.

- 1 Heated air **expands/expansions** and occupies more space than before.
- 2 **Circulating/circulation** of water is provided through the pipes within the system.
- 3 **Aerators/deaerators** add air to soil or water to supply oxygen necessary for the substance.
- 4 The **accumulation/accumulates** of air and gases in the cooling water should be minimised.
- 5 The cooling water **circuit/circuits** repeatedly during the operation of the engine.

C Match the words to form collocations.

- 1 gas _____
- 2 closed _____
- 3 expansion _____
- 4 fresh _____

- a tank
- b water
- c accumulation
- d circuit



D Match the two halves to find out the functions of the cooling system components.

- | | |
|--|---|
| <p>1 Expansion tank is the tank that stores enough cooling water ____</p> <p>2 Pumps provide the transfer of ____</p> <p>3 Cooler is the component that allows the water in the central cooling system ____</p> <p>4 Filter is the component that clean the cooling water from ____</p> <p>5 Deaerator prevents the accumulation of ____</p> | <p>a to be cooled by sea water.</p> <p>b air or various gases in the cooling system.</p> <p>c cooling water within the system.</p> <p>d for the operation of the engine.</p> <p>e various contaminants in the cooling system.</p> |
|--|---|



II Listening and Writing

A Complete the paragraph about the cooling system with the given phrases. Then listen and check your answers.



41308

- sea water cooling system and fresh water (central) cooling system
- with the help of various heat exchangers
- all the engines on board are cooled using fresh water
- and kept at a certain temperature
- and keeping the engine at the ideal operating temperature

THE COOLING SYSTEM

The high temperature resulting from combustion in engines must be cooled _____

_____ **1.** The cooling system ensures the water circulation in the engine

_____ **2.** There are two cooling systems on ships; _____

_____ **3.**

In the central cooling system, _____ **4.** The sea water system works in a closed circuit and cools the heated fresh water circuit _____

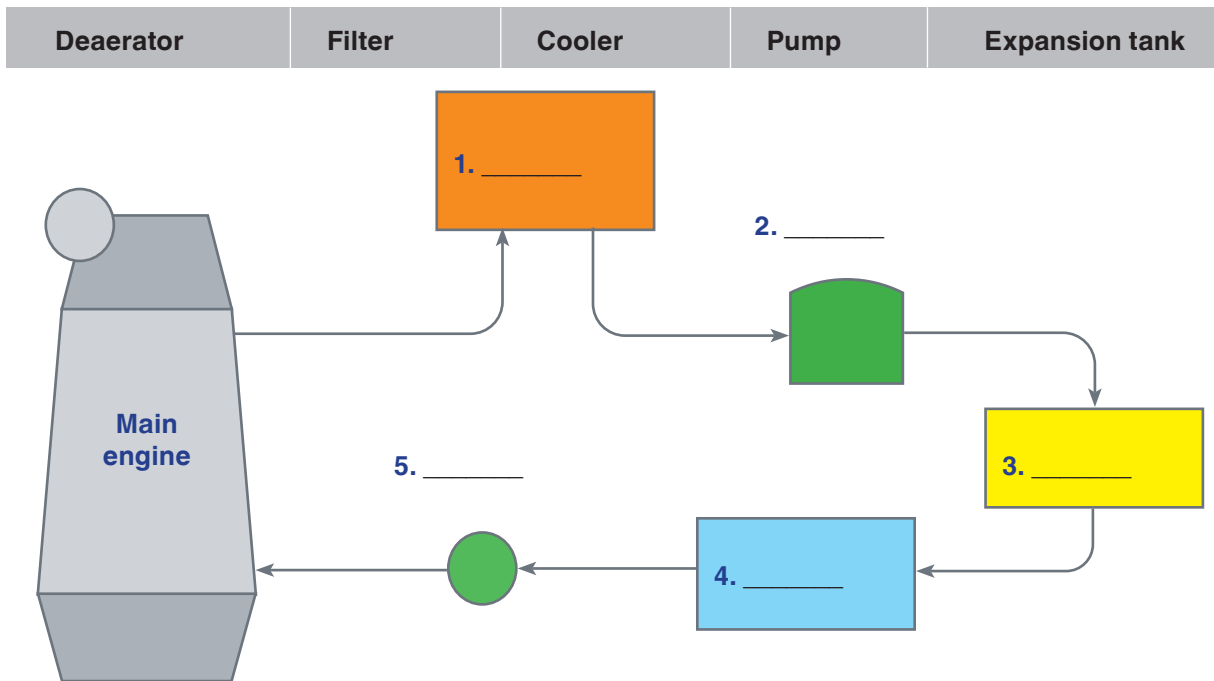
_____ **5.** The cooling system consists of **expansion tank, pumps, cooler, filter and deaerator.**



B1 Listen and complete the paragraph about the cooling system circuit.

The expansion tank is the first component of the cooling system in which the cooling water is _____ 1. The cooling water in this tank is first _____ 2 to the deaerator and then to the filter to get _____ 3. Then, the cooling water is cooled down in the cooler. Finally, cooling water is first _____ 4 to the main engine and then to the circuit within the system by the pump. This circuit of the cooling water runs continuously in this way.

B2 Read the paragraph in Exercise B1 and the names of the cooling system components on the diagram.

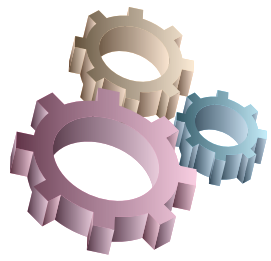


III Speaking

Close your books, ask and answer questions in pairs about the functions of the cooling system components as in the examples.

- e.g., Student A: What does a deaerator do?
 Student B: It stores the cooling water in the cooling system.
 Student A: Which component stores the cooling water?
 Student B: The deaerator.

6D THE STARTING AIR SYSTEM



I Listening and Vocabulary

A Work with your partner and complete the word chart.

VERB	NOUN
receive	1 _____
distribute	2 _____
propel	3 _____
ignite	4 _____

B Match the words to form collocations.

- | | |
|--------------------|------------|
| 1 compressed _____ | a force |
| 2 initial _____ | b order |
| 3 propulsive _____ | c speed |
| 4 ignition _____ | d movement |
| 5 certain _____ | e air |

C Listen and complete the paragraph about **the starting air system**.



41309

THE STARTING AIR SYSTEM

The _____ 1 in the ship's main engine is provided by the _____ 2. Compressed air is sent to the cylinders according to the _____ 3 after the turning gear on the ships. It applies a _____ 4 on the piston and ensures the rotation of the engine. When the engine reaches a _____ 5, the air is cut off and the engine starts to work normally after the fuel is sent. The starting air system consists of **compressor, air receiver, starting air distributor** and **starting air valve**.



D Read the sentences below and write **TRUE** or **FALSE**.



- 1 Compressed air is sent to all cylinders at the same time.
- 2 The first point that compressed air reaches is the turning gear. _____
- 3 Piston is propelled by the compressed air. _____
- 4 Piston is a component of the starting air system. _____
- 5 Fuel is sent to the engine with the compressed air at the same time. _____



41310

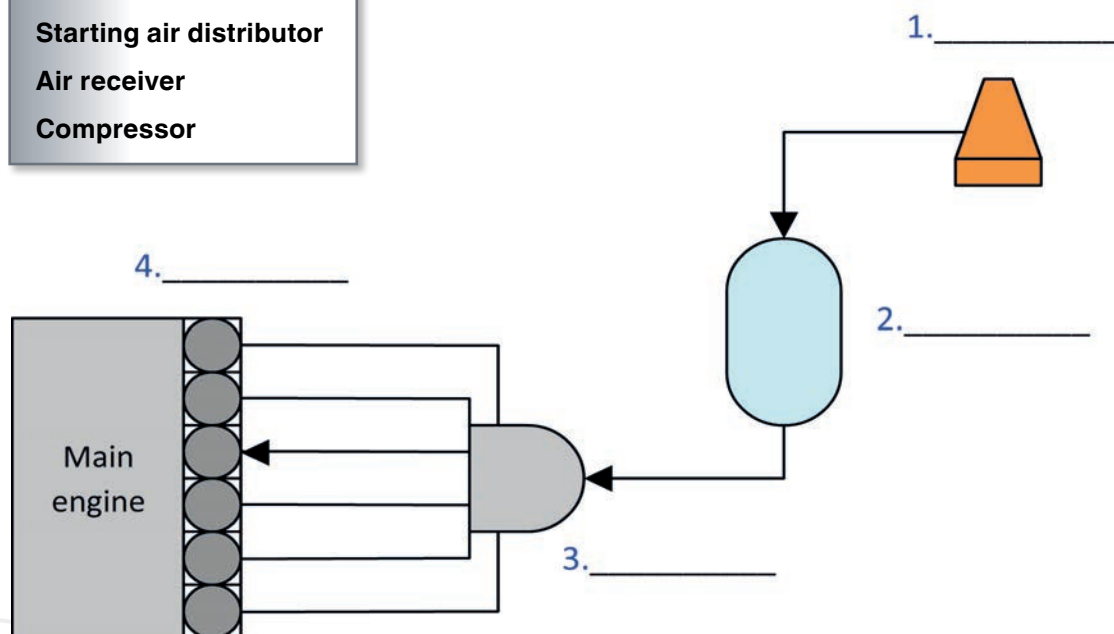
E Listen and match **the starting air system components** with their functions.

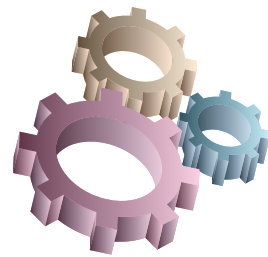
- 1 Compressor _____
- 2 Air receiver _____
- 3 Starting air distributor _____
- 4 Starting air valve _____

- a stores the compressed air.
- b sends air to the starting valve of the next cylinder.
- c sends the compressed air to the cylinder.
- d produces compressed air.

F Write the names of **the starting air system components** on the diagram.

Starting air valve
Starting air distributor
Air receiver
Compressor





Work in groups, make research about the auxiliary engine systems told in this unit, and prepare a presentation telling the functions and interaction of these systems with the main engine. Use pictures and diagrams in your presentation.

SELF ASSESSMENT 6



I can tell the components of the fuel system and describe their purposes.



I can tell the components of the oil system and describe their purposes.



I can tell the components of the cooling system and describe their purposes.



I can tell the components of the compressed air system and describe their purposes.



REVISION 6

A Choose the correct option.

1 _____ is NOT a fuel system component.

- a Centrifuge b Filter
c Turbocharger d Injector

2 _____ are used to clean the fuel, oil or water from various pollutants.

- a Filters b Valves
c Pumps d Tanks

3 Lubrication system reduces heating and wear due to _____.

- a combustion b accumulation
c compression d friction

4 In the central cooling system _____ water is used to cool all the engines.

- a drinkable b fresh
c sea d clean

5 Which one is NOT a lubrication system on ships?

- a cylinder oil system
b main lubricating oil system
c central lubricating oil system
d turbocharger lubricating oil system

6 The initial movement in the engine is provided by compressed _____.

- a fuel b air
c gas d oil

7 Cooling water is stored in the _____.

- a expansion tank
b settling tank
c daily service tank
d double bottom tank

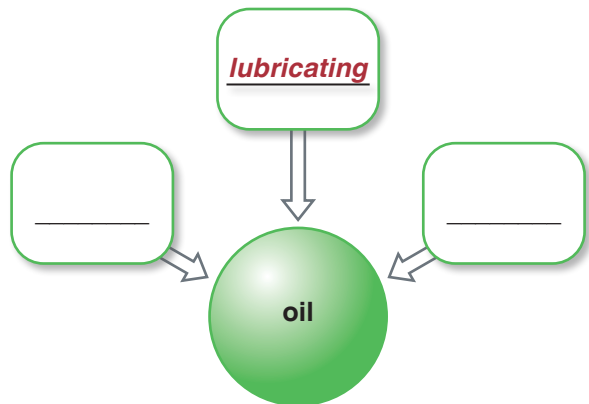
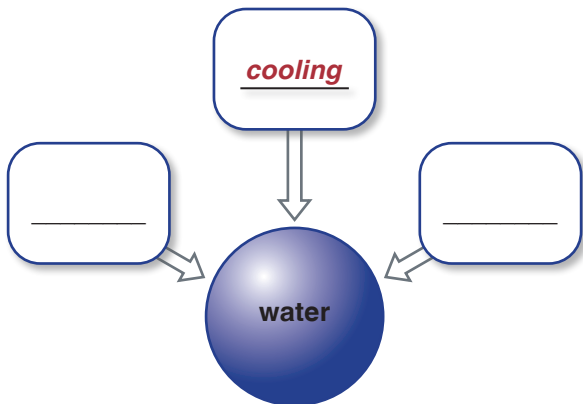
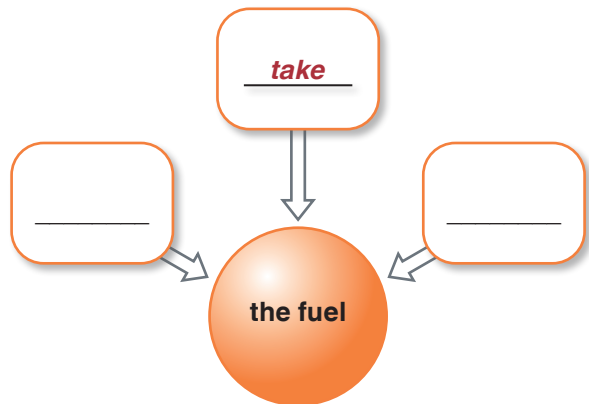
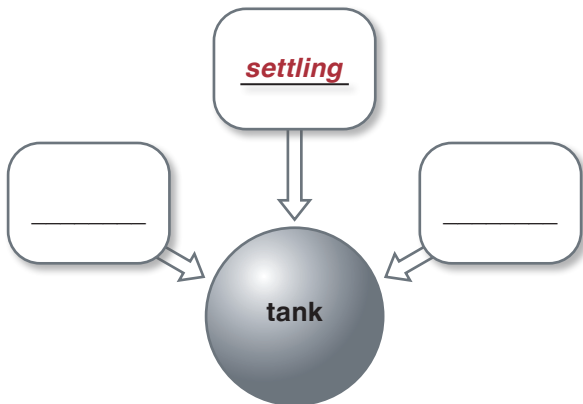
8 Which word DOESN'T complete this phrase: starting air _____?

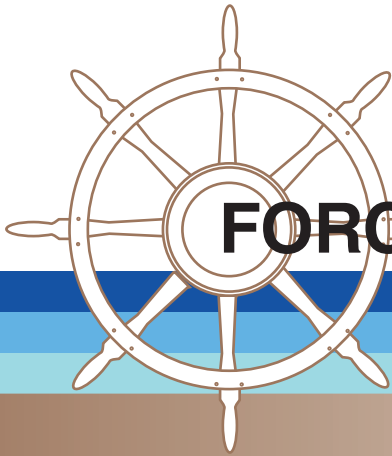
- a receiver b distributor
c valves d pumps



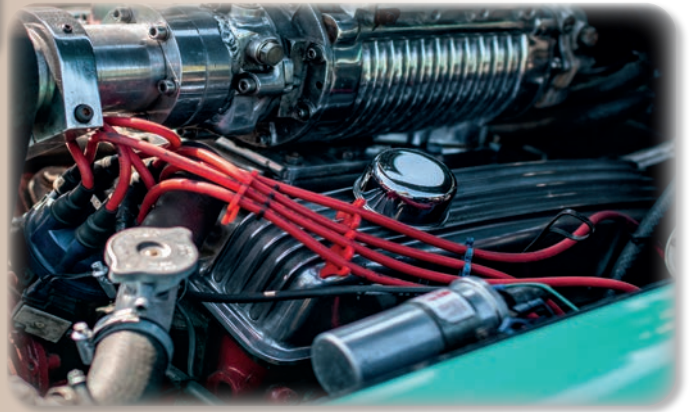
B Complete the word collocation charts with the given words.

daily service	diesel	settling	transfer	fresh	fuel
double bottom	cooling	lubricating	store	take	sea





FORCED AIR INDUCTION



- Get familiar with the types of forced air induction
- Learn the differences between turbocharger and supercharger system
- Know the location of the blower
- Recognise the basic components of an engine
- Understand the function of an air cooler



Vocabulary

A Match the terms related to engines with their photos and then write them next to their definitions below.

cylinder _____

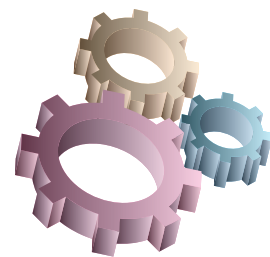
turbine _____

exhaust _____

combustion _____



- 1 _____ : the system through which exhaust gases come out
- 2 _____ : the process of burning
- 3 _____ : the tube in an engine, in which the piston moves
- 4 _____ : a type of machine with blades through which liquid or gas flows and turns a special wheel in order to produce power



B Complete the sentences using the words in Exercise A on Page 130.

- 1 The _____ of an engine consists of the waste gas that leaves it.
- 2 In an internal _____ engine, the combustion of the fuel occurs within the engine itself.
- 3 A _____ is a machine that uses a moving stream of air, water, steam, or hot gas to turn a wheel to produce mechanical power.
- 4 Fuel is combusted and power is generated in the _____ of an engine.

C1 Write the required forms of the words with the given suffixes below.

WORD	SUFFIX	REQUIRED FORM
1 extern	-al	_____ (adjective)
2 induct	-ive	_____ (noun)
3 compress	-ed	_____ (adjective)
4 effect	-ive	_____ (adjective)
5 qualify	-ty	_____ (noun)

C2 Read the paragraph below and fill in the gaps with the correct word from Exercise C1.

Forced air _____ allows the cylinders of the internal combustion engine to get _____ air. The air comes from an _____ source other than the engine intake. If the amount of air increases, combustion _____ also increases. This makes the engine more _____.



II Listening



41311

A Listen to the recording and write the type of forced air induction.

- In a _____ system; the turbine, which is rotated by the energy of the cold gases coming out of the pistons, rotates the compressor at the end of the shaft to which it is connected, and ensures that the air entering the engine shaft is sent with pressure.
- In a _____ system; the fuel entering the cylinder is sent with pressure by an internal pump that moves mechanically. The turbine used in this system is called blower.

B Listen to the recordings again, find three mistakes in each paragraph and correct them.



41311

- | | | | | | | | |
|---------|---|-------|---|---------|---|-------|---|
| 1 _____ | ✗ | _____ | ✓ | 4 _____ | ✗ | _____ | ✓ |
| 2 _____ | ✗ | _____ | ✓ | 5 _____ | ✗ | _____ | ✓ |
| 3 _____ | ✗ | _____ | ✓ | 6 _____ | ✗ | _____ | ✓ |

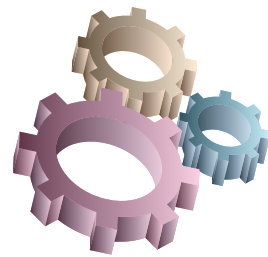


III Reading and Writing

A Read the text and complete it with the correct sentence from the box.

- the density of the forced air must be increased
- this causes the engine to lose power
- As the temperature of the compressed air rises

_____ 1, its density decreases. As the density decreases, the amount of oxygen in the air also decreases, and _____ 2. To prevent this loss of power, _____ 3. For this reason, the air is cooled by the air cooler before it is sent to the engine.



B Read the paragraph in Exercise A, Page 132 again and write **TRUE** or **FALSE**.



- 1 Engine loses power when the compressed air temperature rises. _____
- 2 If the density of the compressed air is low, temperature will also be low. _____
- 3 Air cooler's aim is to increase the power produced by the engine. _____
- 4 The amount of oxygen and air density are not related to each other. _____

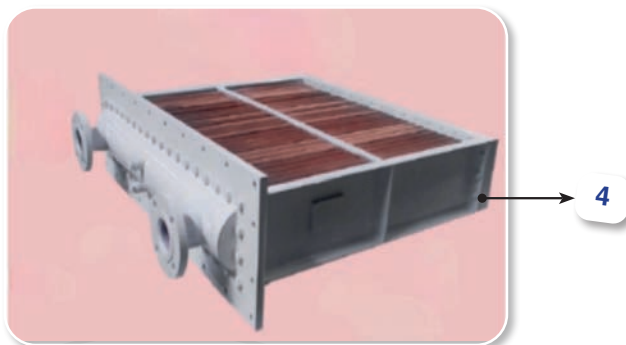
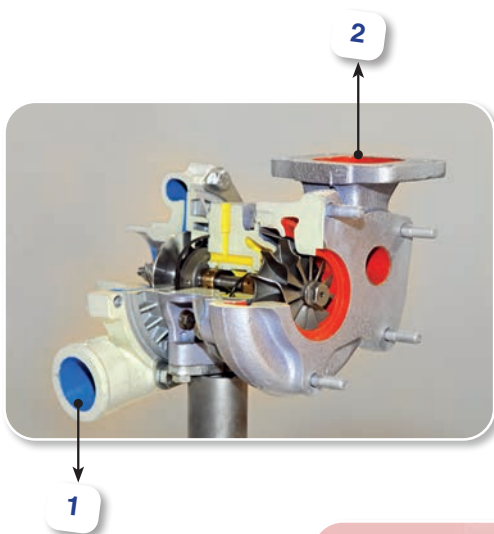
C Look at the photos and match the numbers with the phrases or names.

blower ____

compressor inlet ____

turbine exhaust ____

air cooler ____





Work in groups of six; visit an engine room on a vessel or examine an engine at school workshop, and get information about turbocharger/supercharger. Make a presentation about your visit, including advantages and disadvantages of both types of the forced air induction.

SELF ASSESSMENT 7



I can tell the types of forced air induction.



I can tell the differences between a supercharger and a turbocharger



I can talk about the function of an air cooler.



I can describe the basic components of an engine.



I can recognise the location of the blower.



REVISION 7

A Choose the correct word in bold.

- 1 The temperature of the air is **decreased/increased** by the air cooler.
- 2 The waste gasses coming out of the engine are used by the **turbocharger/supercharger** system.
- 3 **Blower/Air cooler** is a pump that sends the air with pressure in the supercharger system.
- 4 **Turbine/Shaft** is a kind of machine that spins a wheel with blades.
- 5 The process of burning in an engine is called **combustion/induction**.



PROPELLER AND SHAFT



- Learn about the reduction gearbox's function
- Understand the structure of the stern tube
- See how the propeller and shaft work in a vessel



I Vocabulary and Writing

A Read the definitions below and find out the words they stand for.

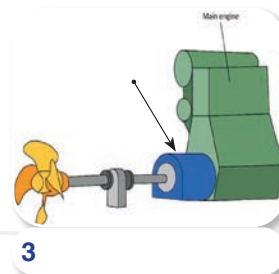
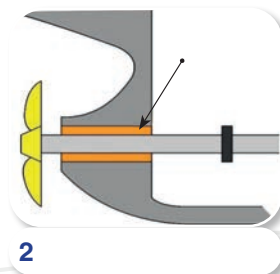
- 1 a metal bar that joins parts of a machine or an engine together, enabling power and movement transmission from one part to another
(h-t-a-f-s) _____
- 2 a device that causes a ship to move, consisting of two or more helical blades
(r-o-l-e-p-e-r-l) _____
- 3 a device, often consisting of connecting sets of wheels with teeth that controls how much power from an engine goes to the moving parts of a machine
(a-r-g-e) _____
- 4 a tube in which the propeller shaft is located.
(e-r-n-t-s u-b-e-t) _____

B Match the two halves of the sentences describing the functions of reduction gearbox elements.

- 1 **Propeller** is a device that causes a ship ____
- 2 In vessels, a **reduction gearbox** is used ____
- 3 **Stern tube** is used ____
- 4 **Shaft** is an engine component used ____

- a to connect the main engine and propeller, and prevent sea water from entering the engine room.
- b to move, consisting of two or more twisted blades.
- c to increase the torque.
- d to transmit the movement of the main engine to the propeller.

C Choose a word written in bold from Exercise B and write it under the correct picture.



D Match the words to form meaningful phrases.

- 1 High-speed ____
- 2 Sealing ____
- 3 Helical ____
- 4 Output ____

- a blades
- b speed
- c engine
- d elements

E Read the underlined phrases in the sentences below and write a wh- question for each.

- 1 The torque is produced in the main engine.

- 2 A reduction gearbox is used to increase the torque by reducing the output speed.

- 3 Sealing elements prevent seawater from reaching the engine room.

- 4 A propeller works like a screw in water with its helical blades.

- 5 The reduction gearbox can be seen on ships using medium or high-speed (RPM) engines.



Work in groups of four, visit a vessel or school workshop and make an observation about propeller, shaft, reduction gearbox, and stern tube. After your visit, talk about the importance of these elements and the possible problems if they don't work properly in class.

SELF ASSESSMENT 2



I can talk about the function of a reduction gearbox.



I can tell the structure of a stern tube.



I can understand how the propeller and shaft work in a vessel.



A Choose the correct item.

- 1 Which statement is NOT true about the stern tube?
 - a stern tube protects the engine room from seawater
 - b propeller shaft passes through the stern tube.
 - c stern tube is found only in medium and high-speed (RPM) engines
 - d stern tube is located at the stern of the vessel
- 2 Which of the following is the main function of the reduction gearbox?
 - a It increases the torque.
 - b It keeps the engine maintained.
 - c It increases the stability of a ship.
 - d It transmits the movement of the engine.
- 3 Which is NOT an element that helps the movement of a vessel?
 - a shaft
 - b propeller
 - c reduction gearbox
 - d stern

B Count down one minute. Create as many words you have learnt in Unit 8 as you can with the letters on the tiles. You can use all the tiles for each word. Do not use any extra letters.

The one who has the highest letter value (count the small numbers in the lower right corner) wins.



words	points
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	





MACHINE ELEMENTS



- Recognise permanent and non-permanent fasteners
- Understand the steps before, during and after lubrication
- Get familiar with belts, gear wheels, chains and pulleys



I Listening and Vocabulary



41534

A Listen to the recording and fill in the blanks with phrases you hear. First letters are given for you.

- a** N_____ - p_____ f_____ can join two or more machine parts in a way that they can be removed and reused without any damage or break. **Screws, bolts, nuts, washers, pins, keys, cotter pins** and **stud bolts** are commonly used examples of them.
- b** P_____ f_____ join two parts of a machine or a material permanently. They are designed for single-use as they cannot be removed without damaging the part or the connection area. **Rivets, welds** and **solders** are some examples of this type of fasteners.

B Write the names of **non-permanent fasteners** under the pictures.

washer

nut

pin

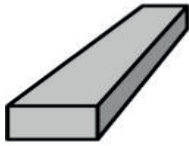
bolt

stud bolt

key

cotter pin

screw



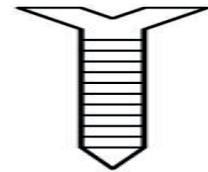
1 **key** _____



2 _____



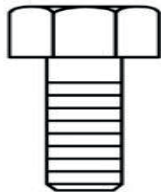
3 _____



4 _____



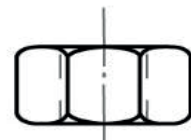
5 _____



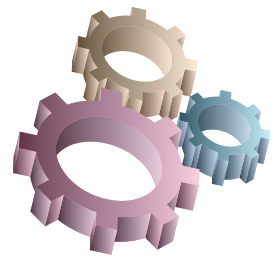
6 _____




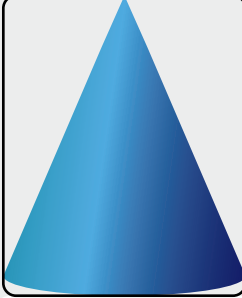


7 _____



8 _____



C Reorder the letters and write the names of geometric shapes.

			
3 q-a-u-s-r-e _____	2 n-e-c-o _____	1 c-l-i-y-d-r-e-n _____	4 x-h-l-i-e _____

D Read the definitions below and fill in the gaps with the names of **non-permanent fasteners** on page 140.

- _____ is an element that transmits movement and moment **mutually** between the shaft and the **hub**. It also provides safety and prevents their separate movement.
- _____ is a fastener that is detachably attached to the bolt and stud.
- _____ is a cylindrical or conical steel element that connects the machine parts in a removable way.
- _____ is a metal object similar to a nail, with a helix around it.
- _____ is an object with a hole in the middle, usually ring, sometimes square. It is used between the nut and bolt head, and the machine part.
- _____ is used to prevent nuts from coming out of the **adjusting** rings and pins.
- _____ is a headless fastener which is **threaded** at both ends and connects the parts together in a detachable way.
- _____ is a fastener with a screwed head, which is used to connect two parts to each other in a **detachable** way.

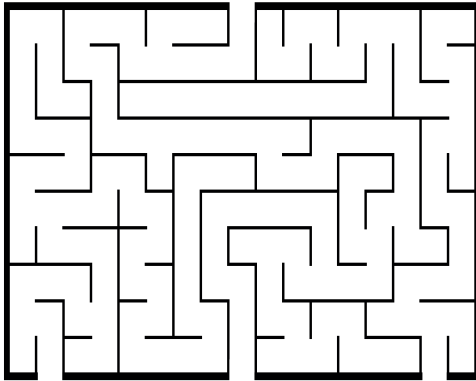
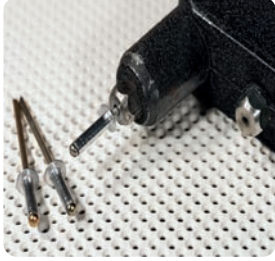
E Use the correct highlighted word from Exercise D to complete sentences.

- What kind of an equipment do I have to use to _____ a hole in this metal sheet?
- Two famous companies developed a _____ beneficial relationship.
- I always _____ the car seat so I can reach the pedals easily.
- _____ is the central part of a propeller that the shaft passes through.
- The handle of the device is _____; so, you can pull it apart and put into its box easily.



F Solve the mazes for the names of some permanent fasteners, and circle the correct option.

1

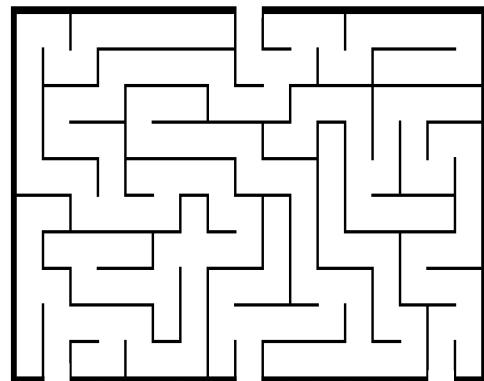


solder

rivet

weld

2

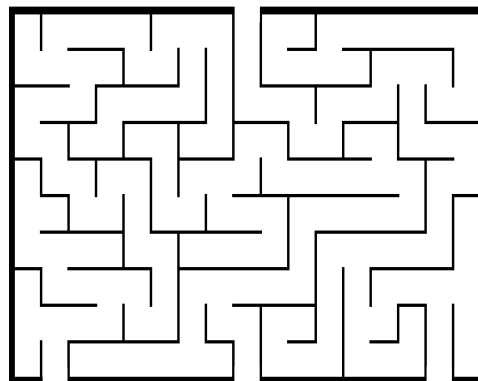


weld

solder

rivet

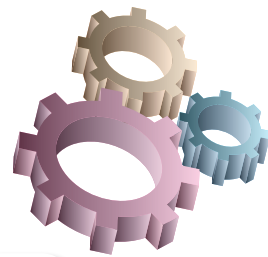
3



rivet

weld

solder



II Listening and Reading



41312

A Read the definitions and circle the correct choices for the methods of permanent fastening.

- a **Riveting/Welding/Soldering** is the fastening method that is used to join two or more metal pieces of similar nature permanently using heat and pressure to fuse them together.
- b **Riveting/ Welding/Soldering** is the fastening method that is used to join metal pieces of similar or different types by melting an additional material called solder between them without melting the pieces of metals themselves.
- c **Riveting/ Welding/Soldering** is one of the fastening methods that is applied using a mechanical fastener consisting of a head and a tail. Holes are drilled in the metal pieces that are going to be joined, the fastener is installed in the holes, and firmed by pressing or using a hammer.

B Read the paragraphs in Exercise A again and write **TRUE** or **FALSE**.



- 1 Welding is a kind of permanent fastening methods that is applied using an additional piece of metal. _____
- 2 Different types of metals can be fastened by welding. _____
- 3 An additional fastener called rivet is used to join metals together in riveting. _____
- 4 Different types of metals cannot be joined by soldering. _____
- 5 Heat is used in both welding and soldering processes. _____

C Look at the pictures below and try to find out the correct sentences describing the **welding types**.



- 1 In picture _____, Mr Koçan is welding by melting the metal and filler metal with the heat generated by the combustion of oxygen and acetylene.
- 2 In picture _____, Mr Turgut is welding by creating an electric arc between the electrode (filler metal) and the base material through a power source.
- 3 In picture _____, Mr Usta is welding by protecting the welding place from oxygen and external effects with a powdery substance.

D Listen to the recording about the lubrication of the moving parts of the machine elements and answer the questions.

- 1 What is the name of substance that forms a layer between two solid objects?

- 2 What is the operation called?

- 3 What are the names of often used lubricants?





41313

E Listen to the recording in Exercise D on Page 143 again and circle the correct word you hear.

Oil is a substance that forms a layer between two rubbing solid objects; **separates/unites 1** them from each other. Therefore, it **minimises/maximises 2** friction, ensures easy movement of the parts and **prevents/allows 3** their wear. Operations with these substances is called **painting/lubrication 4**. Lubricating oils with **different/same 5** properties are used for varied mechanisms in ships. **Oil and grease,** are used as lubricants very **often/rarely 6**. Some **unfixed/fixed 7** and basic moving machine parts may require external **lubrication** as written in the lubrication catalogues. **Regular/irregular 8** lubrication prevents rust and corrosion, prolongs the working life of these parts.

F Choose the correct highlighted word from Exercise E and write it under the photos.



1 _____



2 _____



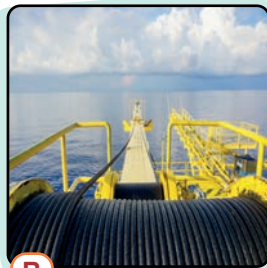
3 _____

G Match the pictures with the elements whose moving parts needs lubrication.

1 steel wire rope ___ 2 crane ___ 3 windlass ___ 4 watertight door ___



A



B



C



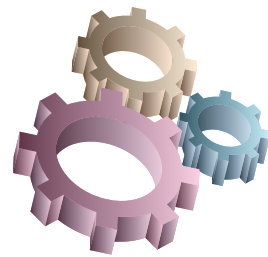
D

III Speaking

Work in groups and discuss the following questions.

- 1 What can be the advantages of lubrication?
- 2 Which movable parts need lubrication?

e.g. Student A: For example; regular lubrication of the capstans, steel ropes, various door or hood hinges prevents rust and corrosion as well as prolonging the life of the elements.



IV Writing and Vocabulary

A Read the sentences below and fill in the gaps with a word from the boxes.

fixed

intervention

auxiliary

joints

- 1 Main and _____ engines on ships have their own lubrication systems.
- 2 Lubrication systems do not require external _____, except for level monitoring, feature control and oil change.
- 3 Some _____ and simple moving ship elements may require external lubrication as written in the lubrication catalogues.
- 4 The _____ of various mechanisms such as winches and cranes are regularly lubricated.

B Reorder the words to form meaningful sentences.

- 1 metal, plastic or wood/circular/machine elements/that/are/**pulleys**/can be.

- 2 machine elements/used in/**gear wheels** /motion and power transmission /are.

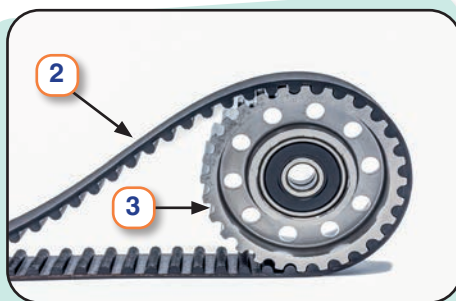
- 3 flexible materials/provide/between pulleys/**belts**/are/that/power and motion transmission.

- 4 **chain**/by connecting/many identical parts/is produced/loosely.

C Match the photos with a word written in bold from Exercise A.



1 _____



2 _____

3 _____



4 _____



Work in groups of four. Visit a vessel or a school workshop. If you are allowed, take at least ten pictures of permanent and non-permanent fasteners. Prepare a portfolio about your visit and present it to your class. Make sure your presentation includes these points:

- Different types of permanent and non-permanent fasteners
- Different types of welding

SELF ASSESSMENT 9



I can recognise permanent and non-permanent fasteners



I can evaluate the steps before, during and after lubrication.



I know belts, gear wheels, chains and pulleys.



REVISION 9

A Pick the odd word.

- | | | | |
|-------------|-------------|------------|-----------|
| 1 bolt | nut | rivet | washer |
| 2 welding | lubricating | soldering | riveting |
| 3 pin | belt | chain | pulley |
| 4 arc | resistance | submerged | chain |
| 5 acetylene | electrode | gauge | oxygen |
| 6 stud bolt | screw | cotter pin | electrode |

B Choose the correct item.

- Which one is not a welding type?
 - arc welding
 - submerged arc welding
 - gas welding
 - hydrogen arc welding
- Which of the following is correct?
 - A belt is made of metal.
 - Belts help the movement of pulleys.
 - A belt is a permanent fastener.
 - Belts need to be replaced every month.
- Which is correct about the following non-permanent fasteners?
 - A washer is generally used between key and nut.
 - A pin cannot be detached from where it is placed.
 - A stud bolt does not have a head.
 - A key has a hole in the middle.



- Learn about heat treatment on materials
- Get familiar with paint types that helps to prevent corrosion on vessels
- Be able to explain the stages of surface preparation for painting
- List the types of paints used in maritime industry
- Understand why cathodic protection is necessary on vessels



I Reading and Writing

A Match the questions with the answers about **heat treatment**.

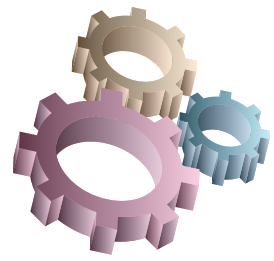
- 1 What can be heat treated? ____
- 2 Which materials are used in heat treatment? ____
- 3 What is heat treatment used for? ____
- 4 How does heat treatment affect the materials? ____

- a To give required properties to the materials.
- b The hardness, grain structure and mechanical properties of the materials reach the desired values at the end of the process.
- c It is the controlled heating and cooling processes of some materials.
- d Solid metals and alloys.

B Re-order the sentences describing **steel production process**.

- ____ Casting process is applied to the steel and it is poured into molds in various shapes.
- 1 The iron ore, which is the raw material of steel, is crushed and washed.
- ____ The steel in the molds is cooled and cut.
- ____ Adequate proportions of other materials such as oxygen, limestone and sand are added to the molten iron, which has come out of the blast furnace, and it is turned into steel.
- ____ The blast furnace is used for melting the iron ore to obtain high-temperature liquid iron which is the main material of steel.
- ____ The coke oven creates high temperatures by burning the coal to smelt the crushed and washed iron ore.





II Speaking and Vocabulary

- A Describe the photos of **painting process on a vessel**. Give details like where people are, what they are wearing, what they are doing, what kind of equipment they are using etc.

e.g., In Picture A, two crew members are washing the main deck to remove residue using detergent. They are wearing white helmets and coloured overalls.

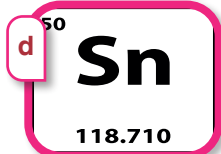
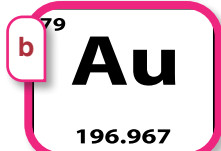
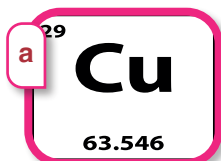


B Complete the sentences with the verbs in the box and then match them with the photos in Exercise A.

paint	wash	scrape	stick	mix
use	apply	prepare	work	

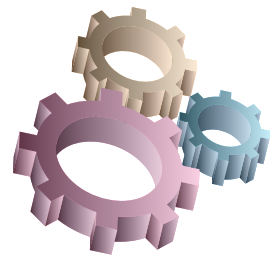
- 1 A crew member *is painting* a platform with yellow-black to make warning. E
- 2 A craftsman _____ the brush under water after finishing the work. ____
- 3 A crew member _____ with a high-pressure washer to clean the hull of the vessel before the painting process. ____
- 4 Shells _____ on the surface of rudder and keel. ____
- 5 A worker _____ the surface to remove the rust. ____
- 6 An able seaman _____ the paints in the paint room.. ____
- 7 A rating _____ the vessel's deck for upcoming painting. ____
- 8 Two crew members _____ the cargo residue on the deck floor using a cleaning solvent. ____
- 9 An ordinary seaman _____ lead oxide to prevent corrosion. ____

C Re-order the letters for **metal coatings** and then draw lines to the correct chemical symbol.

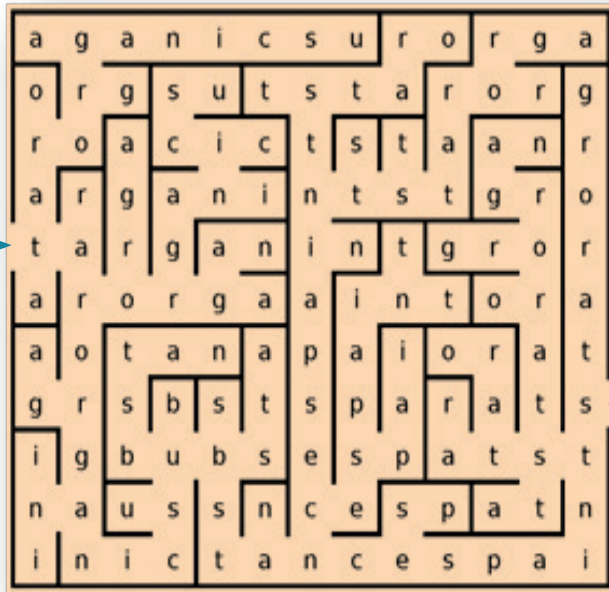


- 1 d-e-a-l
lead
- 2 a-d-m-c-u-i-m
- 3 o-p-c-r-p-e
- 4 n-c-i-z
- 5 h-o-r-m-c-u-i-m
- 6 i-n-t
- 7 k-e-l-i-n-c
- 8 l-o-d-g





D Write three **non-metal coatings** by finding correct path in maze. Then, match the words with the pictures.



- 1 t _ _
- 2 o _ a _ _ s _ st _ _ c _ _
- 3 p _ n _ _



III Listening

A Listen to the recording and number the **painting process** in the correct order.



41314

- a ____ Abrasive scraping, water jet or mechanical cleaning methods are applied to remove temper and rust.
- b ____ When the washed surfaces dry, the lead oxide is applied as a preservative.
- c ____ Brushes used in painting are carefully cleaned, dried and stored in appropriate places.
- d ____ Barnacles sticking to the surface are cleaned by washing and using chemicals if necessary.
- e ____ The painting of the surface is completed by applying the second coat and the last coat of paint.
- f ____ The surface is cleaned with fresh water to clean fine rust dust and dissolved salts.
- g ____ When the lead oxide dries, the first coat of primer is applied, ensuring that the paint covers the surface completely.
- h ____ Substances such as oil and grease are cleaned with a material such as emulsion or detergent.
- i ____ When the painting process ends, the lids of the remaining paints are carefully closed and stored in appropriate places.





41315

B Listen to the three painters and write the **paint types** that they are talking about from the box below. One is extra.

chlorinated rubber paint	anti-fouling paint	anti-corrosive primer	epoxy paint
--------------------------	--------------------	-----------------------	-------------

AMİR



_____ is a single pack solvent-based coating that provides excellent moisture resistance.

ELİF



_____ is a type of paint that is put on bare surfaces such as wood and metal before they are painted. It helps the paint stay on the surface and it protects iron and steel structures from corrosion.

PETER



_____ is a type of paint which has toxins to poison any attached organisms and prevent s others from sticking to the paint.



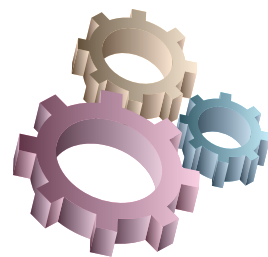
IV Reading

A Read the text below and write the correct abbreviation on the picture.

Cathodic protection is the method used to prevent the structural **deterioration** of metals due to electrochemical corrosion. The purpose of cathodic protection is to bring the metal in which **electrochemical** corrosion occurs to the cathode state and protect it.

It can be done in two ways; galvanic anode cathodic protection (**GACP**) and impressed current cathodic protection (**ICCP**). In the first method, electrochemical corrosion can be prevented by placing a more active metal -**sacrificial** anode- than the wearing metal in the system. In the second method, the electric current from the **external** source prevents corrosion of the worn part by cutting off the electron flow that causes the corrosion.





B Read the text again and fill in the blanks with the correct highlighted word from Exercise A on Page 152.

- 1 _____: the fact or process of becoming worse
- 2 _____: coming from the outside
- 3 _____: designed to be used up or destroyed in achieving a purpose or function
- 4 _____: relating to the production of chemical changes using electricity

C Answer the following questions according to the text in Exercise A on Page 152.

- 1 What is the aim of cathodic protection?

- 2 How is a sacrificial anode used to prevent corrosion in galvanic anode cathodic protection system?

- 3 How does impressed current cathodic protection (ICCP) prevents the corrosion?

D Read the text again and write **TRUE** or **FALSE** next to the sentences.



- 1 Cathodic protection prevents metals from corrosion. _____
- 2 Cathodic protection can be achieved using galvanic cathodes. _____
- 3 Sacrificial anode is used in impressed current cathodic protection (ICCP). _____
- 4 Disconnecting electron flow is the main target of galvanic anode protection method.



Get two pieces of steel plate. Apply necessary paints on the first piece of steel plate by following the painting steps. Leave the second plate as you get. Expose both of them to the sea water in different boxes. Observe them for one week. After one week, take them out and write your observations about their wearing degrees. Present it to your classmates. Discuss in groups of four advantages or disadvantages of painting. Don't forget taking photos of your painting process and adding them to your observation notes.

SELF ASSESSMENT 10



I am familiar with paint types that helps to prevent corrosion on vessels.



I can explain the stages of surface preparation for painting.



I can list the types of paints used in maritime industry.



I can understand why cathodic protection is necessary on vessels.



REVISION 10

A Choose the correct word written in bold.

- 1 **Iron/Steel** is a metal that contains carbon.
- 2 Mechanical properties of materials **can/cannot** be changed through heat treatment.
- 3 **Tar/Tin** is a type of the non-metal coating.
- 4 **Anti-fouling toxic paint/Anti-corrosive primer** is applied before the main coating.
- 5 **Anti-fouling toxic paint/Anti-corrosive primer** targets barnacles that stick on the ship or machine parts.
- 6 **Primer/Epoxy** should be applied after the lead oxide.
- 7 A sacrificial anode is used in the **galvanic anode cathodic protection/impressed current cathodic protection**.
- 8 First coat of primer should be applied when the lead oxide is **wet/dry**.
- 9 Oil and grease are cleaned **with emulsion or detergent/by scraping the surface**.

B Pick the odd word out.

- | | | | |
|--------------|--------------|----------|----------------|
| 1 iron | steel | carbon | epoxy |
| 2 chromium | primer | tin | nickel |
| 3 washing | cleaning | scraping | heating |
| 4 cathode | anode | cadmium | current |
| 5 lead oxide | anti-fouling | epoxy | anti-corrosive |



REPAIRS AND PRODUCTION ON VESSELS



- Recognise the materials used in repair and production on vessels
- Learn what kind of production and repair operations are carried out on ships
- Get familiar with the rules of use for electrical hand tools



I Listening and Vocabulary



41316

A Listen to the recording. Fill in the missing letters of the words for **repairs** and **production processes on a vessel** and write them under the speech bubbles. One is extra.

Fi_ing

H_li-co_l

Me_suri_g

D_illin_

Thr_a_ing

S_ar_eni_g

Cu_t_ng

SPEAKER 1

1

SPEAKER 4

4

SPEAKER 2

2

SPEAKER 5

5

SPEAKER 3

3

SPEAKER 6

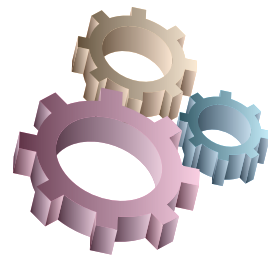
6

B Listen to the recording again and fill in the blanks with a word or phrase.



41316

- 1 Kerem likes to **separate** the plates, profiles and many other metals into parts. He uses a _____, steel chisel, and _____ for cutting.
- 2 This helps the material to be shaped according to the required dimensions. I use many materials including steel ruler, steel V block, height gauge, _____, punch and _____ square.
- 3 One of the duties of a metal worker is the _____ from metal parts with the help of **files** with cutting teeth.
- 4 Threading is the process of opening _____ **threads** on cylindrical surfaces.
- 5 During sharpening work, I create the necessary _____ or correct the **deteriorated** cutting angles.
- 6 Another repair worker prevents _____ from **loosening** due to **vibration**.
- 7 I generally make **cylindrical** holes on surfaces with tools such as _____, countersink and reamer.



C Read the definitions below and match them with the correct highlighted word from Exercise B.

- a** _____: having a shape like a cylinder
- b** _____: the raised line that curves around a screw
- c** _____: becoming less tight and fixed
- d** _____: cutting tools used to remove or flatten rough and sharp edges from cut metals
- e** _____: to move apart; to make people or things move apart
- f** _____: something that became worse
- g** _____: continuous shaking movement or feeling

D Match the pictures with the tools from the box below.

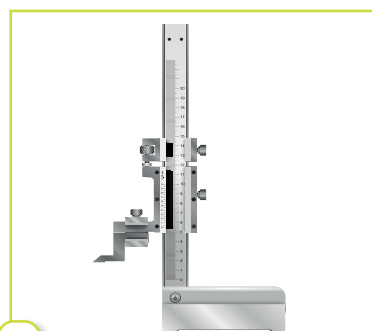
handsaw	height gauge	drill bit	steel ruler	tap wrench	snips
---------	--------------	-----------	-------------	------------	-------



1



2



3



4



5



6

E Choose the correct word written in bold.

- 1 John: I need to cut the profiles.
Mete: Wait for a second. I am bringing **drill bit/handsaw**. That will do the job.
- 2 **Punch/Height gauge** is used to draw parallel and linear lines in precise dimensions to the workpiece.
- 3 Chris: Ali, do you know which one is used for threading the inner surface of the holes, die wrench or tap wrench?
Ali: **Die wrench/tap wrench**, for sure!
- 4 **Snips/Handy files** are hand tools for cutting sheet materials easily.



F Look at the photos and fill in the blanks using the words given in the boxes.

countersink

steel square

measuring plate

handy files

bench vise

punch

screw pitch gauge

steel V block

die wrenches



1

_____ are hand tools for shaping by removing chips from the surface of the workpiece.



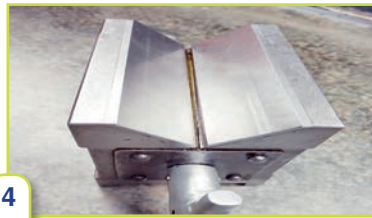
2

_____ is a measuring tool used to check whether the threads drilled on the shaft are in required properties.



3

_____ are hand tools for threading the outer surface of the shafts.



4

_____ is a block that enables measuring and control of cylindrical parts.



5

_____ is a hand tool for making the upper part of the hole wider in a conical or cylindrical shape.



6

_____ is a smooth surface made of iron. Marking is performed on it.



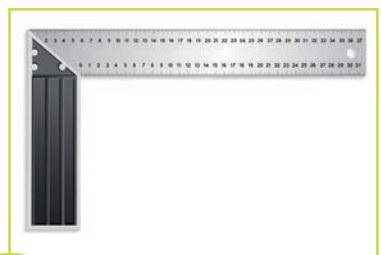
7

_____ is used to make a dot mark to prevent the measuring lines from disappearing and to determine the centre of the holes to be drilled on the workpiece.



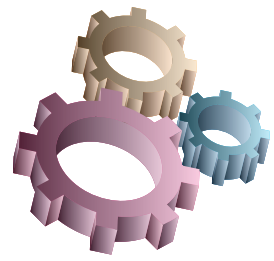
8

_____ are tools for fixing workpieces between opposing jaws.

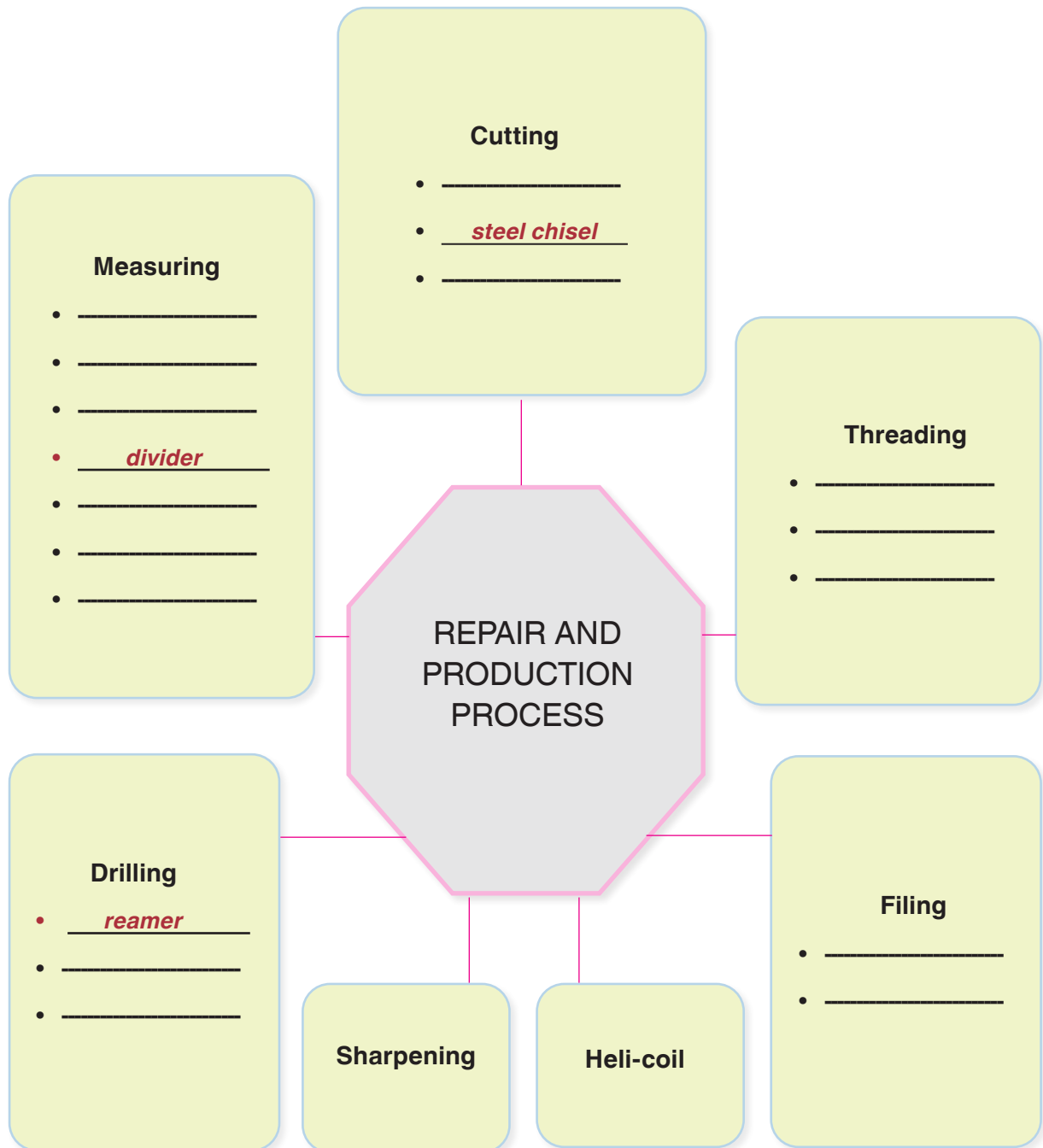


9

_____ is used to check the smoothness of surfaces or corners.



G Write the tools from Exercise D and F under the correct titles on the spider web.





II Reading and Writing

A Write where the hand tools are used with the given clues.



1

draw / divider / circular lines

e.g. Divider is used in measuring to draw circular lines on the workpiece.



2

correct / surfaces / holes / inner / reamer



3

metals / steel chisel / breaking / pieces

B Read the paragraph and write questions according to the answers.

With the development of technology, many electrical hand tools have been produced to make the work easier. These tools can be used in many operations such as cutting, grinding, drilling, sanding, screwing. Although it makes our life easier, rules must be followed in order to prevent negative situations that may happen while using electrical hand tools.

1 _____

They ease the workload.

2 _____

Cutting, grinding, drilling, sanding, screwing, etc.

3 _____

To prevent negative situations that may happen while using electrical hand tools.

C Match the words to form a meaningful collocation.

1 slippery _____

2 possible _____

3 regular _____

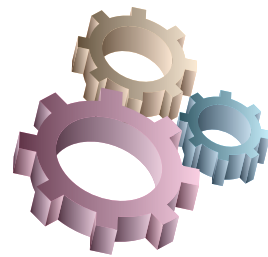
4 properly _____

a stored

b maintenance

c accidents

d handles



D Read the rules that must be followed while using the hand tools and write **TRUE** or **FALSE**.



- 1 Hand tools must be suitable for the work that they are going to be used for. _____
- 2 Maintenance of the hand tools must be done completely and regularly. _____
- 3 Maintenance of the hand tools can be done by anyone easily. _____
- 4 Hand tools must be stored properly. _____
- 5 Faulty hand tools can be used until they are completely broken. _____
- 6 Handles of the hand tools must be ergonomic and robust. _____
- 7 Handles of the tools must be oily. _____
- 8 The workpiece must be fixed. _____
- 9 Working hand tools can be intervened before they stop completely. _____

E Match the phrases to complete the **drill operating instructions**.

- | | |
|--|---|
| 1 Work in accordance with _____ | a to prevent the machine from overheating. |
| 2 Use appropriate _____ | b the piece properly. |
| 3 Check drill electrical connections _____ | c while the drill is running. |
| 4 Fix _____ | d occupational safety rules. |
| 5 Fix the piece _____ | e to be drilled. |
| 6 Do not touch the moving parts _____ | f leave the drill clean and safe. |
| 7 Drill _____ | g personal protective equipment. |
| 8 Use coolant when drilling _____ | h the appropriate drill bit. |
| 9 When drilling is finished, _____ | i before starting work. |



Work in groups of four. Visit the workshop of your school. Select a category of repair and production process. Explain to your classmates the following;

- the names of the hand tools used in that process
- the hand tools' area of use
- why the process and hand tools you selected are important for repair and production.

SELF ASSESSMENT 11



I can recognise the materials used in repair and production on vessels.



I am familiar with the repair and production works.



I am familiar with the rules of use for electrical hand tools.



REVISION 11

A Choose the odd one.

- | | | | | |
|---|-----------------|--------------|--------------|-------------|
| 1 | steel V block | punch | steel square | bench vise |
| 2 | handsaw | steel chisel | handy file | snips |
| 3 | measuring plate | reamer | countersink | drill bit |
| 4 | tap wrench | height gauge | die wrench | screw pitch |
| 5 | filing | cutting | painting | drilling |

B Here is a word bingo, a game in which players mark off the words on cards as the words are drawn by your teacher, the winner is the first person to mark off all his/her words. Don't forget to say the names of the words on your own language.



41317





SHEET METAL AND PIPE APPLICATIONS ON VESSELS



- Learn about the processes of bending and cutting sheet metals
- Recognise the types of cutting tools or machines
- Understand what kind of pipes are used on vessels
- Get familiar with the advantages of specific pipe types





I Speaking and Vocabulary

A Look at the photos below and talk about the situations, where people are, what they are wearing, what they are doing, what kind of equipment they are using etc.

e.g. In the first picture, workers are welding some metal sheet parts of a vessel in dry dock. They are wearing welding goggles, but not safety harnesses.



B Write the names of **sheet shearing tools** under the photos and match the numbers with their definitions.

hand lever(bench) shears

tin snips(shears)

guillotine shears

electric shears



1



2



3



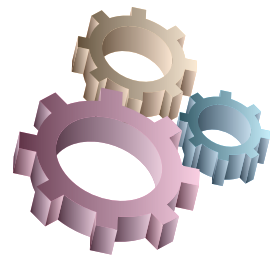
4

a _____ cut metals with high speed blades and rotating jaws powered by electricity.

b _____ use their blades to cut sheet metal with a long lever that increases force to operate the blades by hand.

c _____ work by dropping a blade on to the sheet metal to cut it.

d _____ are hand tools similar to ordinary scissors; however, they are stronger and allow control for perfect cutting.



C Write the missing words of the **fastening types** and three examples for each.

1 **fasteners** _____

2 **fasteners** _____



II Reading and Writing

A Choose a word from the text about metal bending to complete the crossword by using the clues given below.

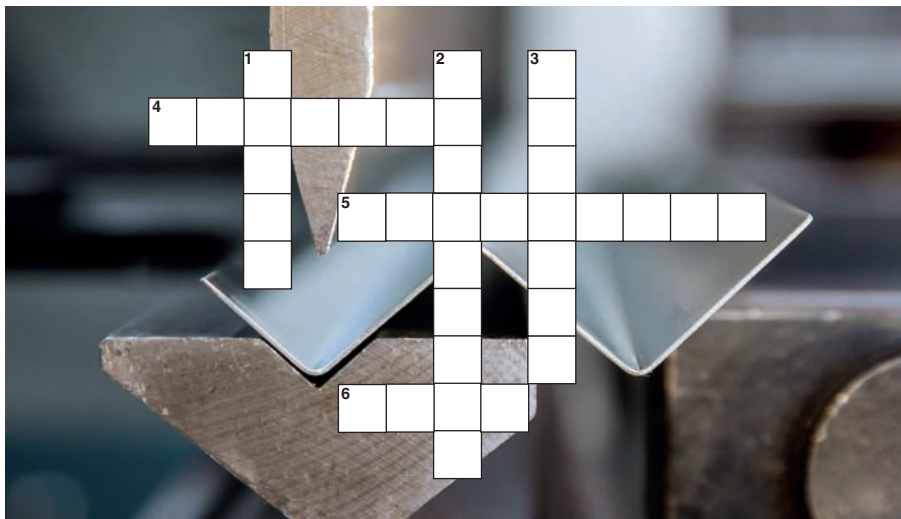
Metal bending is a process that gives shape to metals by applying force on them. Permanent physical changes can be achieved during bending process in sheet materials. Sheet materials can be cut to specified dimensions using different sheet shearing tools. In order to connect separate sheets, permanent fasteners such as weld and rivets can be applied as well as non-permanent fasteners.

across

- 4 To succeed in finishing something or reaching an aim, especially after a lot of work or so.
- 5 The length, width, height, or depth of something.
- 6 To use force to cause something, such as a wire or pipe to become curved.

down

- 1 External form or appearance; figure.
- 2 Not temporary, lasting for a long time or forever.
- 3 To join two or more things together

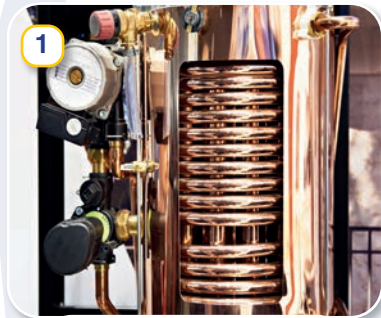


B Match the sentences with their halves.

- 1 **Plastic pipes** have become an alternative for almost all systems with the production with different properties, _____
- 2 **Steel galvanized pipes** are used _____
- 3 Due to the high thermal conductivity of **copper and aluminium pipes**, _____

- a in systems operating under conditions such as high temperature and vibration.
- b they are used on vessels.
- c are preferred for reasons such as ease of installation and longevity.

C Choose a pipe type from Exercise B and write it under the pictures. Then, write the advantages of them.





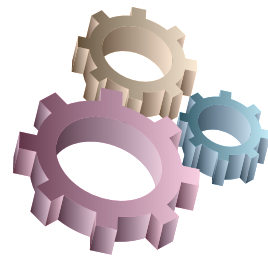


ADVANTAGES

1 _____

2 _____

3 _____



Work in groups of four. Visit a vessel. Take photos of vessel parts made of sheet metal and pipe types. Inspect which fastener type is used. Interview with the crew members; ask questions about advantages or disadvantages of used materials. Prepare a presentation about your visit and present it to your class.

SELF ASSESSMENT 12



I know about the processes of bending and cutting sheet metals.



I can recognise the types of cutting tools or machines.



I can understand what kind of pipes are used on vessels .



I am familiar with advantages of specific pipe types.



REVISION 12

A Choose the correct item.

- Which of the following is NOT a shear type that is used for cutting sheet metals?
 - tin snip
 - guillotine
 - jet chisel
 - electric
- Which of the following is NOT an advantage of plastic pipes?
 - They can work for many years.
 - They can be produced in many different types.
 - They are easy to work.
 - They can be used in high temperature.



3 Which is true about sheet metals?

- a They can be cut by using various tools.
- b They cannot be connected to other metals
- c They cannot be shaped.
- d Welding is not possible for sheets.

4 Copper and aluminum pipes are NOT used in _____.

- a heating
- b hydraulics system
- c cooling
- d air conditioning systems

B Find fifteen words related to sheet metal and pipes. Write them in the boxes given below.

gsjdfssmcguillotinemansdsasbshbenchsjwqhsgwelectricshearskwswpwairconditioningrxnvm
gwwipcprbendingowreyeirgalvanizedwretueietinsnipuicsmhajzxnweldingwsgjsoheatingeuwgsdc
coppergtknakdsjadplasticrwtwyuerivettwyueoqweyiejcoolingxbiospsagunsolderingtwywuiwjsaluminium

<u>guillotine</u>				



SCRIPTS

UNIT 1 SEAFARING ESSENTIALS

1A VESSEL TYPES

III LISTENING

A - B

A vessel is a watercraft which moves on water by a propulsion system like ships or boats. Vessels can be used for military purposes, pleasure, or public utility. Most vessels are used for commercial purposes, like transporting cargoes or passengers. Ships are usually large, offshore vessels.

They carry cargoes or passengers from one port to another, or among multiple ports. On the other hand, boats are small crafts used in coastal waters for different purposes such as fishing or assisting larger ships in various ways. There are four basic types of commercial vessels: Cargo carriers, passenger ships, service vessels and fishing vessels.

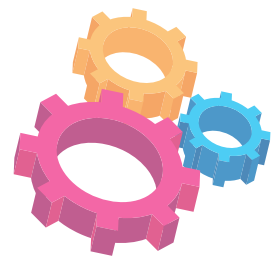
Cargo carriers are the most common commercial ships. They carry various dry cargoes, liquid cargoes, or both. The ones which carry liquid or liquified cargo are known as tankers. Widely used cargo ships are container ships, bulk carriers, general cargo ships, heavy-lift cargo ships, reefers, Ro-Ros, livestock carriers, oil tankers, LNG/LPG tankers and chemical tankers. Passenger ships are also used for commercial purposes. Two types of passenger ships are commonly used today: Ferries and cruise ships. The former is used for short cross-water trips for passengers and vehicles between fixed routes; the latter is preferred for pleasure trips with a lot of onboard facilities like the ones in luxurious hotels.

Fishing vessels are used for catching or processing fish. Trawlers, gillnetters, long liners and seiners are among widely used fishing vessels. They are named according to their method of catching the fish, or the type of the equipment they use to catch the fish. Except for these, there are fish processing vessels which process the caught fish and get it ready for the marketing.

Service vessels are used to assist larger ships, or they provide the needs of ships such as provisions, fuel, or equipment. Tugs, offshore-supply vessels, icebreakers, dredgers are among most commonly encountered service vessels. Some service vessels, like cable layers or pipe layers, deal with underwater infrastructure. They are used to lay or repair underwater cables or pipes.



SCRIPTS



VI LISTENING AND SPEAKING

Cemre: *What type of a ship would you like to work on in the future?*

Murat: *I think, I would choose to work on a tanker.*

Cemre: *Why is that?*

Murat: *My uncle is an engineer on a tanker and he says that you earn a lot when you work on a tanker. Also, you have got a lot of skills that will be useful for your career.*

Cemre: *It sounds nice. I have never thought in that way.*

Murat: *What about you?*

Cemre: *I suppose I would like to work on a cruise ship. I think voyages among beautiful coastlines would be fun and I love seeing different touristic places.*

Murat: *That sounds fun. I hope you can have spare time to enjoy those places.*

Cemre: *I hope so.*

1B THE CREW

II LISTENING AND SPEAKING

B

Deck crew consists of deck officers and deck ratings who are responsible for the navigation, cargo operations, mooring and anchoring operations. Deck officers fill out the deck log book related to their work during watchkeeping.

The master represents the ship owner or the company during navigation, and he is responsible for everything on board as he holds the highest rank.

As he is the head of the deck department, the chief officer schedules and oversees all operations in the deck department.

The second officer is usually designated as the vessel's medical officer, and he also updates the charts and publications.

The third officer assists the chief officer with the check and maintenance of fire-fighting and life-saving equipment.

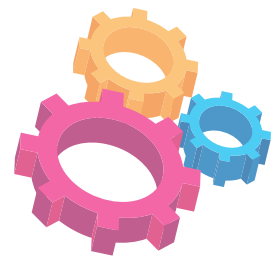
A deck cadet is a trainee officer who is learning and practising the necessary skills to be a deck officer in the future.

The boatswain is the head of deck ratings; so, he supervises and mostly takes part in the operations at the deck department, and reports to the chief officer about the work.

The able seaman is a qualified and experienced member of deck ratings who is able to operate, maintain and repair most of the deck machinery and equipment.



SCRIPTS



The ordinary seaman does not have much experience or high qualifications; so, he assists the able seaman during cargo operations and maintenance work, and has some duties like cleaning, handling ropes, wires.

The pumpman is responsible for operating, maintaining and repairing liquid cargo equipment such as pumps and filters on tankers.

The cook is responsible for preparing a healthy menu for the crew members and preparing the meals on time. He orders and stores the galley supplies and also keeps the galley maintained and clean.

The steward is responsible for general cleaning of the ship and the master's cabin, assisting the cook in the galley works and keeping the provision store room proper and clean. He also provides the needs of the ship crew such as detergent, soap, paper towel, toilet paper, clean sheets etc.

C-D

- 1 Hello, I am Hasan. I am a donkeyman on a container ship. I am the head of engine ratings. I assign their duties and manage them to do their work properly. I am responsible for the stocks and the equipment in the engine room and the routine control of the bilge and bilge pumps. I report to the second engineer.*
- 2 Hello, I am Ahmet. I am an able seafarer engine. I usually assist maintaining and repairing of main propulsion and auxiliary machinery. I also take part in fuel, oil transfer, bilge and ballast operations. I handle the stores and clean the tools and equipment in the engine room.*
- 3 Hi, my name's James and I work as an oiler. I am responsible for lubricating moving parts and maintaining the oil level. I also clean and maintain the engine room and assist the engineers with the maintenance of the machinery.*

E

Ahmet: Hi Elif.

Elif: Hi Ahmet. Nice to see you! How are you?

Ahmet: Good. And you?

Elif: I'm fine. You are taring on a bulker, right? How is it going?

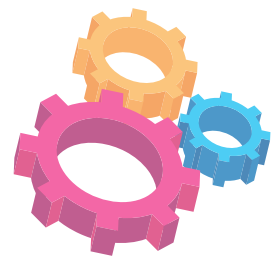
Ahmet: It is fun. The voyage is usually longer than other ships, and you have enough time at ports to see around.

Elif: What do you usually do? What is your routine like?





SCRIPTS



Ahmet: *I assist engineers during working hours. I learn a lot from them like running the main engine and generators, watching the indicators, sounding fuel tanks, maintaining separators and valves, changing filters of fuel and lubricating oil. Sometimes you have to do errands, but you still have enough spare time for yourself. How about you?*

Elif: *I'm training on a container ship and practice similar works like you, but our working conditions are a bit different. We have shorter time at ports and we drop in more than one port during a voyage; so, we don't have much time to see around. It is tiring for me, but, I like being on board. I've made a lot of new friends and we have great time together.*

Ahmet: *Glad to hear that... Sorry, I got to go now.*

Elif: *Catch you later!*

Ahmet: *OK. See you!*

1C THE DOCUMENTS

I LISTENING

A - B

Applicant: *Hello. I am Deniz Akdemir. I am here to apply as an engineer in your company.*

Personnel Manager: *Hello Mr. Akdemir. What is your capacity?*

Applicant: *I am a third engineer.*

Personnel Manager: *Which school did you last graduate from?*

Applicant: *I am a high school graduate. I graduated in 2015.*

Personnel Manager: *Have you done your military service?*

Applicant: *Yes, sir. I did my military service in 2017.*

Personnel Manager: *Are you married?*

Applicant: *No, sir. I am single.*

Personnel Manager: *Do you know any foreign languages?*

Applicant: *Yes. I have got an upper intermediate level in English. I also know a little Spanish.*

Personnel Manager: *What is your register port?*

Applicant: *My register port is İzmir.*

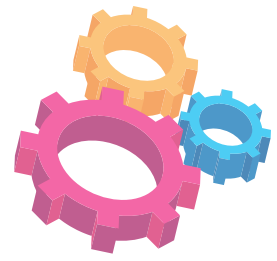
Personnel Manager: *Do you have any experience?*

Applicant: *Yes, I do.*

Personnel Manager: *Which company did you work for?*



SCRIPTS



Applicant: I worked for Kırlangıç Maritime, on M/V SAKA as a third engineer.

Personnel Manager: How long did you work on that vessel?

Applicant: I worked from June, 2019 to December, 2020 ... about one and a half year.

Personnel Manager: Have you got necessary certificates for a seaman?

Applicant: Yes. I have got them all.

Personnel Manager: Are your documents valid?

Applicant: Yes. They are all valid.

Personnel Manager: OK. Fill in the application form, please. We will have a personnel change in a week. We'll probably call you back then.

Applicant: Oh! OK. Thank you.

UNIT 2 SHIP STRUCTURE

2A MAIN PARTS OF A SHIP

III LISTENING

The main structure of a ship consists of the hull and the machinery. The hull is the main body of the ship. It consists of various structural elements. The machinery includes all devices and equipment that help the ship move.

A ship can roughly be divided into seven parts, and there are many compartments located on these parts. We can use the names of these parts or compartments when we talk about the location of something on a ship. We can say "The propeller is at the stern." or "The bridge is above the accommodation." The direction terms also help us to say the exact locations or positions of something around our ship. For example, we can say "Motor vessel BLUEBIRD is ahead of us." or "There is a wreck on our starboard abeam."

V LISTENING AND SPEAKING

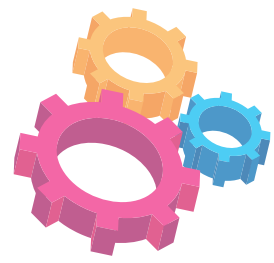
A

- 1 Be careful! There are uncharted rocks ahead of you.*
- 2 Keep clear of the wreck on your starboard abeam.*
- 3 The tug is towing Motor Vessel BLUELINE 7 towards the starboard quarter.*
- 4 There is a buoy on your port bow.*
- 5 A tanker is passing astern of the container ship.*
- 6 I see a fishing boat on our starboard bow.*
- 7 Look! There is a whale on port quarter.*
- 8 We can see Cape of Good Hope is on our port abeam now.*





SCRIPTS



2B STRUCTURAL COMPONENTS

III LISTENING AND READING

B - C

- *The keel extends from the bow to the stern along the hull. It is the backbone of the vessel. It supports the hull and holds all other things forming the skeleton.*
- *Frames cross the keel like ribs in human body. They support the hull together with the keel.*
- *Beams are attached to the top ends of frames. They support the hull against pressure of the water from the sides.*
- *Brackets are metal joints. They connect frames and beams.*
- *Bulkheads are watertight walls. They provide isolated sections to protect the cargo from external effects and damage.*
- *The shell plating is the outer skin of a vessel usually made of steel. It encloses the hull and protects it from external effects like a shell.*
- *The bulbous bow is a bulb-like extension at the vessel's bow. It reduces pitching and protects the vessel's bow when there is a collision.*
- *Bulwarks form the sidewalls and rails around the decks. They prevent seawater entry and protects the crew or passengers against fallings from the deck.*
- *The double bottom consists of two watertight layers leaving a space between the inner bottom and shell plating. It prevents cargo holds and the engine room from flooding when there is a bottom damage. It also increases the longitudinal strength of the vessel.*
- *Floors are plates at the bottom with holes. They strengthen the ship to hold the weight of the cargo, the machinery, and the tanks. They also protect the ship against crashes.*
- *The sea chest is a box attached to the inside bottom of the shell. It has inlet valves and strainers to take seawater for various purposes such as ballast, cooling, or fire-fighting etc.*
- *Bilge keels are fin-like plates at two sides of the vessel. They reduce rolling.*

2C BASIC FITTINGS

II LISTENING AND WRITING

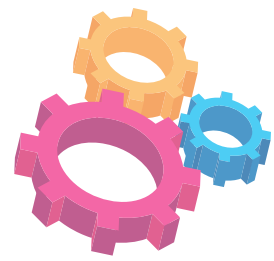
A

There are some basic fittings on each ship with various functions such as creating the propulsion power, supporting manoeuvring, anchoring, mooring, or maintaining the stability.

On almost all ships, there are two masts: The main mast is situated at the after part of the ship, on the bridge; and the head mast is on the forecastle deck. They hold navigational lights, flags, radio antennas etc. Another fixed basic fitting is the funnel. It is normally at the after part, next



SCRIPTS



to the accommodation. It is used to discharge exhaust gases coming from the engines and generators like a chimney.

The fittings that produce or support the propulsion power are the propeller, the bow thruster and the stern thruster. The propeller has curved, rotating shafts to transmit the power of the engine which helps the ship move. It is at the stern. The bow thruster and the stern thruster are like propellers enclosed by a tunnel. They ease moving to starboard and port sides, and help manoeuvring. The bow thruster is at the bow, and the stern thruster is at the stern. There is also a vertical device at the stern of the ship, next to the propeller called rudder. It is used to steer and manoeuvre the ship.

Anchor, windlass and capstan are among basic anchoring and mooring equipment. The anchor is a heavy object tied by a chain and hanged from the hawse pipe. It is usually at the bow of the ship -rarely at stern as kedge anchor- and used to moor the vessel to the sea bottom and hold it still. The windlass is a horizontal cylinder rotated by a mechanical power to make the anchor cable wind around it. It can be at the forecabin or at the poop deck. It is used for heaving up or letting go the anchor. The capstan is a vertical cylinder rotated by a mechanical power. It has a similar function with the windlass. It is usually at the poop deck.

2D MEASUREMENT

II LISTENING AND SPEAKING

A - B

SHIP MEASUREMENT

Before a ship starts her navigation, several things are measured. These measurements are very important to determine maximum cargo capacity and berthing costs, manoeuvring in shallow waters and narrow canals, passing under the bridges, docking operations, or maintaining the stability.

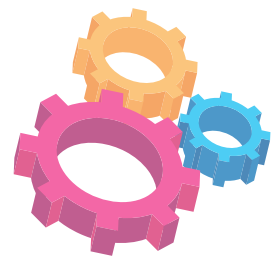
Measuring the depth and the height of a ship is necessary for having an idea about her buoyancy and stability with maximum permissible load. These values are also important for a safer voyage in shallow waters, and passing under bridges safely.

The measurement of the dimensions, including the length and the width of a ship is also important for the stability, safe manoeuvring in narrow canals, berthing and docking operations, and determining the cargo capacity.

Measuring the weight and the volume is also necessary when deciding how much load that she can carry safely.



SCRIPTS

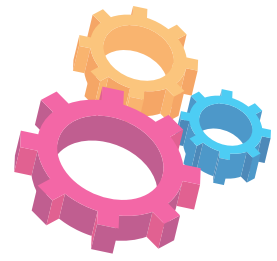


C

- VTS:** *M/V WAVEBREAKER1 M/V WAVEBREAKER1 M/V WAVEBREAKER1! This is Messina VTS! Over.*
- M/V:** *Messina VTS! This is M/V WAVEBREAKER1! Over.*
- VTS:** *M/V WAVEBREAKER1! This is Messina VTS! What is your destination port and ETA? Over.*
- M/V:** *Messina VTS! This is M/V WAVEBREAKER1! My destination port is Liverpool, UK; and my ETA is December, 5th at 1100 UTC. Over.*
- VTS:** *M/V WAVEBREAKER1! This is Messina VTS! What is your LOA and beam length? Over.*
- M/V:** *Messina VTS! This is M/V WAVEBREAKER1! My LOA is 190 metres and beam length is 14,5 metres Over.*
- VTS:** *M/V WAVEBREAKER1! This is Messina VTS! What is your LBP? Over.*
- M/V:** *Messina VTS! This is M/V WAVEBREAKER1! My LBP is 174 metres. Over.*
- VTS:** *M/V WAVEBREAKER1! This is Messina VTS! What is your maximum draught? Over.*
- M/V:** *Messina VTS! This is M/V WAVEBREAKER1! My maximum draught is 12 metres. Over.*
- VTS:** *M/V WAVEBREAKER1! This is Messina VTS! What is your loaded and light displacement? Over.*
- M/V:** *Messina VTS! This is M/V WAVEBREAKER1! My loaded displacement is 59.000 metric tons and light displacement is 30.000 metric tons. Over.*
- VTS:** *M/V WAVEBREAKER1! This is Messina VTS! What is your deadweight? Over.*
- M/V:** *Messina VTS! This is M/V WAVEBREAKER1! My deadweight is 50.000 metric tons. Over.*
- VTS:** *M/V WAVEBREAKER1! This is Messina VTS! What is your gross and net tonnage? Over.*
- M/V:** *Messina VTS! This is M/V WAVEBREAKER1! My gross tonnage is 32.000 and net tonnage is 17.000. Over.*
- VTS:** *M/V WAVEBREAKER1! This is Messina VTS! Thanks for your co-operation and good watch. Please stand by on channel 11 and 16. Out.*



SCRIPTS



UNIT 3 SAFETY AND EMERGENCY

3A WORK SAFETY AND PERSONAL PROTECTIVE EQUIPMENT

III LISTENING AND SPEAKING

A

Entanglement

Employees working near powered machinery may have a high risk of entanglement. They risk being pulled into the moving danger points of machinery. The risk of entanglement with machinery can occur during operations, maintenance, repairs, inspection and cleaning activities. Entanglement can result in serious injuries, loss of limb or death. Clothing, hair, jewellery, cleaning brushes can be easily entangled. Entanglements can be controlled by using guards and placing adequate warning signs.

Working in the Galley

Working in the galley can be challenging because of various reasons. For instance, the rolling and pitching of the ship cause burns, cuts, and other injuries because of hot oil, sharp tools and machines in the galley. It is important to wear safety shoes and keep the floors clean in order to prevent slips.

3B MARINE ACCIDENTS AND EMERGENCIES

IV LISTENING AND SPEAKING

A

DIALOGUE 1:

M/V Farend: MAYDAY MAYDAY MAYDAY. This is M/V FAREND TANGO-CHARLIE-ALFA-ONE-EIGHT Position four one degrees three five minutes north- zero one eight degrees zero six minutes east. Fire on board. Over.

Turk radio: M/V FAREND. This is Turk Radio. Where is the fire? Over.

M/V Farend: Turk radio. This is M/V FAREND. Fire is in the accommodation. Over.

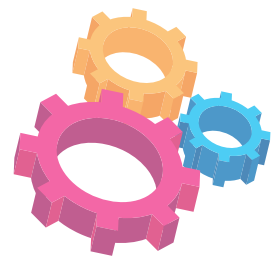
Turk radio: M/V FAREND. This is Turk Radio. Is fire under control? Over.

M/V Farend: Turk radio. This is M/V FAREND. No, fire is not under control. I require fire-fighting assistance. Over.





SCRIPTS



Turk radio: M/V FAREND. This is Turk Radio. Report injured persons. Over.
M/V Farend: Turk radio. This is M/V FAREND. No injured persons. Over.
Turk radio: M/V FAREND. This is Turk Radio. Two fire-fighting tugs and a fire-fighting aircraft is coming to your assistance. Fire-fighting aircraft will reach you within ten minutes. Over.

DIALOGUE 2:

M/V Felixin: PAN-PAN PAN-PAN PAN-PAN. All stations. All stations. All stations. This is M/V FELIXIN. Position four one degrees three zero minutes north zero two nine degrees one eight minutes east. I have one injured person on board. I require medical assistance. Over.
Turk radio: M/V FELIXIN. This is Turk radio. What is state of the injured person? Over.
M/V Felixin: Turk radio. This is M/V FELIXIN. He has serious injuries. There is massive bleeding. We cannot stop bleeding. Over.
Turk radio: M/V FELIXIN. This is Turk radio. I will send a helicopter with a doctor to pick up the injured person. Over.

B

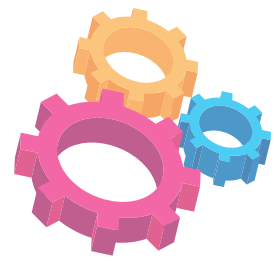
3/O: Do you know where we keep the pyrotechnic equipment on board, cadet?
D/C: Yes, sir. They are ready on the bridge room and in the lifeboats.
3/O: Let's check the pyrotechnical equipment on the bridge room.
D/C: Okay. I think the equipment is in this cabinet.
3/O: Yes, they are. We will check the numbers and expiration dates of the equipment. Check and report the equipment to me.
D/C: Of course, sir. I'm checking at once. There are twelve hand flares, six rocket parachute flares and four buoyant smoke signals. There are two months until their expiration dates.
3/O: Okay. We should note this. We must add them to the requisition list next month.

C

All crew members and passengers, attention please! This is your captain speaking. This is your captain speaking. This is your captain speaking. This is not a drill. This is not a drill. This is not a drill. Ship will be abandoned. All crew members and passengers must wear life jackets, take immersion suits and go to muster stations. All passengers must obey the given orders. Keep calm. There is no reason to panic.



SCRIPTS



3C MEDICAL EMERGENCIES AND FIRST AID

IV LISTENING AND WRITING

A

2/O: Good morning, cadet! First thing to do is to check the first aid kit, this morning.

D/C: Copy that, sir.

2/O: OK. Go ahead! Is there a problem?

D/C: The thermometer, scissors, safety pins and triangular bandage seem fine. We're running out of adhesive tape and eye drops. We don't have any gauze pads and plasters.

2/O: OK. Take note of those. We need to restock them and update the first aid kit checklist.

D/C: Got it, sir. Oh! Expiry date of antibiotic ointment is very soon.

2/O: Alright! We need to replace it with a new one. Check the conditions of the instant cold pack and antiseptic wipes.

D/C: They're fine.

2/O: OK. Make sure to restock the items we need, and replace the expiring items with new ones.

D/C: Copy that, sir.

2/O: Thank you, cadet! That's all for now.

E - F

There are basic first aid steps you should follow in case of bleeding:

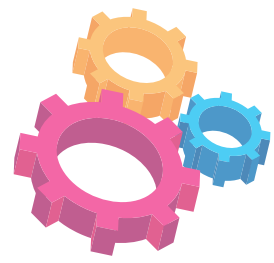
- You should apply direct pressure to the wound with a piece of cloth for 10 minutes.*
- If bleeding is from the arm or leg, you should raise the limb above the level of the heart to slow the bleeding.*
- When the bleeding has stopped, you should close and dress the wound. If bleeding starts again, you should reapply pressure and wait another 10 minutes.*
- You should take the patient's pulse and blood pressure.*
- You should clean up the blood, and dispose of all contaminated equipment.*
- You should seek medical assistance if there is a rapid pulse after the bleeding has stopped or a fall in blood pressure when the casualty stands up. A fall in blood pressure may lead to shock.*

There are things that you should not do in case of bleeding:

- You should not stop pressing on the wound during the first 10 minutes to see if it has stopped bleeding.*
- You should not remove a dressing if it is full of blood: place another dressing on top of the first one.*
- You should not use a tourniquet or attempt to apply pressure to large arteries.*



SCRIPTS



There are basic first aid steps you should follow in case of fractures:

- You should first check if the fracture is open or closed.
- You should apply an ice pack to the injured area for 10 minutes.
- You should keep the injured part above the level of the heart. This may help to reduce swelling.
- You should help the casualty rest in a comfortable position, and keep them warm with a blanket or clothing to prevent shock.
- In case of a major fracture such as collar bone and leg, you should seek medical assistance and the evacuation of the patient to an onshore hospital.

You should avoid doing these in case of fractures:

- You should not mobilize the injured area.
- You should not try to force a fracture or dislocation back into place. This may cause other injuries.

UNIT 4 INTRODUCTION TO MARINE ENGINEERING

4A STATIONARY AND MOVING PARTS OF AN ENGINE

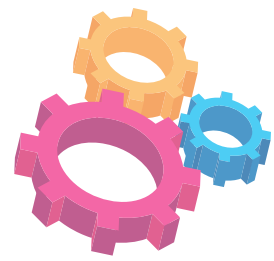
II LISTENING

A

- 1 Cylinder block is the main body of the internal combustion engine.
- 2 Cylinder head is a kind of cover on the top of the cylinder.
- 3 Cylinder head gasket is the leakproof part placed between the cylinder head and the cylinder block.
- 4 Cylinder liner is a kind of inner wall of the cylinder block with a sliding surface in which piston moves. It has scavenge ports on it in two stroke engines.
- 5 Stuffing box is the component which separates the crankcase and the scavenge air space and prevent leakage.
- 6 Bedplate is a part of the main body.
- 7 Crankcase is at the bottom of the engine.
- 8 Manifolds are the canals which let the air in, and out of the engine.
- 9 Frame is the middle part of the engine.
- 10 Crosshead guide is the fixed structure on the frame, usually consisting of two vertical rails.



SCRIPTS



B

- A** *It protects the crankshaft from external impacts.*
- B** *It eases the piston movement in the cylinder and reduces wear due to friction.*
- C** *It holds all the engine parts on it directly or indirectly.*
- D** *It holds the crankcase in it.*
- E** *They let the fresh air in, and exhaust gases equally out.*
- F** *It covers the cylinder and forms the combustion chamber in the cylinder.*
- G** *It helps the crosshead move in the right direction, with a correct alignment.*
- H** *It forms a seal between the cylinder head and the cylinder block and prevents gas or liquid leakage.*
- I** *It prevents lubricating oil steam from entering in the scavenge air space. Piston rod works in it.*
- J** *It supports the engine structure and holds crosshead guides on it.*

D1

Moving engine parts are circular or linear parts of an engine. The interaction between these parts enables power transmission within the main engine.

Piston is the linear moving part of a main engine by which triggers the interaction between the moving parts. It transforms thermal energy into mechanical energy.

Piston rings are leakproof moving components on the piston, which prevent leakage of air or pressure during compression or power strokes.

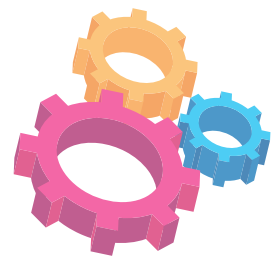
Piston rod and connecting rod transmit the motion of the piston to the crankshaft. There is a connecting rod alone in small engines. However, in larger two stroke engines there is a crosshead, which connects piston rod and connecting rod. It eliminates the lateral pressure of the piston within the cylinder.

Then, the motion is transmitted to the crankshaft. It transforms the linear motion into circular motion and transfers it to the related parts of the engine.

Camshaft takes over the circular motion from the crankshaft and it opens and adjusts timing of the valves.

Valves enable fresh air intake into the cylinder, and exhaust scavenge in four stroke engines. There are ports instead of an intake valve in two stroke engines.

There is a mechanism which transmits the motion from the camshaft to the valves if the camshaft is not directly connected to the valves. This mechanism consists of tappet, push rod and rocker arm. The motion is transmitted from the camshaft to the tappet first, then to the push rod and finally to the rocker arm. The rocker arm changes the direction of the motion and opens the valves.



UNIT 5 MARINE ENGINES

5A HAND TOOLS

II LISTENING AND SPEAKING

A

- 1 We tighten or loosen bolts and nuts using different types of wrenches.
- 2 We need a screwdriver if we want to screw or screw off.
- 3 A hammer helps us to drive nails in the smoother surfaces.
- 4 A steel wire brush will be helpful when we need to remove the rust or residues from surfaces.
- 5 We can use a hacksaw to cut the iron.
- 6 A mechanical puller is used to pull and replace heavy parts such as bearings or gears.
- 7 We use pliers to grip, tighten, loosen, or cut small pieces of metals.
- 8 Callipers are used to measure inside and outside diameters, and the depths of objects.
- 9 We rub metal surfaces via a file to remove small pieces of metal to get a smoother surface.
- 10 Micrometres make precise measurements of objects with different geometrical shapes such as pipes, shafts, and piston etc.

5B TYPES OF MAIN ENGINES

II LISTENING AND READING

A

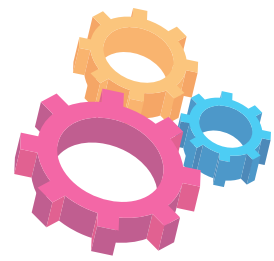
The main engine provides necessary propulsion power for the vessel to move on water. Today, internal combustion, reciprocating diesel engines are used on the majority of vessels. The combustion happens in the cylinder as a result of the piston movement. These engines convert chemical energy into thermal energy, and then thermal energy into mechanical energy. We classify internal combustion engines in two categories in terms of their cycles: four-stroke engines and two-stroke engines.

C1

In an internal combustion engine, the piston moves in a reciprocating motion and it pauses at two points to change its direction. These points are called dead centres. The uppermost point that the piston can go is top dead centre, and the lowermost point is called bottom dead centre. The volume between the two dead centres is called stroke volume. When the piston is at the top dead centre, the volume between the cylinder cover and the top point of the piston head is called combustion chamber volume. The total volume of the two gives the cylinder volume.



SCRIPTS



D2

Intake stroke: The piston moves down. The intake valve is open and fresh air is taken into the cylinder. The cylinder is filled with air when the piston reaches at the bottom dead centre.

Compression stroke: The piston moves up. Both intake and exhaust valves are closed. The air is compressed in the cylinder, thus its temperature and pressure increase. The fuel is injected into the cylinder, and it ignites due to its contact with the high temperature, compressed air.

Power stroke: The piston is pushed down by the combustion power in the cylinder and the power which runs the engine is produced in this way.

Exhaust stroke: The piston moves up. The exhaust valve is open, and exhaust gases are pushed out of the cylinder.

E1

A As the piston moves from the BDC towards the TDC, both scavenge ports and exhaust valve are open, and intake and exhaust processes continue. Before the piston arrives at the TDC, first scavenge ports, and then the exhaust valve are closed; thus, compression stroke starts.

B Through the end of the compression stroke, the fuel oil is sprayed and ignited due to its contact with the high temperature and compressed air. The piston is pushed down to the BDC with the effect of the combustion in the cylinder; thus, power stroke takes place. Before the piston arrives at the BDC, first exhaust valve, and then scavenge ports are opened, and scavenging takes place.

UNIT 6 AUXILIARY ENGINES

6A THE FUEL SYSTEM

II LISTENING AND WRITING

A - B

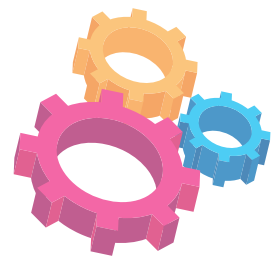
A Double bottom tank: The fuel is first taken and stored into this tank and sent to the settling tank.

B Settling tank: The fuel is heated and rested in this tank. After it is cleaned in this tank, fuel is sent to the daily service tank.

C Daily service tank: The clean fuel necessary for the operation of the main and auxiliary engines is stored in this tank.



SCRIPTS



6B THE LUBRICATION SYSTEM

II LISTENING AND WRITING

A

The lubrication system minimises friction in rotating engine parts and prevents heating and wear. A properly functioning lubrication system ensures long-lasting and efficient operation of the engines. There are three separate lubrication systems on ships; main lubricating oil system, cylinder oil system, the turbocharger lubricating oil system.

The lubrication system usually consists of lube oil sump, lube oil pump, filters and lube oil cooler.

6C THE COOLING SYSTEM

II LISTENING AND WRITING

A

The high temperature resulting from combustion in engines must be cooled and kept at a certain temperature. The cooling system ensures the water circulation in the engine and keeping the engine at the ideal operating temperature. There are two cooling systems on ships; sea water cooling system and fresh water (central) cooling system.

In the central cooling system, all the engines on board are cooled using fresh water. The sea water system works in a closed circuit and cools the heated fresh water circuit with the help of various heat exchangers. The cooling system consists of expansion tank, pumps, cooler, filter and deaerator.

B1- B2

The expansion tank is the first component of the cooling system in which the cooling water is stored. The cooling water in this tank is first directed to the deaerator and then to the filter to get refined. Then, the cooling water is cooled down in the cooler. Finally, cooling water is first directed to the main engine and then to the circuit within the system by the pump. This circuit of the cooling water runs continuously in this way.

6D THE STARTING AIR SYSTEM

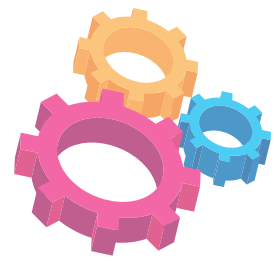
I LISTENING AND VOCABULARY

C

The initial movement in the ship's main engine is provided by compressed air. Compressed air is sent to the cylinders according to the ignition order after the turning gear on the ships. It applies a propulsive force on the piston and ensures the rotation of the engine. When the engine reaches a certain speed, the air is cut off and the engine starts to work normally after the fuel is sent. The starting air system consists of compressor, air receiver, starting air distributor and starting air valve.



SCRIPTS



E

Compressor produces compressed air.

Air receiver stores the compressed air.

Starting air distributor sends air to the starting valve of the next cylinder.

Starting air valve sends the compressed air to the next cylinder.

UNIT 7 FORCED AIR INDUCTION

II LISTENING

A - B

- 1 In a turbocharger system; the turbine, which is rotated by the energy of the hot gases coming out of the exhaust, rotates the compressor at the end of the shaft to which it is connected, and ensures that the air entering the engine cylinder is sent with pressure.*
- 2 In a supercharger system; the air entering the cylinder is sent with pressure by an external pump that moves mechanically. The pump used in this system is called a blower.*

UNIT 9 MACHINE ELEMENTS

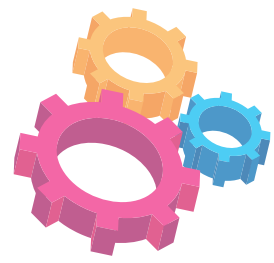
I LISTENING AND VOCABULARY

A

- A** *Non-permanent fasteners can join two or more machine parts in a way that they can be removed and reused without any damage or break. Screws, bolts, nuts, washers, pins, keys, cotter pins and stud bolts are commonly used examples of them.*
- B** *Permanent fasteners join two parts of a machine or a material permanently. They are designed for single-use as they cannot be removed without damaging the part or the connection area. Rivets, welds and solders are some examples of this type of fasteners.*



SCRIPTS



II LISTENING AND READING

D - E

Oil is a substance that forms a layer between two rubbing solid objects; separates them from each other. Therefore, it minimises friction, ensures easy movement of the parts and prevents their wear. Operations with these substances is called lubrication. Lubricating oils with different properties are used for varied mechanisms in ships. Oil and Grease, the types of lubricants, are used very often. Some fixed and basic moving machine parts may require external lubrication as written in the lubrication catalogues. Regular lubrication prevents rust and corrosion, prolongs the working life of these parts.

UNIT 10 METARIALS

III LISTENING

A

- 1 Barnacles sticking to the surface are cleaned by washing and using chemicals if necessary.
- 2 Substances such as oil and grease are cleaned with a material such as emulsion or detergent.
- 3 Abrasive scraping, water jet or mechanical cleaning methods are applied to remove the temper and rust.
- 4 The surface is cleaned with fresh water to clean fine rust dust and dissolved salts.
- 5 When the washed surfaces dry, the lead oxide is applied as a preservative.
- 6 When the lead oxide dries, the first coat of primer is applied, ensuring that the paint covers the surface completely.
- 7 The painting of the surface is completed by applying the second coat and the last coat of paint.
- 8 When the painting process ends, the lids of the remaining paints are carefully closed and stored in appropriate places.
- 9 Brushes used in painting are carefully cleaned, dried and stored in appropriate places.

B

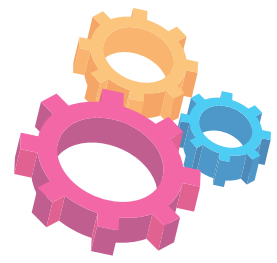
ELIF: Anti-corrosive primer is a type of paint that is put on bare surfaces such as wood and metal before they are painted. It helps the paint stay on the surface and it protects iron and steel structures from corrosion.

AMIR: Chlorinated rubber paint is a single pack solvent-based coating that provides excellent moisture resistance.

PETER: Anti-fouling paint is a type of paint which has toxins to poison any attached organisms and prevents others from sticking to the paint.



SCRIPTS



UNIT 11 REPAIRS AND PRODUCTION ON VESSELS

I LISTENING AND VOCABULARY

A - B

- 1 Kerem is a master on metal works. He likes to separate the plates, profiles and many other metals into parts. Kerem uses a handsaw, a still chisel and snips for cutting.*
- 2 Hello, my name is Michael. I draw marks on the raw material or machine part while measuring. This helps the material to be shaped according to the required dimensions. I use many materials including measuring plate, steel ruler, steel V block, height gauge, divider, punch and steal square.*
- 3 One of the duties of a metal worker is the removal of chips from metal parts with the help of files with cutting teeth. The main tools of the filing are bench vise and handy file.*
- 4 Threading is the process of opening screw threads on cylindrical surfaces. In threading process, tools such as tap wrench, die wrench and screw patch gauge can be used.*
- 5 I am Ali and I produce and repair sharp tools. During sharpening work, I create the necessary cutting angles or correct the deteriorated cutting angles.*
- 6 Another repair worker prevents the bolt from loosening due to vibration. Heli-coil also enables the damaged and worn internal screws to perform their duty without tapping.*
- 7 My name is Gustavo. I am a plumber and I generally make cylindrical holes on surfaces with drilling tools such as drill bit, countersink and reamer.*

REFERENCES

- Akdoğan, Refik. English for the Merchant Marine, 2nd Ed. İstanbul: Lebib Yalkın Yayınları ve Basım İşleri A.Ş., 1999.
- Babicz, Jan. Wärtsilä Encyclopaedia of Marine Technology. Helsinki: Wärtsilä Corporation, 2015.
- Blakey, T.N. English for Maritime Studies, 2nd Ed. Cambridge: Cambridge University Press, 1987.
- Demir, Cengiz. Maritime English. İstanbul: Akademi Denizcilik, 2009.
- Demir, C. and Behçet, İ. English for Marine Engineering Studies. İstanbul: Eğitim Yayınları, 2004.
- Demirel Kemal. Gemi Yardımcı Makineleri ve Sistemleri I. İstanbul: Birsen Yayınevi, 2014.
- Demirel Kemal. Gemi Yardımcı Makineleri ve Sistemleri II. İstanbul: Birsen Yayınevi, 2014.
- Grice, Tony. English for Mariners. Gelsenkirchen: Arbeitsbereich Linguistik, 2009.
- Küçükşahin, Fahrettin. Ansiklopedik Bilimsel ve Teknik Denizcilik Sözlüğü: Türkçe/İngilizce. İstanbul: Akademi Denizcilik, 2006.
- Küçükşahin, Fahrettin. Ansiklopedik Bilimsel ve Teknik Denizcilik Sözlüğü: İngilizce/Türkçe. İstanbul: Akademi Denizcilik, 2003.
- Küçükşahin, Fahrettin. Dizel Motorları, Birsen Yayınevi, İstanbul, 2008.
- Küçükşahin, Fahrettin. Gemi Makineleri Operasyonu-2, Birsen Yayınevi, İstanbul, 2009.
- Küçükşahin, Fahrettin. Gemi Makineleri, Güven Yayınevi, İstanbul, 1997.
- Küçükşahin, Fahrettin. Gemi Yardımcı Makineleri ve Sistemleri, Denizler Kitabevi Dağıtım, İstanbul, 2001.
- Latache, Malcolm. Pounder's Marine Diesel Engines and Gas Turbines, 10th Ed., Elsevier, 2020.
- Maritime & Coastguard Agency, Code of Safe Working Practices for Merchant Seafarers. London: MCA, 2020.
- Öğütoğlu, Nedret. Essential Maritime English. İstanbul: Dergâh Ofset, 2006.
- Papaleonida, Paraskevis L. Maritime English Volume 1. Athens: Athens University, 2018.
- Papaleonida, Paraskevis L. Maritime English Volume 2. Athens: Athens University, 2016.
- Serfiçeli, Y, Saip, Kaynak Teknolojisi, Ankara, 2003.
- Şahin, Ercüment and Fethi Yağız. SOLAS Training Manual Gemi Eğitim El Kitabı. İstanbul: Ege Basım, 2010.
- T.C. Millî Eğitim Bakanlığı. Mesleki ve Teknik Anadolu Lisesi Protokol Kapsamındaki Okullar İçin Anadolu Meslek Programı Denizcilik Alanı Çerçeve Öğretim Programı. MEB, 2022.
- T. C. Sağlık Bakanlığı, T.C. TÜRKİYE Hudut ve Sahiller Sağlık Genel Müdürlüğü. Gemiler için Tıbbi Rehber, 2.Baskı. İstanbul: Nobel Matbaacılık San. Tic. Ltd. Şti, 2015.
- Ülgen, Ümit and Can, Sevilay. Gemi İnşaatı-1. İstanbul: İTÜ Denizcilik Fakültesi, 2003.
- Zaloğlu, Mustafa. Gemici Dili. İstanbul: Türk Deniz Kuvvetleri Güçlendirme Vakfı Yayınları, 1988.

Web References

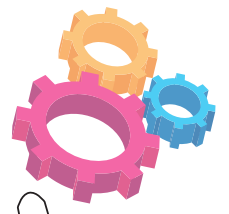
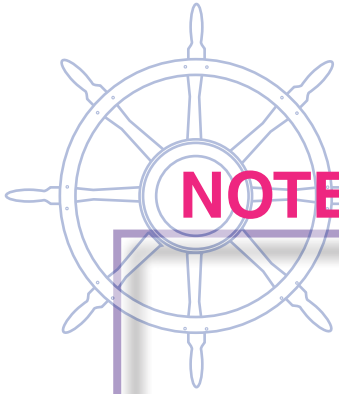
- [https://wwwcdn.imo.org/localresources/en/OurWork/Safety/Documents/A.918\(22\).pdf](https://wwwcdn.imo.org/localresources/en/OurWork/Safety/Documents/A.918(22).pdf) (Accessed 17.01.2022 13.51).
- <https://www.britannica.com/technology/ship/Types-of-ships> (Accessed 02.02.2022 12.22).
- <https://www.txintlfreight.com/shipping-seafreight-cargo-ship-classification/> (Accessed 14.02.2022 15.44).
- <https://www.shiplilly.com/blog/the-most-common-types-of-cargo-ships/> (Accessed 19.03.2022 12.52).
- <https://portocargo.pt/en/all-about-different-types-of-maritime-vessels/> (Accessed 21.03.2022 19.24).
- <https://www.tuscorlloyds.com.mx/types-of-merchant-vessel/> (Accessed 29.03.2022 12.57).
- <https://www.maritimeinfo.org/en/Maritime-Directory/general-cargo> (Accessed 01.04.2022 15.42).
- <http://www.shippopedia.com/ships/> (Accessed 02.04.2022 19.52).
- <http://maritime-connector.com/wiki/offshore-vessels/> (Accessed 20.04.2022 00.19).
- <http://www.fao.org/fishery/vesseltype/180/en> (Accessed 22.04.2022 12.39).
- <http://www.fao.org/fishery/vesseltype/140/en> (Accessed 25.04.2022 12.54).
- <https://www.imo.org/en> (Accessed 30.04.2022 09.46).
- <https://www.wartsila.com/encyclopedia/term/tonnage> (Accessed 01.05.2022 10.59).
- <https://safety4sea.com/cm-do-you-know-how-many-ranks-and-duties-exist-onboard/> (Accessed 02.05.2022 12.59).
- <https://www.edumaritime.net/stcw-code> (Accessed 03.05.2022 15.31).
- <https://www.wartsila.com/encyclopedia/term/tonnage> (Accessed 12.05.2022 15.58).
- <https://www.collinsdictionary.com/> (Accessed 14.05.2022 19.17).
- <https://www.merriam-webster.com/> (Accessed 16.05.2022 22.16).
- <https://dictionary.cambridge.org/tr/s/%C3%B6z%C3%BCk/ingilizce/> (Accessed 18.05.2022 20.29).
- <https://www.macmillandictionary.com/dictionary/> (Accessed 20.05.2022 15.55).
- <https://www.oxfordlearnersdictionaries.com/definition/english/> (Accessed 21.05.2022 19.22).
- <https://www.american-club.com/> (Accessed 28.05.2022 18.43).
- https://en.wikipedia.org/wiki/Port_state_control (Accessed 19.06.2022 01.16).
- <https://tc.canada.ca/sites/default/files/migrated/tp5021e.pdf> (Accessed 01.07.2022 04.36). (Personal Safety On Ships)
- https://www.marineinsight.com/wp-content/uploads/2012/03/The_Ultimate_Guide_to_Personal_Safety_on_Ships.pdf (Accessed 22.07.2022 03.49).

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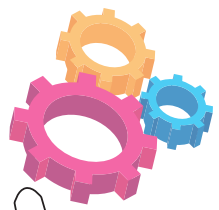
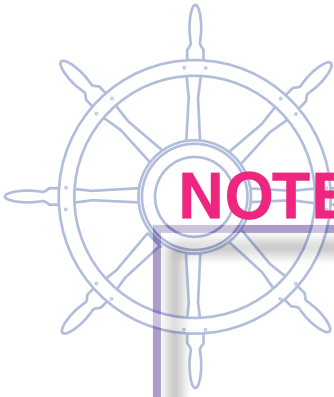
VISUAL REFERENCES



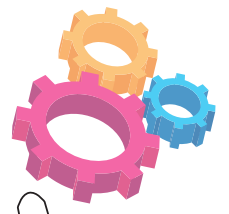
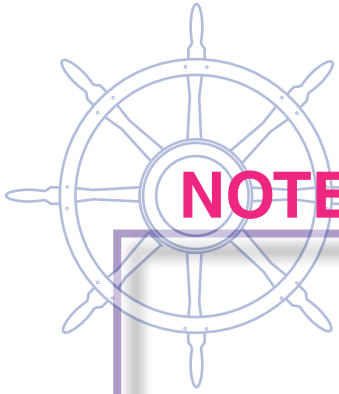
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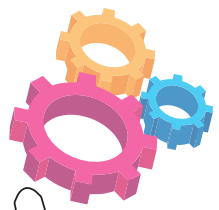
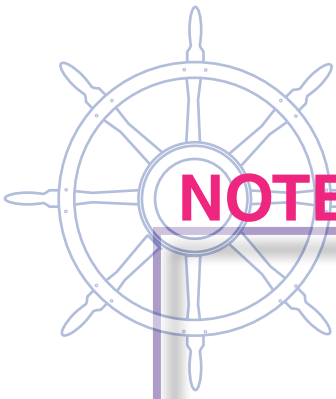
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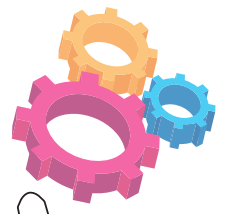
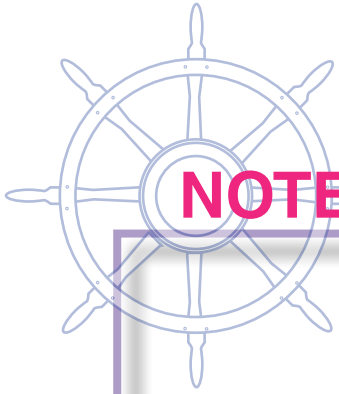
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