**Practice exercises for the exam**

**Fill in the gaps with the following words: occurred / submerged/ dismantled/ alongside/ adherence/ cancelled/ revealed/ ballasted/ trimmed/ procedures**

During a ballast operation at night, while at a shipyard in order to trim the vessel for drydocking, it was discovered that the engine room was flooded. Damage to 1…………………….. electrical equipment 2…………... Furthermore, the engine room had to be cleaned after the flooding. The vessel was 3…………….. a shipyard for renewal hull survey. Some pipes and a main ballast pump had been 4…………….. for maintenance. The vessel needed to be 5……….., after midnight, in order to be 6…………… for entering into the drydock. The most probable cause of the flooding was lack of communication between the deck side and the engine room and lack of 7 ……………. to proper 8 …………………. regarding the sounding of alarms. Investigations afterwards 9 …………………. that during the ballasting, bilge alarms in the engine room sounded three times. The watch keeper 10 …………….. the alarm without going down into the engine room bottom floor to check. After some hours the deck officer discovered that the water level in the ballast tanks did not increase.

**Answer the questions**

What is bilge?

Why is it necessary?

Why do we have bilge? How does it accumulate?

What do bilge pumps do?

How many systems of pumps are there usually? What are they?

What is an ejector?

What is the distribution valve chest?

What does the separator do?

What is a mud box?

What is the bilge pump?

Where are bilges found?

How big are bilges?

What kind of liquids constitute the bilges?

What is the law regarding bilge?

Why do bilge wells have strainers?

What does a bilge well look like?

What is an anti-heeling system?

What is the ballast system used for?

Why are the rules for the ballast system not as strict as the ones for bilge systems?

Why do we need ballast?

What are some of the tanks used for ballast?

How do the valves in ballast arrangement systems have to be arranged?

Why are marine ejectors more reliable in operation?

Where are water ejectors used?

How do ejectors work?

What are some of the applications of ejectors?

What is the size of the water ejectors?

**Fill in the correct form of the word in capital letters**

Rules made up by governments and CLASSIFY  Societies have to comply with international SOLAS RULES. Small amounts of water can accumulate in the ship as a result of CONDENSE, LEAK  of pipes, washing or rain. In the most FAVOUR  circumstances the water flows down the sides into the bilge well and can be pumped overboard. The ejector is a pumping device without MOVE  parts (e.g. piston etc.) which is actuated by the high pressure of water flowing through it by the general service pump or the fire fighting pump. A mud box is a kind of filter on the suction line head which is a perforated basket, easily ACCESS  and DETACH , necessary to prevent ashes and other particles from entering the pumps and choking them. Ejectors are simple in use and RELY  in operation as they don’t have movable parts like standard pumps. Since there are no moving parts, no LUBRICATE  is necessary and MAINTAIN  is minimal. The size of the ejectors may vary from 50 cm to more than a few metres, and their versatile application makes them a SIGNIFY  part of ship’s engine room equipment. Ballast is used to improve STABLE  of the ship and improve MANOEUVRE . Ballast eductors can save VALUE  energy and power, depending on the application. One must check the CLEAN  of cooling water and SUITABLE  of lube oil in the sump tank before starting up the engine. SATISFY  lubrication of the cylinders is important before starting the engine. Before starting the engine you must report READY  to the bridge. You must start an ADD  auxiliary engine in order to ensure a power reserve for the manoeuvres. The checklist for the engine room preparation for departure must be completed prior to COMMENCE  of stand by.

**DERIVATIVES- EJECTORS**

Ejectors are simple in design and ………… 1.RELY in operation as they don’t have …………….. 2.MOVE parts like standard pumps. Since there are no moving parts, no ……………. 3. LUBRICATE is necessary and ………………. 4.MAINTAIN is minimal. Ejectors are self- priming and …………………. 5.EASY activated by simply turning on the flow of the driving water.

Due to their excellent suction ……………. 6.CAPABLE and ………………… 7. RELY , water ejectors are frequently used for various marine ………………..8. APPLY.

**You will read instructions from a manual on preliminaries before starting up the engine. Fill in the gaps with the following words. Replenish/ supply/ prime/purified/ gradually/ rags/ ventings/ tight/ suitability/ bar/disengage/ readiness/ raise/ emerges/ ascertain/ cock/ drain/ obstructs/ ensure/ components**

1. Warm up the engine ………………… using the circulating pumps to circulate the system.

2. Check all the levels of liquids in all tanks belonging to the engine. Check the cleanliness of cooling water and ……………….. all cooling systems. Check the ………………. of lube oil in the sump tank and fill up with clean lubricating oil. Fill up the fuel oil service tank with …………. fuel oil.

3. Check all shut off valves of all systems for correct position.

4. Check the ……………. of the cooling water outlets for free passage, so as to allow the air to escape from the cooling spaces of the cylinder. The cooling spaces of the turbocharger and charge air coolers are to be vented too.

5. Make an examination inside the crankcase to make sure that no tools, cleaning ………….., devices or guide bars have been left inside. These might later impede the motion of the running gear or obstruct any ducts or pipes.

6. Put in the turning gear. Start up all cooling water and lubricating oil pumps. Put the system under service pressure and check for leakages making ……………. any found. Check all [components] connected to the lubricating oil system for correct oil flow. …………….. the engine over by means of the turning gear with the indicator cocks (valves) open and the control gear in the top position (=stop), to …………… that nothing ……………. the movement of the running gear. At the same time operate the hand cranks of the cylinder lubricators to …………… satisfactory lubrication of the cylinders from the very beginning. If there are no leakages and you find everything correct, ………….. the turning gear and secure it.

7. Pump up the starting air reservoirs to their maximum pressure and [drain] them of water. Also, drain the air-coolers, the scavenge (charge)-air receiver and the spaces underneath the piston undersides.

8. ……………… (make ready for use) the fuel oil system (fuel pumps, pipes and fuel injectors) using a priming (booster) pump. For this purpose open the vent cock on the fuel filter to allow the air escape through the fuel ………………supply] pipe. Then open the priming plugs on the fuel valves and …………………. the pressure. Check if the fuel [emerges] from the drain openings of the priming plugs without any accompanying air.

9. Finally, before putting on the staring air, check the reversing and control gear. Set the automatic starting air stop valve to “auto” position and close the vent …………….. on the starting air distribution pipe. Check water and oil pressures and report ………………. of the engine to the bridge.

**ENGINE ROOM PREPARATION FOR DEPARTURE CHECKLIST**

Read parts of the check list and fill in the gaps with the following words: commencement/ applicable/ disengaged/ Log/ available/ steering/ synchronized/ levels/ sufficiently/ parallel

* 1. Is main engine warmed up through ………… ?
	2. Has turning gear been ………………. ?
	3. Are minimum of two alternators running and in ……………?
	4. Are all main engine coolant and lube-oil sump …………. correct?
	5. Have ……………… gear tests been carried out in all modes and two motors left in use?
	6. Has engine room clock been …………. with bridge?
	7. Are air start compressors running and set on auto start (where …………..?)
	8. Is power source ……….. for mooring winches (steam, hydraulic or electrical)?
	9. Are both Bell and ………………. books available?
* This checklist must be filled in prior to 10………….. of stand-by.

**TRUE – FALSE QUESTIONS**

1. Lack of adherence to proper rules can lead to accidents.
2. The output of the engine is measured using degrees.
3. The pitch of the propeller is measured in degrees.
4. The bilge is the space where only rain water is collected.
5. The function of the bilge is to pump out all unwanted water.
6. The bilge system is optional.
7. If necessary, the bilge system can take over the work of the ballast line system.
8. Condensation occurs when cold air hits a warm surface.
9. There are usually two systems of bilge pumps.
10. The water from the bilge can be thrown overboard without any other treatment.
11. The ejector has moving parts.
12. The bilge holding tank is a big compartment with no other smaller compartments.
13. The distribution valve chest is a kind of filter.
14. The mud box does not have holes.
15. The main bilge line runs from the manifold to the suction side of the pumps.
16. Strainers are filters.
17. The bilges are at the highest part of the ship.
18. Bilge water is a mixture of various substances.
19. Bilge wells are emptied to prevent accidents.
20. Bilge water that has been cleaned by the separator can be thrown overboard, even if the ship is at port.
21. The bilge well is covered with a lid.
22. Rules for ballast are more stringent than the rules for bilge.
23. Ballast is used to improve manoeuvrability.
24. List can be minimized using an anti-heeling system.
25. In bulk carriers, the holds can be used for ballast, if necessary.
26. The ballast system has non-return valves.
27. Ejectors need to be maintained very often.
28. Ballast eductors can help save money.

Before starting up the engine:

1. You must warm up the engine gradually.
2. You must check the camshaft for rags.
3. Pump up the starting air reservoirs to the maximum pressure and fill them with water.

For engine room preparation for departure you must

1. Check if alternators are running in parallel.
2. Start the additional auxiliary engine.
3. Check if the main engine has been turned on gear with indicator cocks closed.

After the ship has arrived in port you must

1. See that when the finished with engine order is given from the bridge, change over from engine control to bridge control.
2. Open main starting air valve.
3. Open indicator cock and turbocharger drain valve.
4. Engage turning gear and turn engine for 10 minutes.
5. Close vent for exhaust gas boiler.
6. Activate the arrival program if UMS to stop the lube oil pump, cross head pum, shaft bearing and stern tube bearing pumps.

**Fill in the gaps with the following words: nowadays, alter, therefore, mounted, list, stringent, fitted, stability, anti-heeling, transfer, handling, minimize, change over, blanked, appropriate, handling, required, remote, separate, discharge**

Several suction lines are 1………………. on a manifold.

Suction lines are 2………………….. with valves.

Depending on 3……………….. and trim, we choose which bilge well the water is collected in.

The ballast system is used to pump seawater in or out of the ballast tanks. The rules for the ballast system are less 4…………….. than the rules for bilge systems. Some reasons for taking ballast on board or shifting ballast once it is on board include:

 to improve 5……………. of the ship, especially when the ship does not carry cargo

 to 6………………..the trim

 to control the list during loading and discharge. Many ships use an /a 7………………… system for this purpose

 to improve manoeuvrability

An anti-heeling system is used to 8……………….the list (in port). Pumps with large capacity (1000 m³/hour) are installed between two tanks (one port side and one starboard). These pumps can 9……………. water from one tank to the other at great speed. The system is fully automatic and much used on ships with cranes, container vessels and Ro-Ro vessels to reduce the list that can occur during cargo 10…………………….

Contrary to the valves in the bilge arrangement, the valves in the ballast arrangement have to be two-way valves as the tanks must be able to be filled and emptied. 11……………… the ballast system is often designed as a 12………….. line. 13…………………. controlled valves are used to empty or fill the ballast tanks.

Combined or 14…………. mains for suction and 15…………….. may be provided. Where a tank or cargo space can be used for ballast or dry cargo, then either a ballast or bilge connection will be 16…………... The system must 17……………. be arranged so that only the 18…………… pipeline is in service; the other must be securely 19……………. or closed off. Where tanks are arranged for either oil or ballast, a 20…………… chest must be fitted in the pipeline so that only the ballast main or the oil transfer main is connected to the tank.

**Find the missing word**

1. Are both Bell and l…………. books available?
2. Present o…………. of the main engine is 1.000 kilowatts
3. Do not exceed a p…………………of 4 bars.
4. Pump up the starting air reservoirs to their maximum pressure and d………..them of water.
5. Before starting the engine you must re…………. readiness to the bridge.
6. Present rev…………………. the main engine are 100 per minute.
7. Do not exceed a minimum t……………. of 20 degrees centrigrade.
8. Sea water and fresh water can find their way to the bilge w ……… due to leakage in the pipe lines,
9. Depending on l………… and trim, we choose which bilge well the water is collected in.
10. Slop so…………… 2 metres.
11. We are dis…………… double bottom tank.
12. Present p …………… of propeller is 90 degrees.
13. The ballast system is used to p…………. seawater in or out of the ballast tanks.
14. Pumps with large c……………… (1000 m³/hour) are installed between two tanks (one port side and one starboard).
15. Make an examination inside the crankcase to make sure that no tools, cleaning r…………, devices or guide bars have been left inside. These might later impede the motion of the running g………… or obstruct any ducts or pipes.

***Some things to be done by the Duty Engineer on Receiving One-hour notice from the Bridge***

1. I \_ \_ \_ \_ m Chief Engineer regarding arrival.
2. S \_ \_ \_ t additional generator.
3. S \_ \_ p the steam turbine and shaft generator if fitted.
4. E \_ \_ \_ \_ e that power is available for deck machinery and bow thruster.
5. M \_ \_ e a visual inspection of the steering gear room.
6. C \_ \_ \_ e the dampers for exhaust gas boiler and open bypass.
7. S \_ \_ t and l \_ \_ k sewage direct overboard discharge and start sewage plant or o \_ \_ n valve for sewage holding tank.
8. C \_ \_ \_ \_ e over to high sea suction from low sea suction.
9. Check the **v ings** [ventings]of the cooling water outlets for free passage, so as to allow the air to escape from the cooling spaces of the cylinder.
10. **B** the engine over by means of the turning gear with the indicator cocks (valves) open and the control gear in the top position (=stop).
11. **R a** the pressure. Check if the fuel emerges from the drain openings of the priming plugs without any accompanying air.
12. **P r** the fuel oil system (fuel pumps, pipes and fuel injectors) using a

**bo** pump. For this purpose open the vent **c k [cock]** on the fuel filter to allow the air escape through the fuel supply pipe. **R** e [raise] the pressure. Check if the fuel emerges from the drain openings of the priming plugs without any accompanying air.

1. **W** up the engine gradually using the circulating pumps to circulate the system.
2. Check all the levels of liquids in all tanks belonging to the engine. Check the cleanliness of cooling water. Fill up with clean **l ing** [lubricating] oil. Fill up the fuel oil service tank with p ied [purified] fuel oil.

***Complete the verbs.***

***What to do when a ship is about to arrive in port:***

Some things to be done by the Duty Engineer on Receiving One-hour notice from the Bridge

* 1. I \_ \_ \_ \_ m Chief Engineer regarding arrival.
	2. S \_ \_ \_ t additional generator.
	3. S \_ \_ p the steam turbine and shaft generator if fitted.
	4. E \_ \_ \_ \_ e that power is available for deck machinery and bow thruster.
	5. M \_ \_ e a visual inspection of the steering gear room.
	6. C \_ \_ \_ e the dampers for exhaust gas boiler and open bypass.
	7. S \_ \_ t and l \_ \_ k sewage direct overboard discharge and start sewage plant or o \_ \_ n valve for sewage holding tank.
	8. C \_ \_ \_ \_ e over to high sea suction from low sea suction.
	9. D \_ \_ \_ n the air receivers.

**Fill in the gaps with the following words. There are two extra words: pitch/ submerged/ mud/ main/ overboard/ suction/ manifold/ condensation/ separator/ shifting/ drydocking/ discharge/ flooded/ priming /sludge/ bilge / stringent**

* During a ballast operation at night, while at a shipyard in order to trim the vessel for ………………..…., it was discovered that the engine room was ……………. Damage to ……………………..….. electrical equipment occurred.
* We will………………………………double boτtom tank.
* Present ……………………. of propeller is 90 degrees.
* From the tank, the water is pumped by another small pump through an oil water…………… overboard, only when it is sufficiently clean. If not, it goes to another storage tank, the …………… tank. A second bigger pump, can pump the bilge water from the engine room straight ……………., but this is only allowed in emergencies. A third possibility is to use the direct …………. of the main cooling water pumps, which has huge capacity for big leaks in emergencies.
* ………………………. box is a kind of filter on the suction line head which is a perforated basket, easily accessible and detachable, necessary to prevent ashes and other particles from entering the pumps and choking them.
* A pump which suctions bilge water from the bilge well and discharges into the bilge tank or overboard. It is a self-……………. pump which means it doesn’t need another pump to supply it with water for starting.
* The cargo holds are provided with four …………………… wells, one in each corner of the hold and each provided with its own suction line to the ………………….line.
* The ballast system is used to pump seawater in or out of the ballast tanks. The rules for the ballast system are less …………………………….. than the rules for bilge systems. There are many reasons for taking ballast on board or …………………... ballast once it is on board .

**Fill in the correct synonym word. There are two extra words- box,improve, different, disengage, get, cloth, vent, impede, replenish, obstruct, enough, ascertain**

* Make better……………………….., chest………………….., obtain…………………….., rag……………………, block…………………….., sufficient………………….., ensure………………………., miscellaneous………………………….., let go………………….., refill……………………

**Fill in the gaps with the following words. There are two extra words: dismantled/ main/ mud/ sounding /separator/ excess/ list/ pressure/ survey/ overboard/ required/ trimmed/ condensation/ shifting/ priming/ manifold/ ejector**

* The vessel was alongside a shipyard for renewal hull …………………. Some pipes and a main ballast pump had been ………………………. for maintenance. The vessel needed to be ballasted, after midnight, in order to be …………………… for entering into the drydock.
* Do not exceed a ………………… …of 4 bars.
* Slop ………………………. is 2 metres.
* The bilge line arrangement is an important safety system that is……………. by law. The purpose of the bilge line arrangement is to pump …………….. water out of the ship.…………….. can occur when warm air hits a cold surface. In the most favourable circumstances the water flows down the sides into the bilge well and can be pumped ………..
* ………………………. box is a kind of filter on the suction line head which is a perforated basket, easily accessible and detachable, necessary to prevent ashes and other particles from entering the pumps and choking them.
* A pump which suctions bilge water from the bilge well and discharges into the bilge tank or overboard. It is a self-……………. pump which means it doesn’t need another pump to supply it with water for starting.
* ………………. bilge line is a pipe line situated in the engine room. It runs from the ………………. to the suction side of the pumps.
* The …………………………..creates a vacuum by the speed of the water flowing through it.
* Depending on …………………….. and trim we chose which bilge well the water is collected in.

**Fill in the gaps to complete the words of the instructions from a manual on preliminaries before starting up the engine.**

* **P r** the fuel oil system (fuel pumps, pipes and fuel injectors) using a

**bo**  pump. For this purpose open the vent **c k** on the fuel filter to allow the air escape through the fuel supply pipe. **R** e the pressure. Check if the fuel emerges from the drain openings of the priming plugs without any accompanying air.

* Before putting on the staring air, check the reversing and control **g**  .
* Check the **v ings** of the cooling water outlets for free passage, so as to allow the air to escape from the cooling spaces of the cylinder.
* **B**  the engine over by means of the turning gear with the indicator cocks (valves) open and the control gear in the top position (=stop).
* Pump up the starting air reservoirs to their maximum pressure and **d**  them of water.
* **W**  up the engine gradually using the circulating pumps to circulate the system.
* Check all the levels of liquids in all tanks belonging to the engine. Check the cleanliness of cooling water. Fill up with clean **l ing** oil. Fill up the fuel oil service tank with p ied fuel oil.

**Fill in the correct synonym word. There are two extra words- stringent, disengage, alter, different, replenish, cloth, vent, opening, emerge, component, impede, reverse**

Strict………………………….., part……………………, stop………………….., change…………………………, miscellaneous………………………….., let go………………….., come out ……………………., outlet…………………., refill……………………, back………………………

**Fill in the gaps with the following words. There are two extra words.- Convention, stability, dismantled, investigations, comply, shifting, fitted, independent, flooding, excess, adherence, required, output, separator, residue, mounted, mud**

* The most probable cause of the………..………. was lack of communication between the deck side and the engine room and lack of ……………………… to proper procedures regarding the sounding of alarms. ………………….. afterwards revealed that during the ballasting, bilge alarms in the engine room sounded three times.
* The bilge line arrangement is an important safety system that is……………. by law. The purpose of the bilge line arrangement is to pump …………….. water out of the ship. Rules made up by governments and Classification Societies have to …………….… with international SOLAS RULES. SOLAS states the bilge line arrangement, the ballast line arrangement and the fire fighting arrangement must be three ………….…… systems, each being capable of taking over the work of the other if necessary.
* ……………………. box is an appropriate box which contains valves, each of which controls the flow of bilge water from a bilge compartment or a bilge well.
* Bilge water …………………… is a cleaning apparatus which separates oil from bilge water before it is pumped overboard to prevent pollution. The ………………………….. of oil in the water that is pumped overboard must not exceed 15ppm, according to the MARPOL………………
* Several suction lines are …………………….. on a manifold.
* Suction lines are …………………….. with valves to open or close them.
* Some reasons for taking ballast on board or ……..……….. ballast once it is on board include to improve……………… of the ship, especially when the ship does not carry cargo.

**Fill in the correct preposition**

Call the Chief Engineer if the revolutions of the main engine are 90 minute.

We transferred ballast water number 2 tank to number 4 tank.

Start an additional auxiliary engine order to ensure a power reserve the manoeuvres.

**Fill in the correct synonym word. There are two extra words- circulate, purified, apparatus, readiness, emerge, eductor, capability, disconnect, important, blank, suitability, sump**

Clean……………………., go round…………………., come out………………………., device……………………, standing by……………………., empty……………………., when something is appropriate………………….., valuable……………….., when one is able to do something s/he has …………………….., disengage……………………