

Lebray



Department of Marine Engineering

EDUCATION & TRAINING COURSE: PRE-SEA TRAINING COURSE FOR ENGINE RATINGS

COURSE CODE: ED 273 P1 (22-002 & 22-002A)

ENGINEERING KNOWLEDGE – II

- Answer **ALL FIVE** questions
- Date: 2023.06.10

Pass mark 50%

Time allocated: 03 Hrs

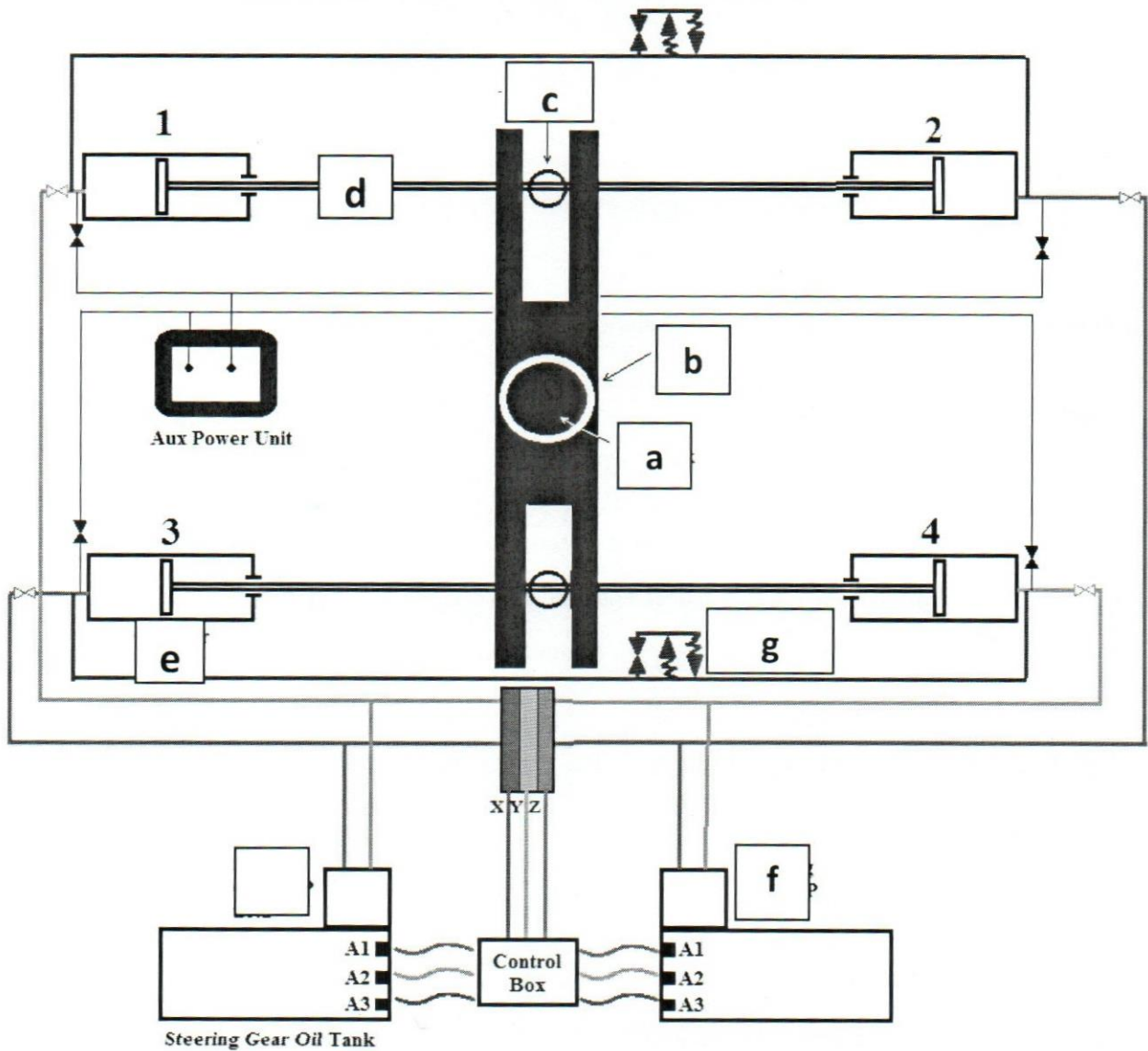
- 01.**
- a. Who are the people responsible to comply with permit-to-work before Enter into 'Enclosed space' in engine room fuel tank (4 marks)
 - b. What is a fire alarm on board ship, what is your action when alarm ring (4 marks)
 - c. Briefly explain three of following terms
 - 1. Drill
 - 2. Muster station
 - 3. Ventilation flap
 - 4. Quick closing valve
 - 5. Muster list (6marks)
 - d. Write down 6 personal protective equipment and their purposes (3marks)
 - e. State 3 reason you have to wear safety helmet in engine room (3 marks)
- 02.**
- a. State 3 main potential hazards are present in an enclosed space (3marks)
 - b. Write down 2 instruments which used to check enclosed space (3marks)
 - c. Write down 4 portable fire extinguishers and their colour code (4marks)
 - d. Which fire extinguisher is suitable for Electric fire (2 marks)
 - e. State 5 places where fire risks on board ship (5 marks)
 - f. Why do we have to keep engine room bilge clean? (3 marks)
- 03.**
- a. Write down two types of boilers (2marks)
 - b. What is the purpose of steam on board? State three of them (3marks)
 - c. Write down 2 boiler mountings and their purpose (2marks)
 - d. Draw a sketch of a basic refrigeration diagram and name it (6marks)
 - e. Briefly explain above components (4marks)
 - f. What basic safety you will follow while working with an electrical equipment? (3marks)

04.

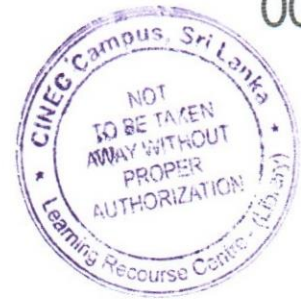
- a. Write down 3 kinds of scavenging methods (3 marks)
- b. Draw a sketch of a 4 stroke engine timing diagram (3 marks)
- c. Indicate all functions in above timing diagram (3 marks)
- d. State 3 different parts of a marine 2 stroke engine, not a part of a 4 stroke engine (3 marks)
- e. What type of entries to be entered in chief engineer's log book? State 3 of them. (2 marks)
- f. Draw a sketch of a centrifugal pump and name all important parts (4 marks)
- g. What is the purpose of emergency power supply on board ship (2 marks)

05.

4 RAM STEERING GEAR SYSTEM



- a. Name the parts of above steering diagram, a to g (5marks)
- b. What are the routine checks necessary in steering gear room on your watch (4 marks)
- c. Draw a sketch of a gear pump and name it (6marks)
- d. Write down 5 types of valves used in engine room (5marks)



CINEC Campus (Pvt) Ltd

Department of Marine Engineering

EDUCATION & TRAINING COURSE: PRE-SEA TRAINING COURSE FOR ENGINE RATINGS

COURSE CODE : ED 273 P1(22-03 & 22-04)

ENGINEERING KNOWLEDGE – II

- Answer ALL questions

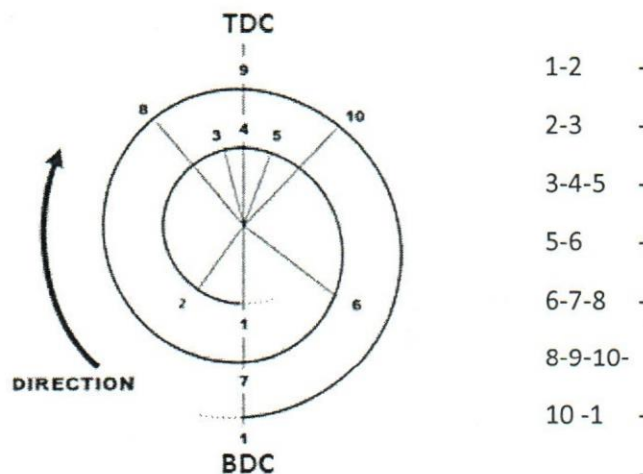
Date: 07.04.2023

Pass mark 50%

Time allocated: 03Hrs

1)

- a) What are the scavenging methods used in marine 2- stroke engines? **(03 marks)**
 b) define the term **black out** **(02 marks)**
 c) Note down the main points of the following four stroke marine diesel engine cycle as per the number listed below **(07 marks)**



- d) Mention the overlap period of the above cycle. **(02 marks)**
 e) State **five** entries(daily entries) in Engine room log book. **(03 marks)**
 f) State three unsafe conditions in engine room **(03 marks)**

- 2)
- what are the main factors to create a fire? (03 marks)
 - State **three** components in the steering gear system. (03 marks)
 - State the reason why quick closing valves are fitted to fuel oil tanks (02 marks)
 - Write down **three** types of valves used in engine room (02 marks)
 - Draw a double acting reciprocating pump & name it. (10 marks)

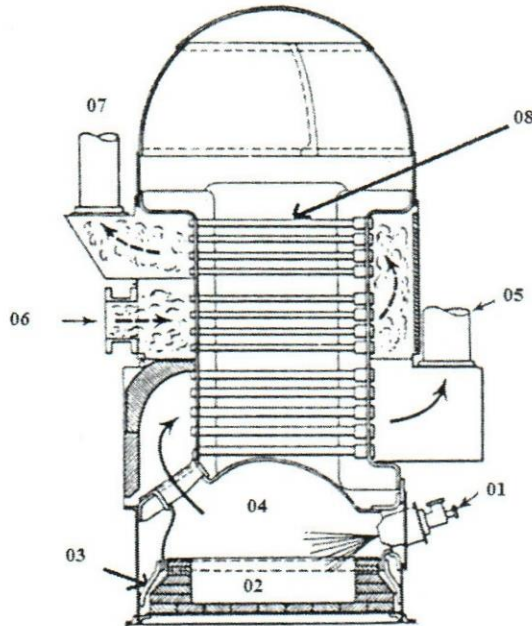
- 3)
- HFO #1 Port tank's depth is 950 cm, Sounding is 534 cm, Trim is 1m Head,
 - Find the Ullage. (02 marks)
 - Find the remaining oil (ROB) in the tank. (02 marks)

***** ULLAGE TABLE *****								
ULLAGE DEPTH CM	TRIM BY HEAD 1.0M	EVEN KEEL 0.0M	CAPACITIES IN CUBIC METERS					
			TRIM BY STERN					
			-0.5M	-1.0M	-1.5M	-2.0M	-2.5M	-3.0M
400.0	2351.1	2350.6	2350.3	2350.1	2349.8	2349.6	2349.3	2349.1
402.0	2347.5	2347.0	2346.8	2346.5	2346.3	2346.0	2345.8	2345.6
404.0	2344.0	2343.5	2343.2	2343.0	2342.7	2342.5	2342.3	2342.0
406.0	2340.4	2339.9	2339.7	2339.5	2339.2	2339.0	2338.7	2338.5
408.0	2336.9	2336.4	2336.2	2335.9	2335.7	2335.4	2335.2	2334.9
410.0	2333.4	2332.9	2332.6	2332.4	2332.1	2331.9	2331.6	2331.4
412.0	2329.8	2329.3	2329.1	2328.8	2328.6	2328.3	2328.1	2327.8
414.0	2326.3	2325.8	2325.5	2325.3	2325.0	2324.8	2324.6	2324.3
416.0	2322.7	2322.2	2322.0	2321.7	2321.5	2321.3	2321.0	2320.8
418.0	2319.2	2318.7	2318.4	2318.2	2318.0	2317.7	2317.5	2317.2

- Draw & name a working plate type fresh water generator. (10 marks)
- write down 6 Annexes of MARPOL 73/78 (06 marks)

4)

a) Name the components of the below composite boiler. **(08 marks)**



b) Write down five boiler mountings. **(05 marks)**

c) With the aid of a sketch explain boiler gauge glass blow down. **(05 marks)**

d) What is the difference between clarifier and purifier? **(02 marks)**

5)

a) Draw the **complete** refrigeration cycle and "*explain the duties*" of main components. **(10 marks)**

b) Explain the following (In-short)

- | | |
|---------------------------------|------------------|
| i. boiler safety valve | (01 mark) |
| ii. I.M.D.G code | (01 mark) |
| iii. M.S.D.S | (01 mark) |
| iv. ullage | (01 mark) |
| v. Salinometer | (01 mark) |
| vi. Oil mist detector (OMD) | (01 mark) |
| vii. Oily water separator (OWS) | (01 mark) |
| viii. SOPEP | (01 mark) |
| ix. EEBD | (01 mark) |
| x. MLC | (01 mark) |



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COURSE CODE : ED 273 P1(22-03& 22-04)
ENGINEERING KNOWLEDGE – 1

- This paper consists of THIRTTY THREE questions and the marks will be awarded,
1st question - Four(04) marks Other questions -Three(03) marks each
- Answer ALL questions

Date: 07.04.2023

Pass mark 50%

Time allocated: 1Hr

- 1) Emergency Bilge suction valve
 - a) Is connected to the main s.w pump
 - b) Is connected to the bilge pump
 - c) Is connected to the sludge pump
 - d) Is connected to the fuel transfer pump
- 2) Emergency Bilge suction valve
 - e) Is connected to the main s.w pump
 - f) Is connected to the bilge pump
 - g) Is connected to the sludge pump
 - h) Is connected to the fuel transfer pump
- 3) Which statement is correct about maintenance of bilge system?
 - a) Mud box strainers should be cleaned
 - b) Suction filter of the pump should be cleaned
 - c) bilge wells has to be maintained in oil free condition
 - d) All above
- 4) When CO2 alarm is given by a siren/bell
 - a) Should inform Chief engineer
 - b) Should report at the muster
 - c) Should evacuate from the engine room
 - d) Should report to the engine control room

- 5) CO₂ is used as a fire extinguishing medium, because
- a) It does not support combustion
 - b) Non corrosive
 - c) Non conductive
 - d) All above
- 6) E.E.B.D (emergency escape breathing device) used for
- a) Extinguished the fire
 - b) Entering to the enclosed space
 - c) Escaping areas of hazardous
 - d) All of above
- 7) Which fire extinguisher is most suitable for dealing with oil fires?
- a) Wet chemical
 - b) Foam
 - c) Dry Powder
 - d) Water
- 8) Muster list does not contain
- a) Duties of each crew member in case of a fire
 - b) Location of muster station
 - c) Duties of each crew member in case of abandoning the ship
 - d) Life boat starting procedure
- 9) After one hour notice is given is it required to synchronize the clocks of bridge and ECR?
- a) Yes
 - b) No
 - c) Occasionally
 - d) Not applicable
- 10) Which is not a Safe practice before using the turning gear
- a) Starting air must be closed & locked
 - b) Indicator cocks must be opened
 - c) turning the engine as the engineer need
 - d) Propeller clearance must be taken in writing from bridge
- 11) Which one is incorrect regarding emergency power. Emergency power is supplied to
- a) Steering gears
 - b) Emergency fire pump
 - c) Main ballast pump
 - d) navigation lights
- 12) Hunting gear is a
- a) Cargo handling gear
 - b) Feedback mechanism of a rudder control
 - c) System of reversing gear
 - d) Gear system of a purifier

13) Emergency Generator

- a) Supplies power when main generators fail
- b) Is used to pump bilges in an emergency
- c) Is used for entering Enclosed space
- d) Is used to supply power to Main Engine

14) Select the correct statement regarding the loss of suction in a centrifugal pump

- a) Air entering suction side
- b) Suction lift too much
- c) Suction strainer blocked
- d) All above are correct

15) Which one is not a self-priming pump?

- a) Centrifugal pump
- b) Gear pump
- c) Screw pump
- d) Reciprocating pump

16) Identify the purpose of relief valves

- a) Use to relief excess temperature
- b) Use to regulate flow
- c) Use to relief excess pressure
- d) All of above

17) What kind of pumps are fitted to the steering gear system

- a) Centrifugal pumps
- b) Variable delivery pumps
- c) Diaphragm pumps
- d) Axial flow pumps

18) What is the purpose of boiler scum blow down valve

- a) To take boiler water samples
- b) To remove floating solids from the boiler
- c) To fill the boiler
- d) To release air from the boiler

19) Which of the following is **not a boiler mounting?**

- a) Mechanical seal
- b) Main steam stop valve
- c) Gauge glass
- d) Safety valve

20) Boiler gauge glass is used

- a) To find water level in the boiler
- b) To find the pressure in the boiler
- c) To find the Oil level in the boiler
- d) To find the Oxygen in the boiler

21) In a four-stroke cycle of a marine diesel engine, the sequence of operations is

- a) Suction, compression, expansion and exhaust
- b) Suction, expansion, compression and exhaust
- c) Expansion, compression, suction and exhaust
- d) Compression, expansion, suction and exhaust

22) In a large two stroke engine the bed plate, A frame and entablature are held together in compression by

- a) Tie bolts
- b) Holding down bolts
- c) Fitted bolts
- d) External casing

23) Fuel injector

- a) Supplies fuel to the piston
- b) Sprays fuel into the combustion space of cylinder
- c) Supplies L.O to the cylinder liner
- d) Supplies L.O to the gudgeon pin

24) Which is not a part of 4 stroke diesel engine

- a) Gudgeon pin
- b) exhaust valve
- c) Crosshead bearing
- d) main bearing

25) Which operation is **not** coming under oil record book?

- a) Bunkering of fuel oil
- b) Pumping out engine room bilges
- c) Collection and disposal of oil residues
- d) Incineration of oily rags

26) Which substance is an air pollutant?

- a) SOX
- b) NOX
- c) Volatile organic compounds
- d) All above

27) Cofferdam is a

- a) void space between two water tight bulkheads
- b) space between two engines
- c) space between two adjacent decks
- d) all of above

28) Which is possible in an enclosed space?

- a) Lack of Oxygen
- b) Presence of toxic gases
- c) Presence of flammable gases
- d) All of above

29) What is the colour code of dry powder?

- a) Black
- b) French Blue
- c) Pale Cream
- d) Signal Red

30) The term for seawater used to trim a ship is ...

- a) Black water.
- b) Ballast water.
- c) Billage Water.
- d) Brown Water.

31) Cylinder heads of marine diesel engines are provided with _____ to relieve any excessive pressure within the combustion chamber

- a) Safety valves
- b) Indicator cocks
- c) Relief valves
- d) Bursting discs

32) Evaporative distillation fresh water generators used to heat sea water by,

- a) Jacket cooling water
- b) LUB oil
- c) Fuel oil
- d) None of above

33) After one hour notice is given is it required to synchronize the clocks of bridge and ECR?

- a) Yes
- b) No
- c) Occasionally
- d) Not applicable