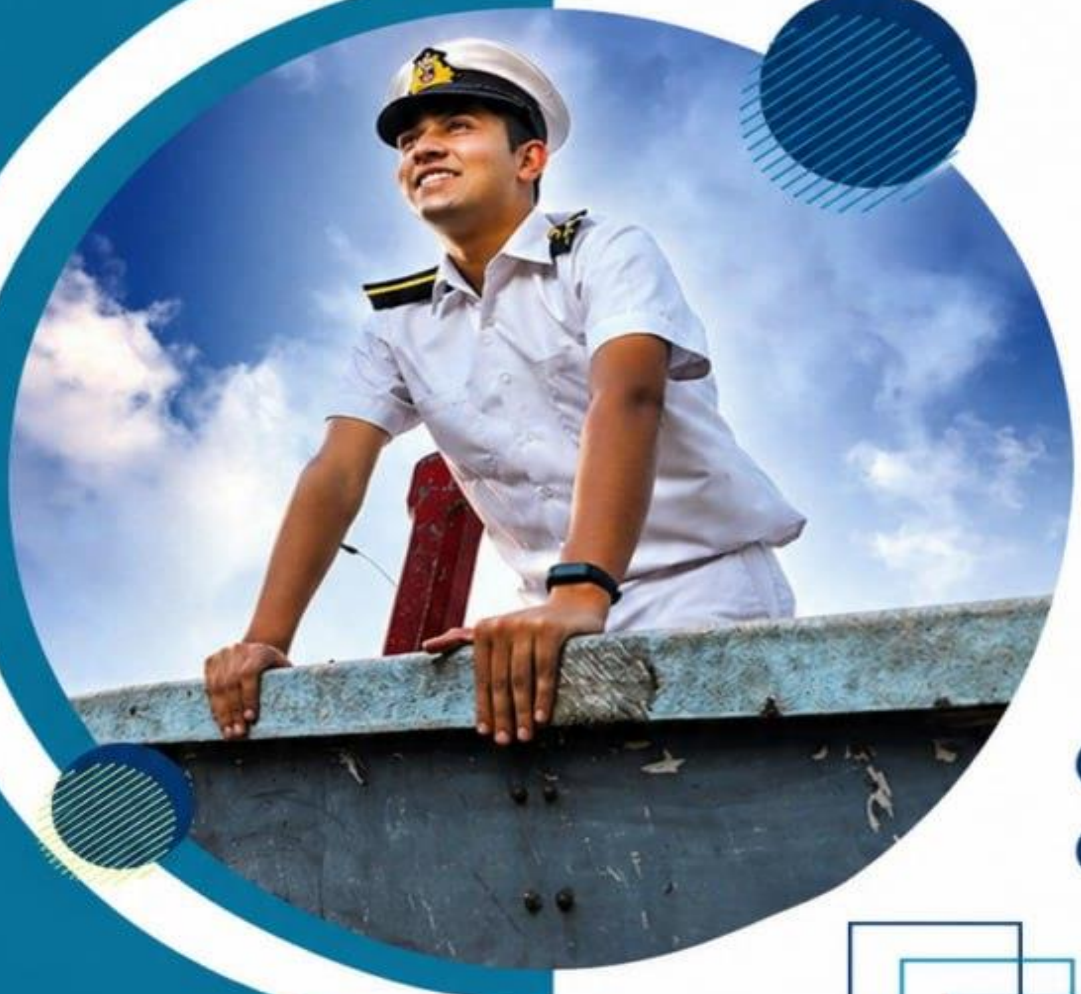
D. MARINE
Study Material

MEO CLASS 4 WRITTEN: MEP

(MARINE ENGINEERING PRACTICE)

FOR INDIAN COMPETENCY EXAM



www.dmarinestudy.com

www.dmarinestudy.com

D. MARINE
Study Material

MAY – 2023(PART –1)

Q1.a) Describe principle of arc welding, with diagrams. (6)
b) Describe equipment used in arc welding. (6)
c) Describe health hazards and precautions to be taken. (4)
2023/MAY1/Q1
Click Here to See the Answer

Q2. Describe the following properties of steel and which components are most considered with advantages & disadvantages.
a) Ductility (4)
b) Hardness (4)
c) Malleability (4)
d) Toughness (4)
2023/MAY1/Q2
Click Here to See the Answer

Q3. Describe materials used with composition and reasons for use with following components of Diesel Engine Plant:
a) Dudgeon pins and connecting rod bolts. (4)
b) Gear Wheels (4)
c) Upper Piston Parts. (4)
d) Fuel Nozzles. (4)
2023/MAY1/Q3
Click Here to See the Answer

Q4.a) Describe how leak in leaky tube in Heat exchanger is detected? How to rectify leaky tube? (8)
b) Describe how division plate on the inlet and outlet end is detected? (4)
c) Describe reasons for poor performance of heat exchanger and action to rectify the same. (4)
2023/MAY1/Q4
Click Here to See the Answer

Q5.a) Describe onboard main Air Compressor maintenance schedule. (8)
b) Describe malfunctions observed on Main Air Compressor. (8)
2023/MAY1/Q5
Click Here to See the Answer

Q6. a) Describe all parts of Gear Pump. Explain how pumping is carried out by gear pump? (8)
b) By suitable drawing describe what is BACK LASH, it's importance. How BACK LASH is measured? (4)
c) What checks will be carried out during overhauls. (4)
2023/MAY1/Q6
Click Here to See the Answer

Q7.a) How leaks are detected and rectified on refrigerating plant? (4)
b) Describe how Suction & Discharge valve are tested for tightness? (4)
c) Describe how refrigerant charging is carried out? (8)
2023/MAY1/Q7
Click Here to See the Answer

Q8.a) Describe by drawing a suitable diagram, Bilge water System of an ocean-going ship. Name each part/equipment with its function. (10)
b) Describe problems associated with Bilge water system and their solutions. (6)
2023/MAY1/Q8
Click Here to See the Answer

Q9.a) Describe maintenance required on auxiliary boiler burner. (8)
b) Describe safety features provided on fuel burning system of auxiliary boiler. (8)
2023/MAY1/Q9
Click Here to See the Answer

www.dmarinestudy.com

D. MARINE
Study Material

MAY- 2023(PART-2)

Q1.a) Under which all circumstances drydocking of a vessel is required. (8)
b) What all repair and maintenance works are expected to be carried out in Dry Dock? (8)
2023/MAY2/Q1
Click Here to See the Answer

Q2.a) Describe with suitable schematic diagrams Inspections and checks to be conducted on Tail Shaft, highlighting areas to be attended. (10)
b) Describe the procedure for repair in way of shaft CONICAL AREA. (6)
2023/MAY2/Q2
Click Here to See the Answer

Q3.a) Describe 2 stroke Main Engine cylinder liner diameter measuring procedure. (8)
b) What is the modern system for Liner Diameter Measurement? (4)
c) What are the advantages of modern system over old system? (4)
2023/MAY2/Q3
Click Here to See the Answer

Q4.a) What is non-destructive testing? What are non-destructive methods used in practice? (6)
b) What are the advantages of non-destructive testing? (6)
c) What are limitations of non-destructive testing? (4)
2023/MAY2/Q4
Click Here to See the Answer

Q5. Describe following metal finishing processes and objectives:
a) Honing (4)
b) Lapping (4)
c) Polishing (4)

d) Buffing (4)
2023/MAY2/Q5
Click Here to See the Answer

Q6.a) What is the principle of gas cutting? (4)
b) Describe how gas cutting is carried out with Oxygen and Acetylene flame? (8)
c) State the pressure levels for Acetylene & Oxy cylinders for gas cutting operations. (4)
2023/MAY2/Q6
Click Here to See the Answer

Q7.a) Describe uses of packed gland seal, which all machinery they are in use? In a running pump, how the gland packing is lubricated and kept cool?
b) Describe advantages of using gland packing. (5)
c) Describe disadvantages of using gland packing. (5)
2023/MAY2/Q7
Click Here to See the Answer

Q8.a) Describe procedure for safe Isolation of Centrifugal Pump prior maintenance work. (6)
b) Describe in detail routine maintenance carried out on the pumps. (10)
2023/MAY1/Q8
Click Here to See the Answer

Q9. With reference centrifuges,
a) How is the vertical Height is measured and why vertical Height of the spindle is so critical? (6)
b) Describe the troubles occurring on centrifuges during their operation and their rectification procedure. (10)
2023/MAY2/Q9
Click Here to See the Answer

JUNE – 2023

Q1.a) Describe the preparations required before drydocking a vessel. (5)
b) Describe what preparation are to be made prior entering a dry dock. (6)
c) Describe actions to be taken, when vessel has set on the blocks in dry dock. (5)
2023/JUN/Q1
Click Here to See the Answer

Q2.a) Describe indications of crank case explosion in main engine. (4)
b) Describe actions to be taken, if there is crank case explosion in main engine. (8)
c) Describe means of prevention of crank case explosion. (4)
2023/JUN/Q2
Click Here to See the Answer

Q3.a) Describe the importance of taking crank web deflections of Auxiliary Engine. (4)
b) Describe preparations for taking crank web deflections of Auxiliary engine. (4)
c) Describe procedure for taking crank web deflections of auxiliary engine and their evaluation. (8)
2023/JUN/Q3
Click Here to See the Answer

Q4. Describe reasons and solutions for following troubles occurring during starting of main engine.
a) Engine fails to start. (4)
b) Engine does not reverse. (4)
c) Engine starts on starting air but shuts down. (4)
d) Engine runs unevenly. (4)
2023/JUN/Q4
Click Here to See the Answer

Q5.a) Describe procedure for overhauling auxiliary engine fuel pump. (8)
b) Describe procedure to check fuel pump timing. (8)
2023/JUN/Q5
Click Here to See the Answer

Q6.a) Describe routine maintenance to be carried out on gear pumps. (8)
b) Describe troubles encountered during operation of gear pumps and their solutions. (8)
2023/JUN/Q6
Click Here to See the Answer

Q7.a) Describe the hazards while working on electrical machinery. (4)
b) What is Lock out / Tag out system used for safety operation on electrical machinery. (8)
c) Describe machineries where Lock out / Tag out system will prevent accident. (4)
2023/JUN/Q7
Click Here to See the Answer

Q8.a) Describe the structural members which need attention during the operation of Engine Room Cranes. (5)
b) Describe maintenance to be carried out on E/R cranes for their trouble free operation. (6)
c) Describe safety checks to be carried out on E/R cranes to prevent major damage and injury. (5)
2023/JUN/Q8
Click Here to See the Answer

Q9.a) What are the reasons of frosting in the refrigeration chambers and its effect. (6)
b) What are the methods used for defrosting refrigerated chambers? (6)

c) What is the arrangement of Reefer Chamber drains. (4)
2023/JUN/Q9
Click Here to See the Answer

JULY – 2023

Q1. Describe materials used for following equipment's with composition and qualities required.
a) Propeller. (4)
b) Propeller Shaft. (4)
c) Engine Gears. (4)
d) Bearings. (4)
2023/JUL/Q1
Click Here to See the Answer

Q2.a) Describe different components used in soldering process. (6)
b) Describe soldering process in detail. (6)
c) What are Do's and Don'ts for good soldering joints. (4)
2023/JUL/Q2
Click Here to See the Answer

Q3.a) Describe types of welds made in arc welding process and their use.
b) Describe various type of welding defects in welding operation. Discuss the causes of these defects. (6)
c) Discuss types of distortions found in welding operations. Discuss the causes and correction methods. (6)
2023/JUL/Q3
Click Here to See the Answer

Q4.a) Describe function of oil seals. (6)
b) Describe materials with their qualities used for making shaft seals. (6)
c) Describe cares to be taken in storing shaft seals. (4)
2023/JUL/Q4
Click Here to See the Answer

Q5.a) Describe safety issues which need to be addressed at all times during vessel is in Dry Dock. (8)
b) Describe common Dry Dock Jobs with their inspection points during dry

docking of the vessel. (8)
2023/JUL/Q5
Click Here to See the Answer

Q6. Describe procedures for following maintenance works of rudder in dry dock.
a) What are pintle clearances and how they are measured? (5)
b) What is the procedure for inspection of Rudder? (5)
c) What is procedure for applying coating to internal surfaces of Rudder?
2023/JUL/Q6
Click Here to See the Answer

Q7. Describe the following turbocharger cleaning operations.
a) Turbine side water washing. (6)
b) Turbine side Dry Cleaning. (5)
c) Blower side water washing. (5)
2023/JUL/Q7
Click Here to See the Answer

Q8.a) Describe the reasons for checking crank web deflections. (8)
b) Describe the procedure for taking and recording crank web deflections of main engine. (8)
2023/JUL/Q8
Click Here to See the Answer

Q9.a) Describe maintenance required on auxiliary boiler burner. (8)
b) Describe safety features provided on fuel burning system of auxiliary boiler. (8)
2023/MAY1/Q9 **2023/JUL/Q9**
Click Here to See the Answer

AUGUST – 2023

Q1. During your watch you observe that Main Engine L.O. sump level is rising due to contamination of lubricating oil. Describe the procedure:
a) To identify the contaminant. (6)
b) Locate the cause of contamination. (6)
c) Action to make the oil suitable for its continued usage. (4)
2023/AUG/Q1
Click Here to See the Answer

Q2. With reference to main refrigeration plant give reason for each of the following operational irregularities and state how these are dealt with:
a) Rapid loss of lubricating oil from the crankcase of a "vee" block compressor. (4)
b) Steady "fall off" in refrigeration effect over a comparatively short period of time. (4)
c) Excessive "icing up" at compressor suction. (4)
d) Short cycling. (4)
2023/AUG/Q2
Click Here to See the Answer

Q3. Performance of a Fire-pump has deteriorated and is not developing required head. Describe the following:
a) The procedure for dismantling the pump. (4)
b) The likely defects and remedial measures to be taken. (3)
c) Which all Clearances are to be checked. (3)
d) Precautions during assembly. (3)
e) Checks for alignment of motor pump coupling. (3)
2023/AUG/Q3
Click Here to See the Answer

Q4. Describe the nature and the possible effects on machinery operation of deposits, which may adhere to the internal surfaces of exhaust gas turbo-

blowers and explain how these deposits are removed. (16)
2023/AUG/Q4
Click Here to See the Answer

Q5.a) A biological sewage system develops a fault, which necessitates opening the unit for repair. Explain the following:
i) The risk associated with opening the unit. (5)
ii) The precautions taken to reduce the risk. (5)
(b) Explain the significance of biological oxygen demand (B.O.D). (6)
2023/AUG/Q5
Click Here to See the Answer

Q6. The vessel upon which you are serving has entered dry-dock and Second engineer has asked you to inspect the shipside valves for defects. Draw a list of different ship side valves and indicate the possible defects. What maintenance is carried out on them, in the drydock? (10)
a) Explain why EACH of the defects are of importance. (6)
2023/AUG/Q6
Click Here to See the Answer

Q7. With reference to hydraulic deck machinery:
a) State the sources for contamination of the system. (6)
b) Describe possible effects due to contamination. (6)
c) Explain how the oil can be monitored by ships staff. (4)
2023/AUG/Q7
Click Here to See the Answer

Q8. Water ballast tanks of dry cargo ships and cargo tanks of oil tankers may be protected from corrosion by sacrificial anodes.
a) When do these anodes need replacement? (10)
b) i) State THREE suitable materials that can be used for anodes. (3)
ii) State any restriction on the use of these materials as anodes in oil

tankers. (3)
2023/AUG/Q8
Click Here to See the Answer

Q9. Give reasons why each of the following conditions can result in oil being carried over with the water discharge from lubricating oil centrifuges:
a) High throughput of mixture. (6)
b) Abnormally high temperature of mixture. (6)
c) Appreciable accumulation of solids in bowl. (4)
2023/AUG/Q9
Click Here to See the Answer

www.dmarinestudy.com

D. MARINE
Study Material

SEPTEMBER – 2023

Q1.a) Under which all circumstances drydocking of a vessel is required. (8)
b) What all repair and maintenance works are expected to be carried out in Dry Dock? (8)
2023/MAY2/Q1 **2023/SEP/Q1**
Click Here to See the Answer

Q2.a) Describe with suitable schematic diagrams inspections and checks to be conducted on Tail Shaft, highlighting areas to be attended. (10)
b) Describe the procedure for repair in ways of shaft CONICAL AREA. (6)
2023/MAY2/Q2 **2023/SEP/Q2**
Click Here to See the Answer

Q3.a) Describe 2 stroke Main Engine cylinder liner diameter measuring procedure. (8)
b) What is the modern system for liner Diameter Measurement? (4)
c) What are the advantages of modern system over old system? (4)
2023/MAY2/Q3 **2023/SEP/Q3**
Click Here to See the Answer

Q4.a) What is non-destructive testing? What are non-destructive methods used in practice? (6)
b) What are the advantages of non-destructive testing? (6)
c) What are limitations of non-destructive testing (4)
2023/MAY2/Q4 **2023/SEP/Q4**
Click Here to See the Answer

Q5. Explain in detail how you would isolate one section of a water sprinkler system for routine maintenance. Describe all tests and inspections you would make and how you would return the system to service. (16)
2023/SEP/Q5

Click Here to See the Answer

Q6. The exhaust temperatures of an auxiliary diesel are found to be excessive and uneven at normal load, with dark exhaust at the funnel. Describe EACH of the following:
a) An investigation of the situation. (5)
b) The procedure to remedy the immediate problems. (6)
c) Any further action that might be necessary. (5)
2023/SEP/Q6
Click Here to See the Answer

Q7. A centrifugal pump has been opened up due to abnormal noise:
a) List the checks you will carry out on various parts. (4)
b) Name the parts which may require replacement. (4)
c) Checks to be carried out after assembly. (4)
d) Operational parameters, which may be required to be compared with manufacturers test record. (4)
2023/SEP/Q7
Click Here to See the Answer

Q8.a) State with reasons, the causes of fatigue cracking of engineering components. (4)
b) State, with reasons, how material and design defects can influence fatigue life. (6)
c) With reference to engine bed plate transverse girders explain how the incidence of fatigue cracking can be minimized. (6)
2023/SEP/Q8
Click Here to See the Answer
Q9.a) Describe how A. E, crankshaft deflections are measured. (6)
b) State how the measurements can be checked for accuracy. (5)
c) Specify with reasons other checks that should be made on the crankshaft.
2023/SEP/Q9
Click Here to See the Answer

OCTOBER – 2023

Q1. With reference to the treatment of water for auxiliary boilers:
(a) State the major risks from
i) Hard water. (3)
ii) Soft water. (3)
(b) Describe FIVE types of boiler water tests that are carried out on board stating the reason for EACH. (5)
(c) State why regular blow down and makeup of the contents of a boiler is essential. (5)
2023/OCT/Q1
Click Here to See the Answer

Q2. Describe an air receiver and explain clearly the purpose of the mountings. State the defects, which may develop and explain the precautions which should be taken to minimize the possibility of deterioration or damages to the receiver. (16)
2023/OCT/Q2
Click Here to See the Answer

Q3. State with reasons which one of the following would most help to correct a pronounced discoloration of the M/E lubricating oil (16)
a) "Make up" from reserve tanks.
b) Increase purifier throughput.
c) Increase frequency of filter pack cleaning.
d) Overhaul piston rod stuffing boxes.
e) Check tank top integrity of sump tank.
2023/OCT/Q3
Click Here to See the Answer

Q4. Describe what examination you will carry out on the following parts of Air Compressor:

a) Suction and delivery valves and seats. (4)
b) Relief valves and bursting discs. (4)
c) Coolers and cooling passages. (4)
d) Piston and piston rings. (4)
2023/OCT/Q4
Click Here to See the Answer

Q5. Explain in detail how you would isolate one section of a water sprinkler system for routine maintenance. Describe all tests and inspections you would make and how you would return the system to service. (16)
2023/SEP/Q5 **2023/OCT/Q5**
Click Here to See the Answer

Q6. The exhaust temperatures of an auxiliary diesel are found to be excessive and uneven at normal load, with dark exhaust at the funnel. Describe EACH of the following:
a) An investigation of the situation. (5)
b) The procedure to remedy the immediate problems. (6)
c) Any further action that might be necessary. (5)
2023/SEP/Q6 **2023/OCT/Q6**
Click Here to See the Answer

Q7. A centrifugal pump has been opened up due to abnormal noise:
a) List the checks you will carry out on various parts. (4)
b) Name the parts which may require replacement. (4)
c) Checks to be carried out after assembly. (4)
d) Operational parameters, which may be required to be compared with manufacturers test record. (4)
2023/SEP/Q7 **2023/OCT/Q7**
Click Here to See the Answer

Q8.a) State with reasons, the causes of fatigue cracking of engineering components. (4)

b) State, with reasons, how material and design defects can influence fatigue life. (6)
c) With reference to engine bed plate transverse girders explain how the incidence of fatigue cracking can be minimized. (6)
2023/SEP/Q8 **2023/OCT/Q8**
Click Here to See the Answer

Q9.a) Describe how A. E, crankshaft deflections are measured. (6)
b) State how the measurements can be checked for accuracy. (5)
c) Specify with reasons other checks that should be made on the crankshaft.
2023/SEP/Q9 **2023/OCT/Q9**
Click Here to See the Answer

NOVEMBER – 2023

Q1.a) Describe various types of valves used in Engine room. State reasons for their use particular type of valves. (8)
b) Describe Materials used for different parts of each design. (8)
2023/NOV/Q1
Click Here to See the Answer

Q2. Describe safety precautions with gas cutting/welding equipments.
a) For storage of gas cylinders. (8)
b) Transportation on ship for working. (4)
c) During gas cutting & welding operation. (4)
2023/NOV/Q2
Click Here to See the Answer

Q3. Describe following metal finishing processes and objectives:
a) Honing (4)
b) Lapping (4)
c) Polishing (4)
d) Buffing (4)
2023/MAY2/Q5 **2023/NOV/Q3**
Click Here to See the Answer

Q4.a) Describe procedure for safe Isolation of Centrifugal Pump prior maintenance work. (6)
b) Describe in detail routine maintenance carried out on the pumps. (10)
2023/MAY1/Q8 **2023/NOV/Q4**
Click Here to See the Answer

Q5.a) Describe shell and tube type heat exchanger and its function with the aid of a diagrammatic sketch, naming each part. (8)
b) Describe the physical cleaning procedure of cleaning tubes. (4)

c) Describe the Chemical cleaning of the shell side of the heat exchanger. (4)
2023/NOV/Q5
Click Here to See the Answer

Q6.a) Describe the hazards while working on electrical machinery. (4)
b) What is Lock out / Tag out system used for safety operation on electrical machinery. (8)
c) Describe machineries where Lock out / Tag out system will prevent accident. (4)
2023/JUN/Q7 **2023/NOV/Q6**
Click Here to See the Answer

Q7.a) Describe following terms used for pumps,
i) Flow Rate. (2)
ii) Pressure. (2)
iii) Head. (2)
iv) Net Positive Suction Head. (2)
b) During watch keeping round what checks are required on a running centrifugal pump? (8)
2023/NOV/Q7
Click Here to See the Answer

Q8.a) Describe what is Slipping of Crank web and its effect on main engine.
b) What actions are required if crank web slipping has occurred? (4)
c) Describe reasons for Slipping of web on the journal. (4)
d) Describe precautions against prevention of slipping crank web and journal. (4)
2023/NOV/Q8
Click Here to See the Answer

Q9.a) Describe maintenance to be carried out on safety valve of Auxiliary Boiler to keep them in good order.

b) Describe procedure for setting safety valve. (6)
2023/NOV/Q9
Click Here to See the Answer

DECEMBER – 2023

Q1.a) Describe safety limits provided on deck cranes.
b) Describe regular maintenance required on deck cranes.
c) Discuss in the Indian context, the inspection, testing and certification regime being followed for the lifting appliances on ships. (16)
2023/DEC/Q1
Click Here to See the Answer

Q2. Describe the following non-destructive testing methods:
a) Radiographic Inspection, principle, method in detail. (8)
b) Ultrasonic Inspection, principle, method in detail. (8)
2023/DEC/Q2
Click Here to See the Answer

Q3. With regard to keeping gas side of boilers in good condition discuss EACH of the following:
a) The mechanism of combustion, stating the factors which are important to good combustion. (6)
b) Oil fuel treatments. (5)
c) Soot removal equipment. (5)
2023/DEC/Q3
Click Here to See the Answer

Q4. During your watch you observe that Main Engine L.O. sump level is rising due to contamination of lubricating oil. Describe the procedure:
a) To identify the contaminant. (6)
b) Locate the cause of contamination. (6)
c) Action to make the oil suitable for its continued usage. (4)
2023/AUG/Q1 **2023/DEC/Q4**
Click Here to See the Answer

Q5. To achieve the optimum performance from a main air compressor, describe the routine maintenance necessary on the following components:
a) Unloader. (4)
b) Air intake filter. (4)
c) Suction/Discharge valves. (4)
d) Intercoolers. (4)
2023/DEC/Q5
Click Here to See the Answer

Q6. With reference to stuffing box of a two-stroke main engine explain following:
a) Why stuffing box is required in two stroke diesel engines. (8)
b) Explain the maintenance carried out on stuffing box during piston overhaul. (8)
2023/DEC/Q6
Click Here to See the Answer

Q7.a) Sketch, describe and explain the operation of the domestic refrigeration system of a ship using one of the HFC as refrigerant. What kind of maintenance is essential for the system. (8)
b) Describe the causes for the following in the domestic refrigeration system:
i) Frequent cut-in and cut-out of the compressor. (2)
ii) Lub oil low pressure cut-out of the compressor. (2)
iii) High pressure cut-out of the compressor. (2)
iv) Frosting in the compressor suction side. (2)
2023/DEC/Q7
Click Here to See the Answer

Q8. The exhaust temperatures of an auxiliary diesel are found to be excessive and uneven at normal load, with dark exhaust at the funnel. Describe EACH of the following:
a) An investigation of the situation. (5)

b) The procedure to remedy the immediate problems. (6)
c) Any further action that might be necessary. (5)
2023/SEP/Q6 **2023/OCT/Q6** **2023/DEC/Q8**
Click Here to See the Answer

Q9. With reference to centrifuges:
a) How is the vertical Height is measured and why vertical Height of the spindle is so critical? (6)
b) Describe the troubles occurring on centrifuges during their operation and their rectification procedure. (10)
2023/MAY2/Q9 **2023/DEC/Q9**
Click Here to See the Answer