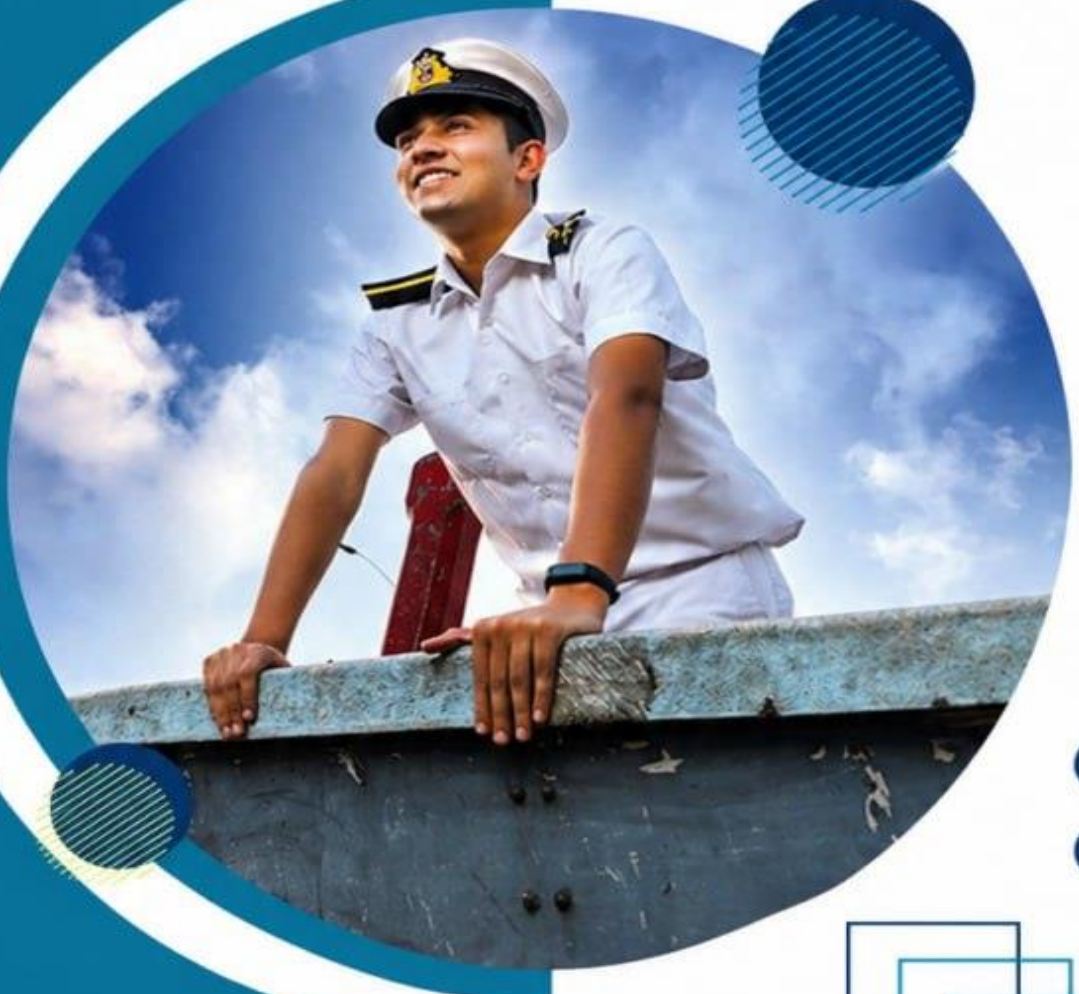
D. MARINE
Study Material

MEO CLASS 4 WRITTEN: MEP

(MARINE ENGINEERING PRACTICE)

FOR INDIAN COMPETENCY EXAM



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D. MARINE
Study Material

JANUARY – 2024

Q1. Draw cooling water system of main engine and naming each component and describe flow of cooling water through the system. (16)
2024/JAN/Q1
Click Here to See the Answer

Q2. Describe the Stem Tube Lubrication System by drawing a schematic diagram and explaining function of each component. (16)
2024/JAN/Q2
Click Here to See the Answer

Q3. Describe following procedures for rudder maintenance in a dry dock.
a) What is Jumping Clearance and why is it considered a valve of importance? (8)
b) What is Rudder Drop and describe the procedure for measuring the rudder drop? (8)
2024/JAN/Q3
Click Here to See the Answer

Q4. Describe the following non-destructive test methods:
a) Dye penetration test principle, and method in details. (8)
b) Magnetic particle testing principle and method in detail. (8)
2024/JAN/Q4
Click Here to See the Answer

Q5. a) Describe types of arc welding processes. (8)
b) Describe what level of temperatures are reached during arc welding. (4)
c) Describe precautions taken to avoid health and shock hazards during welding. (4)
2024/JAN/Q5
Click Here to See the Answer

Q6. 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 records. (4)
2023/SEP/Q7 **2023/OCT/Q7** **2024/JAN/Q6**
Click Here to See the Answer

Q7. 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** **2024/JAN/Q7**
Click Here to See the Answer

Q8. a) Describe the working of a Mechanical Shaft seal with a diagram. How working fluid leak is prevented? (8)
b) What are causes of Mechanical shaft seal failure? (4)
c) Describe for Mechanical shaft seal usage
i) Advantages (2)
ii) Disadvantages (2)
2024/JAN/Q8
Click Here to See the Answer

Q9. With reference to lifeboats and davits describe (a & b) with the aid of sketches:
a) The purpose and types of "limits switches". (6)
b) The centrifugal brake and state the method of testing. (5)
c) Enumerate routine maintenance of lifeboat engine & lifeboat winch. (5)
2024/JAN/Q9
Click Here to See the Answer

FEBRUARY – 2024

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** **2024/FEB/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 **2023/SEP/Q2** **2024/FEB/Q2**
Click Here to See the Answer

Q3. 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** **2024/FEB/Q3**
Click Here to See the Answer

Q4. Describe a procedure for cylinder liner calibration indicating how the readings are recorded to allow for easy recognition of liner wear. (16)
2024/FEB/Q4
Click Here to See the Answer

Q5.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** **2024/FEB/Q5**
Click Here to See the Answer

Q6.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 joint. (4)
2023/JUL/Q2 **2024/FEB/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 **2024/FEB/Q7**
Click Here to See the Answer

Q8.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** **2024/FEB/Q8**
Click Here to See the Answer

Q9.a) Describe what would be the 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 **2024/FEB/Q9**
Click Here to See the Answer

MARCH – 2026

Q1.a) Describe how leak in a Heat exchanger tube is detected? How to rectify leaky tube? (8)
(b) What are the common methods to enhance heat transfer of heat exchanger? (4)
(c) Describe reasons for poor performance of heat exchanger and actions to rectify the same. (4)
2024/MAR/Q1
Click Here to See the Answer

Q2.a) Describe the components forming part of a Gear Pump. Explain how pumping is carried out by gear pump? (8)
(b) By suitable drawing describe what is 'back lash' and enumerate its importance. How is 'back lash' measured? (4)
(c) What checks will be carried out during overhauls. (4)
2024/MAR/Q2
Click Here to See the Answer

Q3.a) How Leaks are detected and rectified on refrigerating plant? (4)
(b) Describe how suction & discharge valves are tested for tightness? (4)
(c) Describe with an illustration, how refrigerant charging is carried out?
2024/MAR/Q3
Click Here to See the Answer

Q4.a) Describe by drawing a suitable diagram, Bilge water system of an ocean-going ship. Name each part/equipment with its function. (10)
(b) Discuss the commonly associated troubles with the Bilge system and their probable solutions. (6)
2023/MAY1/Q8 **2024/MAR/Q4**
Click Here to See the Answer

Q5.a) Describe the uses of packed gland seal. What are the machineries they are in use? In a running pump, how the gland packing is lubricated and kept cool? (6)

(b) Describe advantages of using gland packing. (5)
(c) Describe disadvantages of using gland packing. (5)
2023/MAY2/Q7 **2024/MAR/Q5**
Click Here to See the Answer

Q6. With respect to centrifuges.
(a) Explain the reasons which shall cause a purifier to overflow (6)
(b) What are reasons that induces vibration in a purifier" (4)
(c) Explain the process of desludging? Why is the purifier amperage an important parameter for the operator? (6)
2024/MAR/Q6
Click Here to See the Answer

Q7.a) Explain with a sketch showing the components of an auxiliary engine fuel valve, the complete maintenance procedure including the removal of the fuel valve, pressure-testing and overhaul. (12)
(b) What are the precautions to be taken before installation of a fuel valve on the cylinder head? Indicate the special tools that may be required for the fuel valve removal and overhaul. (4)
2024/MAR/Q7
Click Here to See the Answer

Q8. The exhaust temperatures of an auxiliary diesel engine 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** **2024/MAR/Q8**
Click Here to See the Answer
Q9.a) What is Accumulation of pressure test for Boiler and what is its purpose? (6)
(b) Describe the detailed procedure for an Accumulation of pressure test.
2024/MAR/Q9
Click Here to See the Answer

APRIL – 2024 (PART-1)

Q1.a) Describe various types of valves used in Engine room. State reasons for their use for particular type of valves. (10)
(b) Describe Materials used for different parts of each design. (6)
2023/NOV/Q1 **2024/APR/Q1**
Click Here to See the Answer

Q2. Describe safety precautions with gas cutting/welding equipment's.
(a) For storage of gas cylinders (8)
(b) Transportation on ship for working (4)
(c) During gas cutting & welding operation (4)
2023/NOV/Q2 **2024/APR/Q2**
Click Here to See the Answer

Q3. Describe following metal finishing processes and their objectives:
(a) Honing (4)
(b) Lapping (4)
(c) Polishing (4)
(d) Buffing (4)
2023/MAY2/Q5 **2023/NOV/Q3** **2024/APR/Q3**
Click Here to See the Answer

Q4.a) Describe the safe isolation procedure of centrifuges on board ships before starting maintenance work. (6)
(b) Describe maintenance schedule of centrifuges with brief description of the procedure for satisfactory operation. (10)
2024/APR/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.
2023/NOV/Q5 **2024/APR/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 accidents. (4)
2023/JUN/Q7 **2023/NOV/Q6** **2024/APR/Q6**
Click Here to See the Answer

Q7.a) Describe the following terms used for pumps
(i) Flow Rate (2)
(ii) Cavitation (2)
(iii) Net Positive Suction Head (2)
(iv) Pressure (2)
(b) During watch keeping round what checks are required on running centrifugal pump? (8)
2024/APR/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 probable reasons for slipping of web on the journal. (4)
(d) Describe precautions against prevention of slipping crank web and journal. (4)
2023/NOV/Q8 **2024/APR/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. (10)
(b) Describe procedure for setting safety valve. (6)
2024/APR/Q9
Click Here to See the Answer

JUNE – 2024

Q1. Draw cooling water system of main engine and naming each component and describe flow of cooling water through the system (16)
2024/JAN/Q1 **2024/JUN/Q1**
Click Here to See the Answer

Q2. The reciprocating bilge pump on board your ship, has gradually stopped taking suction from the engine room bilge wells. Write a letter to the owner / manager stating the parts of the pump you suspect are either worn out or broken. (16)
2024/JUN/Q2
Click Here to See the Answer

Q3. Describe following procedures for rudder maintenance in a dry dock.
(a) What is Jumping Clearance and why is it considered a value of importance? (8)
(b) What is Rudder Drop and describe the procedure for measuring the rudder drop? (8)
2024/JAN/Q3 **2024/JUN/Q3**
Click Here to See the Answer

Q4. Describe following non-destructive test methods:
(a) Dye penetration test - principle, and method in detail. (8)
(b) Magnetic particle testing - principle and method in detail. (8)
2024/JUN/Q4
Click Here to See the Answer

Q5.a) Describe types of arc welding processes. (8)
(b) Describe what level of temperatures are reached during arc welding. (4)
(c) Describe precautions taken to avoid health and shock hazards during welding. (4)
2024/JAN/Q5 **2024/JUN/Q5**
Click Here to See the Answer

Q6. 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** **2024/JAN/Q6** **2024/JUN/Q6**
Click Here to See the Answer

Q7.a) Describe how Auxiliary engine crankshaft deflections are measured.
(b) State how the measurements can be checked for accuracy. (5)
(c) Specify with reasons other checks that should be made on the crankshaft. (5)
2024/JUN/Q7
Click Here to See the Answer

Q8.a) Describe working of a Mechanical Shaft seal with a diagram. How working fluid leak is prevented? (8)
(b) What are the causes of Mechanical Shaft seal failure? (4)
(c) Describe the advantages and disadvantages for mechanical shaft seal usage. (4)
2024/JUN/Q8
Click Here to See the Answer

Q9. With reference to lifeboats and davits describe (a & b) with the aid of sketches:
(a) The purpose and types of "limits switches". (6)
(b) The centrifugal brake and state the method of testing. (5)
(c) Enumerate routine maintenance of the lifeboat engine and the lifeboat winch. (5)
2024/JAN/Q9 **2024/JUN/Q9**
Click Here to See the Answer

JULY – 2024

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** **2024/FEB/Q1** **2024/JUL/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 **2023/SEP/Q2** **2024/FEB/Q2** **2024/JUL/Q2**
Click Here to See the Answer

Q3. 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** **2024/FEB/Q3** **2024/JUL/Q3**
Click Here to See the Answer

Q4. Describe a procedure for cylinder liner calibration indicating how the readings are recorded to allow for easy recognition of liner wear. (16)
2024/FEB/Q4 **2024/JUL/Q4**
Click Here to See the Answer

Q5.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** **2024/FEB/Q5** **2024/JUL/Q5**
Click Here to See the Answer

Q6.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 joint. (4)
2023/JUL/Q2 **2024/FEB/Q6** **2024/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 **2024/FEB/Q7** **2024/JUL/Q7**
Click Here to See the Answer

Q8.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** **2024/FEB/Q8** **2024/JUL/Q8**
Click Here to See the Answer

Q9.a) Describe what would be the 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 **2024/FEB/Q9** **2024/JUL/Q9**
Click Here to See the Answer

AUGUST – 2024

Q1. Oil traces have been found in the condensate tank of an auxiliary boiler:
(a) Describe the procedure to trace the source of contamination (8)
(b) List the contamination with reasons for its occurrence and the precaution to be taken to ensure safety of the boiler (8)
2024/MAY2/Q1 **2024/AUG/Q1**
Click Here to See the Answer

Q2.a) Describe how cylinder liners are checked for wear (5)
(b) Explain how these measurements are recorded (5)
(c) Explain why allowance for wear is limited and what extent of the wear governs liner replacement (6)
2024/MAY2/Q2 **2024/AUG/Q2**
Click Here to See the Answer

Q3. State some built in measures by which the steering gear mechanism can be kept operational, in the event of breakages, pipe failures, motor burn out etc. (16)
2024/MAY2/Q3 **2024/AUG/Q3**
Click Here to See the Answer

Q4. Where a waste heat boiler is subject to persistent leakage at the tube / tube plate connection, suggest with sketches, methods of effecting a permanent repair. (16)
2024/MAY2/Q4 **2024/AUG/Q4**
Click Here to See the Answer

Q5.a) What are the routines carried out on a lifeboat winch (6)
(b) What maintenance do the hand brake and Centrifugal brakes require
(c) At what lowering velocity does the centrifugal brake operate (5)
2024/MAY2/Q5 **2024/AUG/Q5**
Click Here to See the Answer

Q6. Give reasons and remedies for the following faults in air compressors.
(a) Excessively hot discharge pipe (5)
(b) Intermediate stage relief valve lifting (5)
(c) Noticeable reduction in free air delivery (6)
2024/MAY2/Q6 **2024/AUG/Q6**
Click Here to See the Answer

Q7. With reference to auxiliary boiler safety valves state with reasons:
(a) What clearances need checking when lapping valves to seats (5)
(b) Why the drain must be clear (5)
(c) Why opening gear should be kept in good working order at all times (6)
2024/MAY2/Q7 **2024/AUG/Q7**
Click Here to See the Answer

Q8. With reference to a fuel oil purifier:
(a) What are the reasons that may cause the purifier to overflow? (6)
(b) What are the reasons for the water carry-over with the oil? (5)
(c) What are the probable reasons for vibration seen during purifier starting? (5)
2024/MAY2/Q8 **2024/AUG/Q8**
Click Here to See the Answer

Q9. Explain with a suitable diagram, the components of an auxiliary engine fuel valve? Briefly explain, the process of overhauling and pressure testing the fuel valve? (16)
2024/MAY2/Q9 **2024/AUG/Q9**
Click Here to See the Answer

SEPTEMBER – 2024

Q1.a) State FOUR reasons for persistent slackening of holding down bolts of a main engine. (6)
(b) State FOUR precautions to be observed when fitting non-metallic chocks in order to ensure accurate choking. (4)
(c) State the periodic checks to be made in order to assess the effectiveness of an engine chocking system. (6)
2024/MAY1/Q1 **2024/SEP1/Q1**
Click Here to See the Answer

Q2. A biological sewage system develops a fault, which necessitates opening the unit for repair.
(a) The risk associated with opening the unit. (6)
(b) The precaution taken to reduce the risk. (6)
(c) Explain the significance of biological oxygen demand (B.O.D.). (4)
2023/AUG/Q5 **2024/MAY1/Q2** **2024/SEP1/Q2**
Click Here to See the Answer

Q3. Work is being carried out in drydock on a large sea water inlet chest and the valves. Describe the inspection you would carry out:
(a) As the work starts (8)
(b) During and after the work. (8)
2024/MAY1/Q3 **2024/SEP1/Q3**
Click Here to See the Answer

Q4.a) How are heat exchangers protected from the effects of corrosion? (8)
(b) What are the problems associated with biofouling? (8)
2024/MAY1/Q4 **2024/SEP1/Q4**
Click Here to See the Answer

Q5. Describe the procedure for the regular maintenance routines to be carried out on the Fixed CO2 fire-fighting system. (16)
2024/MAY1/Q5 **2024/SEP1/Q5**
Click Here to See the Answer

Q6. A jacket cooling water, plate type cooler for the engine system is stripped open during overhaul for survey purposes, State out a list of components, parts or areas, which you would like to particularly check yourself before the survey. (16)
2024/MAY1/Q6 **2024/SEP1/Q6**
Click Here to See the Answer

Q7. During the watch main engine crank case mist detector alarm has sounded.
(a) List the steps to be taken to meet this emergency situation. (8)
(b) Subsequent inspection and action required to put the engine on normal operation (8)
2024/MAY1/Q7 **2024/SEP1/Q7**
Click Here to See the Answer

Q8. With reference to starting air receivers:
(a) Explain why starting air receivers should be drained frequently. (6)
(b) Describe the procedure for the inspection of the internal surfaces of an receiver, indicating the possible defects, which may be encountered. (10)
2024/MAY1/Q8 **2024/SEP1/Q8**
Click Here to See the Answer

Q9. During recent periods of manoeuvring, a number of air start valve bursting discs or cones have failed. In the circumstance, indicate how the actual cause might be:
(a) Detected (8)
(b) Rectified (8)
2024/MAY1/Q9 **2024/SEP1/Q9**
Click Here to See the Answer

SEPTEMBER– 2024(PART- 2)

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 **2024/SEP2/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 **2024/SEP2/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** **2024/SEP2/Q3**
Click Here to See the Answer

Q4.a) Describe the safe isolation procedure of centrifuges on board ships before starting maintenance work. (6)
(b) Describe maintenance schedule of centrifuges with brief description of the procedure for satisfactory operation. (10)
2024/APR1/Q4 **2024/SEP2/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 **2024/SEP2/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** **2024/SEP2/Q6**
Click Here to See the Answer

Q7.a) Describe the following terms used for pumps
(i) Flow Rate (2)
(ii) Cavitation (2)
(iii) Net Positive Suction Head (2)
(iv) Pressure (2)
(b) During watch keeping round what checks are required on running centrifugal pump? (8)
2024/APR1/Q7 **2024/SEP2/Q7**
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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 **2024/SEP2/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 **2024/SEP2/Q9**
Click Here to See the Answer

OCTOBER – 2024

Q1.a) Describe various types of valves used in Engine room. State reasons for their use for particular type of valves. (10)
(b) Describe Materials used for different parts of each design. (6)
2023/NOV/Q1 **2024/APR/Q1** **2024/OCT/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 **2024/APR/Q2** **2024/OCT/Q2**
Click Here to See the Answer

Q3. Describe following metal finishing processes and their objectives:
(a) Honing (4)
(b) Lapping (4)
(c) Polishing (4)
(d) Buffing (4)
2023/MAY2/Q5 **2023/NOV/Q3** **2024/APR/Q3** **2024/OCT/Q3**
Click Here to See the Answer

Q4.a) Describe the safe isolation procedure of centrifuges on board ships before starting maintenance work. (6)
(b) Describe maintenance schedule of centrifuges with brief description of the procedure for satisfactory operation. (10)
2024/APR/Q4 **2024/OCT/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.
2023/NOV/Q5 **2024/APR/Q5** **2024/OCT/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 accidents. (4)
2023/JUN/Q7 **2023/NOV/Q6** **2024/APR/Q6** **2024/OCT/Q6**
Click Here to See the Answer

Q7.a) Describe the following terms used for pumps
(i) Flow Rate (2)
(ii) Cavitation (2)
(iii) Net Positive Suction Head (2)
(iv) Pressure (2)
(b) During watch keeping round what checks are required on running centrifugal pump? (8)
2024/APR/Q7 **2024/OCT/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 probable reasons for slipping of web on the journal. (4)
(d) Describe precautions against prevention of slipping crank web and journal. (4)
2023/NOV/Q8 **2024/APR/Q8** **2024/OCT/Q8**
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Q9.a) Describe maintenance to be carried out on safety valve of Auxiliary Boiler to keep them in good order. (10)
(b) Describe procedure for setting safety valve. (6)
2024/APR/Q9 **2024/OCT/Q9**
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D. MARINE
Study Material

NOVEMBER – 2024

Q1. Draw cooling water system of main engine and naming each component and describe flow of cooling water through the system (16)
2024/JAN/Q1 **2024/JUN/Q1** **2024/NOV/Q1**
Click Here to See the Answer

Q2. The reciprocating bilge pump on board your ship, has gradually stopped taking suction from the engine room bilge wells. Write a letter to the owner / manager stating the parts of the pump you suspect are either worn out or broken. (16)
2024/JUN/Q2 **2024/NOV/Q2**
Click Here to See the Answer

Q3. Describe following procedures for rudder maintenance in a dry dock.
(a) What is Jumping Clearance and why is it considered a value of importance? (8)
(b) What is Rudder Drop and describe the procedure for measuring the rudder drop? (8)
2024/JAN/Q3 **2024/JUN/Q3** **2024/NOV/Q3**
Click Here to See the Answer

Q4. Describe following non-destructive test methods:
(a) Dye penetration test - principle, and method in detail. (8)
(b) Magnetic particle testing - principle and method in detail. (8)
2024/JUN/Q4 **2024/NOV/Q4**
Click Here to See the Answer

Q5.a) Describe types of arc welding processes. (8)
(b) Describe what level of temperatures are reached during arc welding. (4)
(c) Describe precautions taken to avoid health and shock hazards during welding. (4)
2024/JAN/Q5 **2024/JUN/Q5** **2024/NOV/Q5**
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Q6. 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** **2024/JAN/Q6** **2024/JUN/Q6** **2024/NOV/Q6**
Click Here to See the Answer

Q7.a) Describe how Auxiliary engine crankshaft deflections are measured.
(b) State how the measurements can be checked for accuracy. (5)
(c) Specify with reasons other checks that should be made on the crankshaft. (5)
2024/JUN/Q7 **2024/NOV/Q7**
Click Here to See the Answer

Q8.a) Describe working of a Mechanical Shaft seal with a diagram. How working fluid leak is prevented? (8)
(b) What are the causes of Mechanical Shaft seal failure? (4)
(c) Describe the advantages and disadvantages for mechanical shaft seal usage. (4)
2024/JUN/Q8 **2024/NOV/Q8**
Click Here to See the Answer

Q9. With reference to lifeboats and davits describe (a & b) with the aid of sketches:
(a) The purpose and types of "limits switches". (6)
(b) The centrifugal brake and state the method of testing. (5)
(c) Enumerate routine maintenance of the lifeboat engine and the lifeboat winch. (5)
2024/JAN/Q9 **2024/JUN/Q9** **2024/NOV/Q9**
Click Here to See the Answer

DECEMBER – 2024 (PART-1)

Q1.a) Describe how leak in a Heat exchanger tube is detected? How to rectify leaky tube? (8)
(b) What are the common methods to enhance heat transfer of heat exchanger? (4)
(c) Describe reasons for poor performance of heat exchanger and actions to rectify the same. (4)
2024/MAR/Q1 **2024/DEC1/Q1**
Click Here to See the Answer

Q2. Describe the Stern Tube Lubrication System by drawing a schematic diagram and explaining function of each component. (16)
2024/JAN/Q2 **2024/DEC1/Q2**
Click Here to See the Answer

Q3. With respect to the properties of fuel oil, explain the significance of the following terms.
(a) Calculated Carbon Aromaticity Index (CCAI). (4)
(b) The importance of Sodium to Vanadium Ratio. (4)
(c) Sulphur content. (4)
(d) Pour point. (4)
2024/DEC1/Q3
Click Here to See the Answer

Q4.a) What causes cavitation in a Centrifugal pump operation? (6)
(b) If the Engine room Bilge pump not taking suction, explore the probable reasons? (6)
(c) Why is a centrifugal pump started with its discharge valve shut? (4)
2024/DEC1/Q4
Click Here to See the Answer

Q5.a) How will you align a motor-pump shaft? What are the different methods of alignment that can be used? (8)

(b) Why is the Fridge compressor belt Driven? (8)
2024/DEC1/Q5
Click Here to See the Answer

Q6.a) Explain why a purifier is not attaining its rated speed on starting from rest? (8)
(b) How do you select the appropriate Gravity Disc of Purifier? Why is this selection an important element in the purifier operation?
2024/DEC1/Q6
Click Here to See the Answer

Q7.a) What are the reasons for foaming in refrigeration compressor crankcase? (4)
(b) Describe the causes for the following in the domestic refrigeration system: (3×4)
(i) Frequent cut-in and cut-out of the compressor.
(ii) Lub oil low pressure cut-out of the compressor.
(iii) High pressure cut-out of the compressor.
(iv) Frosting in the compressor suction side.
2024/DEC1/Q7
Click Here to See the Answer

Q8.a) Describe the effects of taking fresh water from the shore as feedwater for auxiliary boilers. (5)
(b) Describe the measures taken to reduce these effects. (5)
(c) What is the purpose of deaerator in the boiler feed water system? How is the deaeration achieved? (6)
2024/DEC1/Q8
Click Here to See the Answer

Q9. 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 **2024/FEB/Q7** **2024/DEC1/Q9**

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DECEMBER – 2024 (PART-1)

Q1.a) How is fuel (HFO) for a marine diesel engine (main engine) being delivered from a fuel oil storage tank up to the combustion chamber? Explain with a line diagram. (10)
(b) What is the significance of the following:
(i) Heating arrangement with temperature control. (3)
(ii) Prevention of air lock in the system. (3)
2024/DEC2/Q1
Click Here to See the Answer

Q2.a) Describe the components forming part of a Gear Pump. Explain how pumping is carried out by gear pump? (8)
(b) By suitable drawing describe what is 'back lash' and enumerate its importance. How is 'back lash' measured? (4)
(c) What checks will be carried out during overhauls. (4)
2024/MAR/Q2 **2024/DEC2/Q2**
Click Here to See the Answer

Q3.(a) How Leaks are detected and rectified on refrigerating plant? (4)
(b) Describe how suction & discharge valves are tested for tightness? (4)
(c) Describe with an illustration, how refrigerant charging is carried out?
2024/MAR/Q3 **2024/DEC2/Q3**
Click Here to See the Answer

Q4.(a) Describe by drawing a suitable diagram, Bilge water system of an ocean-going ship. Name each part/equipment with its function. (10)
(b) Discuss the commonly associated troubles with the Bilge system and their probable solutions. (6)
2024/MAR/Q4 **2024/DEC2/Q4**
Click Here to See the Answer

Q5.a) Describe the uses of packed gland seal. What are the machineries they are in use? In a running pump, how the gland packing is lubricated and kept cool? (6)
(b) Describe advantages of using gland packing. (5)
(c) Describe disadvantages of using gland packing. (5)
2024/MAR/Q5 **2024/DEC2/Q5**
Click Here to See the Answer

Q6. With respect to centrifuges.
(a) Explain the reasons which shall cause a purifier to overflow (6)
(b) What are reasons that induces vibration in a purifier (4)
(c) Explain the process of desludging? Why is the purifier amperage an important parameter for the operator? (6)
2024/MAR/Q6 **2024/DEC2/Q6**
Click Here to See the Answer

Q7.(a) Explain with a sketch showing the components of an auxiliary engine fuel valve, the complete maintenance procedure including the removal of the fuel valve, pressure-testing and overhaul. (12)
(b) What are the precautions to be taken before installation of a fuel valve on the cylinder head? Indicate the special tools that may be required for the fuel valve removal and overhaul. (4)
2024/MAR/Q7 **2024/DEC2/Q7**
Click Here to See the Answer

Q8. The exhaust temperatures of an auxiliary diesel engine 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** **2024/MAR/Q8** **2024/DEC2/Q8**
Click Here to See the Answer

Q9.(a) What is Accumulation of pressure test for Boiler and what is its purpose? (6)
(b) Describe the detailed procedure for an Accumulation of pressure test.
2024/MAR/Q9 **2024/DEC2/Q9**
Click Here to See the Answer