D. MARINE
Study Material

MEO CLASS 2 WRITTEN: MEP

(MARINE ENGINEERING PRACTICE)

FOR INDIAN COMPETENCY EXAM

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JAN-2023

Q1. a. In the case of main propulsion engine explain the indications and possible effects which might
be expected from-
A. Insufficient bearing clearances; B. Excessive bearing clearances; C. Crankshaft misalignment
b. State the recommended bearing clearances for the bottom end, top end and main bearings of your
last motor vessel.
2023/JAN/Q1
Click Here to See the Answer

Q2. Discuss the validity of EACH of the following statements with respect to large slow speed diesel engines:
A. Bearing clearances obtained by taking leads (or use of plastic inserts) are fundamentally more accurate than those obtained with the use of feelers;
B. Bearing wear down can be measured by taking deflections;
C. A timing chain should be renewed when its slackness causes late fuel injection and exhaust valve operation;
D. Timing chain slackness is solely due to stretch of the link plates.
2022/DEC/Q6 **2023/JAN/Q2**
Click Here to See the Answer

Q3. Your ship is due for Drydocking. Prepare repair specifications for the following:
a) Main Engine cooling sea water Overboard valve
b) Aft winch hydraulic oil pressure line, holed at deck penetration in Steering Compartment
c) Deck seal of a IG system used in an oil tanker
2023/JAN/Q3
Click Here to See the Answer

Q4. Describe briefly the methods of carrying out a bend test and an impact test. Illustrate the general form of the test pieces used and state how the final

results are given for comparison of different materials. Of what practical use are the figures obtained?

2023/JAN/Q4

Click Here to See the Answer

Q5. With reference to main turbochargers:
a) Give a reason why binding wire is frequently fitted near the top of the blades
b) Mention one fault that occasionally develops with binding wire in services,
c) Define the cause and identification under running conditions of turbine blade damage
d) State how (c) can be largely avoided.

2023/JAN/Q5

Click Here to See the Answer

Q6.a) State the circumstances that may lead to hollow rudder becoming flooded.
b) Describe how flooding of the rudder may become evident when a vessel is on Passage.
c) Describe the procedure for:
(i) Rudder examination:
(ii) Rudder repair:

2022/AUG/Q2 **2023/JAN/Q6**

Click Here to See the Answer

Q7. With reference to air receivers and bottles explain with reasons:
A. Why regular systematic internal inspection is advisable?
B. Which internal areas of large receivers should receive particularly close examination?
C. How bottles are inspected internally and what parts should be closely examined?
D. How the condition of a bottle or receiver that cannot be inspected internally is checked?

2023/JAN/Q7

Click Here to See the Answer

Q8. As a second engineer, you are required to offer for survey, to a Classification Society, a crosshead of the engine following an unscheduled repair due to bearing failure.
A. Outline the information you would be required to provide prior to the survey
B. Briefly describe the survey procedure likely to be adopted stating with reasons the areas which should receive close attention
C. State with reasons what information would be requested by the surveyor and /or the operation required to be observed after re-assembly of the crosshead.
2023/JAN/Q8
Click Here to See the Answer

Q9. With respect to hydraulic Ram steering gears;
A. What emergency locking device can be used in order to speedily bring the steering gear to rest? State one reason the best angular position to lock the steering gear.
B. Use a simple sketch to show where the "Jumping" (top) and wear down (bottom) rudder carrier ring clearances can be measured. Indicate what clearances you would expect with a new steering gear;
C. State the consequences of the wear down clearances being reduced to less than Zero.
2021/APR/Q8 **2021/SEP/Q4 2021/NOV/Q3** **2021/DEC/Q8** **2022/JUN/Q7** **2022/OCT/Q4** **2023/JAN/Q9**
Click Here to See the Answer

FEB-2023

Q1. A. Describe how a main engine fuel pump would be set and checked for: (i) Timing; (ii) Quantity
B. Explain how a setting of a variable injection timing fuel pump is checked and adjusted.
C. State why it be necessary to adjust the settings of a variable injection timed fuel pump.
2023/FEB/Q1

Click Here to See the Answer

Q2. An auxiliary boiler water level control system has a differential pressure transmitter as the detecting element for water level. A. Sketch and describe such an arrangement;
B. If the transmitter was damaged describe how a replacement unit would be calibrated

2023/FEB/Q2

Click Here to See the Answer

Q3. With reference to safety valves fitted to waste heat boilers:
A. State with reasons the areas which should receive particularly close examination during a survey inspection;
B. Describe the procedure you, as Second Engineer would adopt when setting such valves at sea;
C. State the procedure to be adopted when reporting the setting of a waste heat boiler safety valve, to a classification society.

2023/FEB/Q3

Click Here to See the Answer

Q4. With reference to timing chains:
A. Explain the causes of increasing chain slackness in service, using sketches to illustrate your answer;
B. State: each of the following: i. The effects of increased chain length:
ii. The method of assessing percentage increase in length:
C. describe how the effects of elongation are corrected:
D. State why a limit is placed on percentage chain elongation.
State what measures you, as Second Engineer, would consider necessary after the correction procedure
(c) has been completed and the engine is running.

2023/FEB/Q4

Click Here to See the Answer

Q5. In a situation where the main engine control system suddenly fails and it is not possible to rectify this immediately
A. Explain the action that a 2 nd engineer should take.

B. State the instruction that the 2 nd engineer should issue in order to ensure the continued safe and effective operation of the engine

2023/FEB/Q5

Click Here to See the Answer

Q6. With reference to main engine starting and reversing:
a) Define the function of the automatic valve and how it is controlled.
b) State what provisions are made to control the engine in the event of automatic valve failure.
c) Define the purpose of interlocks and blocking devices, differentiating between their functions.

2023/FEB/Q6

Click Here to See the Answer

Q7. State how each of the following practices affect piston ring life: (a) Nitriding of rings, (b) Chromium
plating of ring grooves, © Contouring of rubbing faces, (d) Carbon or copper coating of rubbing faces.

2022/DEC/Q3 **2023/FEB/Q7**

Click Here to See the Answer

8.With reference to crossheads:
a) Describe with sketches one arrangement whereby lubricant is fed to top end bearings, slippers, and guide.
b) Explain why the clearances of each top-end bearings are of vital importance.
c) state why booster pumps are sometimes used to feed lubricant to top end bearings.

2023/FEB/

Click Here to See the Answer

Q9. (a) Describe how it is determined whether a crankshaft was twisted during a major “smash up” in a main engine.
(b) Explain where twisting is most likely to occur.
(c) Specify with reasons the degree of twisting that might be accommodated without correction

(d) Explain briefly what adjustments and precautions should be instituted when putting an engine with a twisted crankshaft back into service.
2023/FEB/Q9
Click Here to See the Answer

MAR-2023

Q1. Discuss the validity of EACH of the following statements with respect to large slow speed diesel engines:
A. Bearing clearances obtained by taking leads (or use of plastic inserts) are fundamentally more accurate than those obtained with the use of feelers.
B. Bearing wear down can be measured by taking deflections.
C. A timing chain should be renewed when its slackness causes late fuel injection and exhaust valve operation.
D. Timing chain slackness is solely due to stretch of the link plates.
2022/DEC/Q6 **2023/JAN/Q2** **2023/MAR/Q1**
Click Here to See the Answer

Q2. A. Explain in detail, how an underwater survey is carried out;
B. State the requirements to be fulfilled before an underwater survey is acceptable to the survey authority
C. Construct a list of the items in order of importance that the underwater survey authority should include
2023/MAR/Q2
Click Here to See the Answer

Q3. With reference to main turbochargers:
a) Give a reason why binding wire is frequently fitted near the top of the blades
b) Mention one fault that occasionally develops with binding wire in services,
c) Define the cause and identification under running conditions of turbine blade damage
d) State how (c) can be largely avoided.
2023/JAN/Q5 **2023/MAR/Q3**
Click Here to See the Answer

Q4. Comment on the reliability and maintenance requirements of two of the following;
(i) Pneumatic control equipment, (ii) Electro-mechanical control equipment, (iii) Electronic control equipment
(b) Discuss the routine attention required and the defects, which may occur in service.
2022/NOV/Q4 **2023/MAR/Q4**
Click Here to See the Answer

Q5. (a) Suggest four reasons why the temperature of the oil in the steering gear system may become excessive.
(b) With reference to steering gears explain how the ship may be steered in each of the following circumstances;
(i) destruction by fire of the primary supply cable;
(ii) destruction by fire of the telemotor lines;
(iii) bearing failure in the running pump;
2022/JUL/Q6 **2022/MAR/Q5**
Click Here to See the Answer

Q6. A). Describe the procedure for opening a bottom end bearing for inspection making reference to the positioning of the crank and the safety precautions to be observed.
B). State how the bearing clearance may be checked and adjusted when necessary
C). State TWO defects, which may be encountered during inspection of the bottom end bearing and crankpin giving possible causes of EACH.
D). State TWO checks, which should be made before returning the engine to service following overhaul of the bottom end bearing.
2021/FEB/Q7 **2021/AUG/Q2** **2022/JAN/Q1** **2022/MAR/Q6**
Click Here to See the Answer

Q7. An Auxiliary boiler is periodically unattended and equipped with alarms to cover low water level, high steam pressure, and air and flame failure.
A. State why and how fuel burners are automatically cut off under alarm conditions of water level, steam pressure, air and flame failure.

B. Describe how and when each of the above alarms is tested without endangering the boiler.
2020/OCT/Q7 **2022/OCT/Q7** **2023/MAR/Q7**
Click Here to See the Answer

Q8. a) Describe the inspection, which is required to be carried out in the dry-dock after the stern of a ship has heavily struck a dock wall. (8)
b) The propeller is found to be damaged, and it is decided to fit the spare propeller. Describe the process and mention the precautions to be taken to ensure correct assembly. (8)
2023/MAR/Q8
Click Here to See the Answer

Q9. a) State why onboard testing of fuel oil whilst taking bunkers can be advantageous. (4)
b) State how a representative fuel sample may be obtained during the bunkering operation. (4)
c) Explain how EACH of the following is formed during the combustion of fuel:
(i) Oxides of Nitrogen, NOx (ii) Carbon Monoxide, CO (iii) Oxides of Sulphur, SOx
d) State how the effects of sulphurous products of combustion on the engine system may be reduced.
2023/MAR/Q9
Click Here to See the Answer

APRIL-2023

Q1. A. Describe how a main engine fuel pump would be set and checked for:
(i) Timing; (ii) Quantity
B. Explain how a setting of a variable injection timing fuel pump is checked and adjusted.
C. State why it be necessary to adjust the settings of a variable injection timed fuel pump.
2023/FEB/Q1 **2023/APR/Q1**
Click Here to See the Answer

Q2. What is understood by risk on board ship? As a 2nd engineer discuss various methods for hazard identification and assessment of risk available on board.
2023/APR/Q2
Click Here to See the Answer

Q3. A. As second engineer describe the procedure involved in the complete inspection of a cylinder liner and piston assembly, indicating areas of significant interest.
B. Explain with reasons, possible faults which might be found;
C. Suggest how such faults might be avoided.
2021/JUL/Q1 **2022/JUL/Q1** **2023/APR/Q**
Click Here to See the Answer

Q4. (a) With the aid of a simple sketch, explain the "trouble spots" in a basic air-conditioning unit and with reference to your sketch, explain the following:
(a). How the problem of increase in humidity of cooled air is overcome?
(b). How discomfort caused by the excessive drying effect of heated air is overcome?
2021/NOV/Q6 **2021/DEC/Q6** **2022/JAN/Q6** **2022/FEB/Q3**
2022/APR/Q4 **2022/JUN/Q3** **2023/APR/Q4**
Click Here to See the Answer

Q5. Explain in detail how you would isolate CO2 Fixed firefighting system foe routine maintenance. Please enumerate the Maintenance schedules and their frequency performed on this system. Describe all tests and inspections you would make and how you would return the system to service.
2023/APR/Q5
Click Here to See the Answer

Q6. a) Describe Three methods of tracing a superficial crack in a marine machinery component;
b) Explain how propagation of a crack in a machinery component can be arrested.
Click Here to See the Answer

Q7: Boiler automatic combustion control has failed during operation of boiler. Explain:
A. Procedures to operate boiler in emergency
B. Action plan to investigate, rectify and bring system to normal boiler operation.
2023/APR/Q7
Click Here to See the Answer

Q8: A. Outline the procedure for the inspection of the rudder in a dry dock.
B. What are the requirement with respect to steeling gear as per SOLAS 74, as amended for the following:
i. Relief valve;
ii. Steering gear control;
iii. Electrical power circuits.
2021/FEB/Q2 **2021/AUG/Q1** **2022/APR/Q2** **2023/APR/Q8**
Click Here to See the Answer

Q9. Explain how each of the following conditions contributes to the satisfactory performance of oil centrifuges.
A. Correct bowl speed;
B. Cleanliness of bowl;
C. Low rate of feed to the bowl;
D. Contaminated oil preheated prior to centrifuging;
E. Contaminated oil allowed standing for an appreciable time prior to centrifuging.
2023/APR/Q9
Click Here to See the Answer

JUNE-2023

Q1. Express your reactions and state the subsequent investigation you would make if a laboratory report on a used diesel engine oil sample indicated the presence of appreciable amounts of: -
A. Iron; B. Copper, Antimony and Tin; C. Silicon.
2020/FEB/Q5 **2023/JUNE/Q1**
Click Here to See the Answer

Q2. A single forged shaft for a small gear pump is broken in the middle. Suggest some emergency repairs to the shaft to enable run the pump. State the type of repair and procedure for carrying out the repair. What is the most viable alternative to repair if no spares are available?
2020/OCT/Q5 **2022/DEC/Q5** **2023/JUNE/Q2**
Click Here to See the Answer

Q3. With reference to sea water cooled multi-tubular heat exchangers state: -
(a) The materials used for the construction of tubes, tube plate and water boxes.
(b) The various types of corrosion that the part in (a) are subjected to.
(c) Measures employed to reduce or prevent above corrosion.
2023/JUNE/Q3
Click Here to See the Answer

Q4. With reference to a cylindrical boiler which has undergone major repairs, explain: -
A. How is the boiler prepared for carrying out hydraulic test?
B. What is the test pressure to which boiler is subjected to?
C. What inspection should be made before, during and after the test?
2022/NOV/Q3 **2023/JUNE/Q4**
Click Here to See the Answer

Q5. As a second engineer, you are required to offer for survey, to a Classification Society, a crosshead of the engine following an unscheduled repair due to bearing failure.
A. Outline the information you would be required to provide prior to the survey
B. Briefly describe the survey procedure likely to be adopted stating with reasons the areas which should receive close attention
C. State with reasons what information would be requested by the surveyor and /or the operation required to be observed after re-assembly of the crosshead.
2023/JAN/Q8 **2023/JUNE/Q5**
Click Here to See the Answer

Q6. Give a reasoned explanation why some marine diesel engines might continue to run ahead on the astern cams following a reversal of the controls. Sketch and describe an arrangement designed to prevent this happening.
2023/JUNE/Q6
Click Here to See the Answer

Q7: A. As Second Engineer, outline your instructions to members of the ship's engineering staff for inspection of the main engine timing chain; B. The inspection in (A) has revealed that the roller chain needs replacement. Describe how this is achieved.
2023/JUNE/Q7
Click Here to See the Answer

Q8. Describe briefly the methods of carrying out a bend test and an impact test. Illustrate the general form of the test pieces used and state how the final results are given for comparison of different materials. Of what practical use are the figures obtained?
2023/JAN/Q4 **2023/JUNE/Q8**
Click Here to See the Answer

Q9. What is Rocking test of Deck Crane? Explain the procedure of rocking test. Tabulate and indicate fault finding procedure. What is the action taken if deviation is out of limit?
2021/FEB/Q6 **2021/APR/Q7** **2021/DEC/Q7** **2022/SEP/Q1**
2023/JUNE/Q9
Click Here to See the Answer

JULY-2023

Q1. With regard to the main turbine lubrication oil system:
a) (i) Describe the effects of tin oxide corrosion;
(ii) Explain the actions to be taken if this occurs in a high-pressure turbine thrust bearing.
b) Discuss the factors that determine the various filtration sizes:
2022/NOV/Q6 **2023/JULY/Q1**
Click Here to See the Answer

Q2: A. Describe the method of setting the safety valves of an exhaust gas boiler at sea.
B. State the limits in terms of %age above maximum design working pressure for setting safety valves.
C. State the formality necessary when chief engineer sets the safety valves.
2023/JULY/Q2
Click Here to See the Answer

Q3. a) Describe the Inspection and maintenance of flameproof enclosures for luminaries installed in hazardous condition. (10)
b) List the precautions to be taken while carrying out insulation resistance test of electrical equipment located in a hazardous area. (6)
2023/JULY/Q3
Click Here to See the Answer

Q4: With reference to engine remote control and monitoring systems:
a) Explain how the location and nature of a fault may be determined if the instrument panel in the control room is indicating a low reading for a cylinder exhaust; (6)
b) State, with reasons, THREE sources of potential problems when choosing the location for transducers and signal transmission systems; (5)
c) In the event of complete failure of the remote control and monitoring system state how you, as 2nd Engineer, would organize the engine room personal to ensure safe manning of the engine room and list
SIX main engine parameters, which should be manually recorded. (5)
2023/JULY/Q4
Click Here to See the Answer

Q5. Suggest a procedure to the Chief Engineer, on how you propose to ensure that the engine room overhead crane is maintained and operated correctly. What tests certificates are required for the overhead crane, and who is the issuing authority.
Click Here to See the Answer

Q6: With reference to electro-hydraulic steering gears:

A. Sketch and describe a steering gear with two 50% torque units conforming to the single failure criteria.
B. State, with reasons, the precautions necessary when operating on two rams only;
C. Describe the tests necessary to ascertain that the gear will operate as required when one side of the circuit develops a malfunction.
2023/JULY/Q6
Click Here to See the Answer

Q7. a) Describe with aid of a line diagram the layout and components of a hydraulic system suitable for the operation of deck machinery (6)
b) Explain how the hydraulic system pressure is controlled assuming the use of a variable delivery pump.
c)State which design of hydraulic motor is used in the system described in (a).
2023/JULY/Q7
Click Here to See the Answer

Q8. What is a “Cam"? Explain its function. With reference to its application in diesel engines Discuss the requirement and the type of cam used in
a) Fuel Pump
b) Indicator drive
c) inlet Valve
d) Exhaust Valve
e) Starting air distributor. (16)
2023/JULY/Q8
Click Here to See the Answer

Q9. Explain why auxiliary engine bottom-end bolts are prone to failure, even under normal running conditions. Identify those features, incorporated into the design of bottom-end bolts, to inhibit failure. Explain how this tendency is either aggravated or inhibited during maintenance and what checks are to be carried out.
2020/MAR/Q4 **2020/OCT/Q1** **2022/SEP/Q2** **2023/JULY/Q9**
Click Here to See the Answer

AUG-2023

Q1. Describe the procedure to be undertaken when, upon a routine schedule for changing Exhaust Valve on a main engine, it is found that the Exhaust valve body is seized inside the cylinder head and cannot be removed by conventional means and also the internal threads in the exhaust valve body connecting to the exhaust bellows are damaged. (16)

2023/AUG/Q1

Click Here to See the Answer

Q2. It is found that the tie rods are persistently becoming slack:
A. State, with reasons, the possible causes; (6)
B. State, with reasons, the likely effects on the engine if it is allowed to operate with slack tie rods; (5)
C. Explain how this problem can be minimized? (5)

2023/AUG/Q2

Click Here to See the Answer

Q3. A. Briefly explain the term fatigue and explain how fatigue failure occur;
B. State the difference between high stress / low cycle and low stress / high cycle fatigue giving an example of each; (4)
C. State how defect in metal can influence the expected safe life of a component; (4)
D. State how fuel injection timing and cylinder power balance can influence the possibility of fatigue cracks developing in the bedplate. (4)

2021/JAN/Q9 **2022/AUG/06** **2023/AUG/Q3**

Click Here to See the Answer

Q4. With reference to air receivers and bottles explain with reasons:
A. Why regular systematic internal inspection is advisable? (4)
B. Which internal areas of large receivers should receive particularly close examination? (4)
C. How bottles are inspected internally and what parts should be closely examined? (4)
D. How the condition of a bottle or receiver that cannot be inspected internally is checked? (4)

2023/JAN/Q7 2023/AUG/Q4
Click Here to See the Answer

Q5. List the maintenance routines you plan to carry out on the deck hydraulic cranes, winches and mooring machineries before arrival port after a long voyage, considering the fact that cargo operation is solely dependent on the proper Functioning of the crane and winches. (16)
2023/AUG/Q5
Click Here to See the Answer

Q6. Describe, with aid of sketches, a system of turbo-charging a two-stroke cycle main engine. State the routine attention, which should be given to the turbo-charger. (16)
2023/AUG/Q6
Click Here to See the Answer

Q7. A). Describe the procedure for overhauling a boiler safety valve and explain using sketches where necessary, those parts, which require close attention.
B). Describe the procedure for setting of boiler safety valves. (16)
2021/APR/Q5 2023/AUG/Q7
Click Here to See the Answer

Q8. Severe engine vibration has recently become evident when the main engine for which you are responsible operates within a certain speed range –
A. State, with reasons, the possible causes of such vibration; (6)
B. State the consequences of operating the engine under such vibratory conditions; (5)
C. Describe the procedure you, as Second Engineer, would implement in order to investigate and rectify the problem. (5)
2021/JAN/Q8 2021/JUL/Q9 2021/DEC/Q9 2023/AUG/Q8
Click Here to See the Answer

Q9. What is understood by risk on board ship? As a 2nd engineer discuss various methods for hazard identification and assessment of risk available on board. (16)

2023/APR/Q2 2023/AUG/Q9
Click Here to See the Answer

SEP-2023

Q1. a) Describe how crosshead bearing and guide clearances can be checked.
b) Describe, With the aid of a sketch the procedure for checking the condition of a crosshead engine bottom end bearing (10)
2023/SEP/Q1
Click Here to See the Answer

Q2. What are the causes of corrosion in boilers? What precautions would you take to prevent corrosion
(a) when boiler is steaming?
(b) when boiler is idle? How would you test the boiler water for acidity and alkalinity? (16)
2023/SEP/Q2
Click Here to See the Answer

Q3. a) Describe the inspection, which is required to be carried out in the dry-dock after the stern of a ship has heavily struck a dock wall. (8)
b) The propeller is found to be damaged, and it is decided to fit the spare propeller. Describe the process and mention the precautions to be taken to ensure correct assembly.
2023/MAR/Q8 2023/SEP/Q3
Click Here to See the Answer

Q4. A. With the aid of a block diagram state the usual check points for maintenance of an electronic governor fitted to an auxiliary diesel engine. (8)
B. As engine fitted with an electronic governor behaves erratically during load changes. Explain the possible causes. (8)
2023/SEP/Q4
Click Here to See the Answer

Q5. Inspection of an engine Indicates an unexpected increase in cylinder liner wear rate. State with reasons the possible causes and remedial measures if.

(i) The problem is confined to a single cylinder (8)
(ii) The problem is common to all cylinders. (8)
2023/SEP/Q5
Click Here to See the Answer

Q6. a) Sketch a line diagram of a high-pressure cutout of the type fitted in a refrigeration system. (8)
b) (i) Describe the operation of the high-pressure cutout sketched in (a). (8)
(ii) State TWO faults that would cause excessive high-pressure and suggest remedy for EACH fault (8)
2023/SEP/Q6
Click Here to See the Answer

Q7. If soon after joining a motor ship, you found a number of holding down bolts slack and fretting occurred at slacked bolts. Describe how you as a second engineer deal such situation? (16)
2020/MAR/Q8 **2023/SEP/Q6**
Click Here to See the Answer

Q8. What is Metal-locking? What types of repairs are carried out by metal-locking? Describe the repair procedure using Metal-Locking. (16)
2020/MAR/Q2 **2023/SEP/Q8**
Click Here to See the Answer

Q9. Sketch suitable welded joints indicating approximate plate thickness and dimensions of preparation for the following purposes: -
a) End plate connection to shell of an unfired pressure vessel. (6)
b) Longitudinal seam of a high pressure compressed air bottle. (5)
c)Describe any faults in workmanship, which might weaken the finished products. (5)
2023/SEP/Q9
Click Here to See the Answer

OCT-2023

Q1. With respect to hydraulic Ram steering gears;
A. What emergency locking device can be used in order to speedily bring the steering gear to rest? State one reason the best angular position to lock the steering gear. (4)
B. Use a simple sketch to show where the "Jumping" (top) and wear down (bottom) rudder carrier ring clearances can be measured. Indicate what clearances you would expect with a new steering gear; (6)
C. State the consequences of the wear down clearances being reduced to less than Zero. (6)
2020/DEC/Q7 **2021/APR/Q2** **2021/APR/Q8** **2021/SEP/Q4** **2021/NOV/Q3** **2021/DEC/Q8** **2022/JUN/Q7** **2022/OCT/Q4** **2023/JAN/Q9** **2023/OCT/Q1**
Click Here to See the Answer

Q2. While carrying out ship's hull inspection, describe the various defects and corresponding repairs that might be expected in shell plating, Ford end of ship, aft end of ship, openings in shell plating, Rudder, Propeller and stern tube. (16)
2021/APR/Q9 **2023/OCT/Q2**
Click Here to See the Answer

Q3. With reference to the exhaust gas boiler of your ship explain the following:
A. Composition and reasons of soot deposits. (4)
B. Various stages of soot fire leading to high temperature fire. (4)
C. Procedure to be followed for firefighting under different stages of soot fire.
D. Actions required prior to dry running of an exhaust gas boiler. (4)
2023/OCT/Q3
Click Here to See the Answer

Q4. With Reference to Main Engine Fuel Pumps.
(a) Explain how the setting of a variable injection timing fuel pump is checked and adjusted. (10)

(b) State why it may be necessary to adjust the settings of a variable injection timed fuel pump. (6)
2021/FEB/Q1 **2021/APR/Q2** **2021/OCT/Q8** **2021/DEC/Q4** **2022/MAR/Q6** **2022/APR/Q9** **2023/OCT/Q4**
Click Here to See the Answer

Q5. What is Rocking test of Deck Crane? Explain the procedure of rocking test. Tabulate and indicate fault finding procedure. What is the action taken if deviation is out of limit?
2021/FEB/Q6 **2021/APR/Q7** **2021/DEC/Q7** **2022/SEP/Q1** **2023/JUNE/Q9** **2023/OCT/Q5**
Click Here to See the Answer

Q6. During normal engine operation, a turbocharger rapidly loses speed and the speed reduction is accompanied by appreciable noise -
A. State with reasons the possible causes. (4)
B. Explain in detail how the engine might be safely operated if the damage caused by this incident is such that the turbocharger cannot function. (6)
C. State with reasons the factors which may limit engine operating speed with the turbocharger out of
action. (6)
2021/JUL/Q2 **2021/SEP/Q9** **2022/DEC/Q9** **2023/OCT/Q6**
Click Here to See the Answer

Q7. The tailshaft of your vessel is suspected to have been damaged in a recent grounding. Explain with sketches the type of Non-Destructive tests that you would carry out with reference to the specific parts of the shaft, to ascertain the damage. (16)
2023/OCT/Q7
Click Here to See the Answer

Q8. Describe briefly the methods of carrying out a bend test and an impact test. Illustrate the general form of the test pieces used and state how the final results are given for comparison of different materials. Of what practical use are the figures obtained? (16)
2023/JAN/Q4 **2023/JUNE/Q8** **2023/OCT/Q8**

Click Here to See the Answer

Q9. Describe the procedure to be undertaken when, upon a routine schedule for changing Exhaust Valve on a main engine, it is found that the Exhaust valve body is seized inside the cylinder head and cannot be removed by conventional means and also the internal threads in the exhaust valve body connecting to the exhaust bellows are damaged. (16)
2023/AUG/Q1 **2023/OCT/Q9**
Click Here to See the Answer

NOV-2023

Q1. a) Explain metal fatigue and how fatigue failure occurs. (4)
b) Differentiate between high stress/low cycle and low stress/high cycle fatigue giving example of each. (4)
c) How do defects in the metal influence the expected life of a component. (4)
d) How does fuel injection timing and cylinder power balance influence the possibility of fatigue cracks developing in the bedplate. (4)
2023/NOV/Q1
Click Here to See the Answer

Q2. (a) Specify with reasons those parts requiring particularly close scrutiny during internal and external examinations of independently fired auxiliary boilers.
(b) With reference to these examinations distinguish between metal fatigue due to caustic embrittlement, corrosion fatigue, overheating (plastic flow) and direct overpressure. (16)
Click Here to See the Answer

Q3. Describe the procedure for overhauling Main Air compressor Valves (Plate type) and explain which parts require close attention. using sketches where necessary. Also describe the procedure for testing of these compressor valves. (16)
2023/NOV/Q3
Click Here to See the Answer

Q4. With regard to keeping the gas side of boilers in good condition discusses EACH of the following:
A. the mechanism of combustion, stating the factors which are important to good combustion; (6)
B. Oil fuel treatments; (6)
C. Soot removal equipment; (4)
2021/SEP/Q6 **2023/NOV/Q4**
Click Here to See the Answer

Q5. Write short notes on following:
A. Magnetic Particle Inspection (MPI) (6)
B. Ultrasonic Testing (UT) (5)
C. Radiographic Testing (RT). (5)
2020/FEB/Q6 **2020/NOV/Q3** **2021/SEP/Q2** **2023/NOV/Q5**
Click Here to See the Answer

Q6. a) State the circumstances owing to which it may be necessary to renew a cylinder liner of a 4- stroke auxiliary engine. (2)
b) Explain how the liner is removed. (5)
c) Explain how the new liner is fitted. (5)
d) State the important checks to be made before and after fitting. (4)
2023/NOV/Q6
Click Here to See the Answer

Q7. With reference to the Crosshead of Large two-stroke engines:
A. Explain how crosshead and guide shoe clearances are checked, in large 2 stroke engines. (8)
B. Explain how crosshead alignment is checked and adjusted. (8)
2023/NOV/Q7
Click Here to See the Answer

Q8. With reference to fire pumps.
A. Explain how and when fire pumps should be tested, what are the requirements as per SOLAS74, as amended. (6)
B. Describe the routine maintenance to be carried out on the various fittings on a fire line, giving testing pressure where appropriate. (4)

C. Describe briefly how will you dismantle a fire pump for survey. Give details of factors which will decide replacing the parts. (6)
2020/MAR/Q9 **2021/NOV/Q1** **2023/NOV/Q8**
Click Here to See the Answer

Q9. Severe engine vibration has recently become evident when the main engine for which you are responsible operates within a certain speed range –
A. State, with reasons, the possible causes of such vibration; (5)
B. State the consequences of operating the engine under such vibratory conditions; (5)
C. Describe the procedure you, as Second Engineer, would implement in order to investigate and rectify the problem. (6)
2020/FEB/Q8 **2021/JAN/Q8** **2021/JUL/Q9** **2021/DEC/Q9**
2023/AUG/Q8 **2023/NOV/Q9**
Click Here to See the Answer

DEC-2023

Q1. Express your reactions and state the subsequent investigation you would make if a laboratory report on a used diesel engine oil sample indicated the presence of appreciable amounts of: - (16)
A. Iron; B. Copper, Antimony and Tin; C. Silicon.
2020/FEB/Q5 **2023/JUNE/Q1** **2023/DEC/Q1**
Click Here to See the Answer

Q2. With reference to health hazards from asbestos:
A. State where asbestos may be found on board ship; (5)
B. State the health risks from asbestos; (6)
C. Outline the precautions necessary to minimize exposure to asbestos during an emergency repair.
2023/DEC/Q2
Click Here to See the Answer

Q3. Describe the procedure for replacing a Main Engine cylinder liner and explain using sketches where necessary, those parts, which require close

attention during lifting of cylinder liner. Also describe the procedure for pressure testing the cooling water side of the Main Engine Cylinder head. (16)
2023/DEC/Q3
Click Here to See the Answer

Q4. a) State the reason for fitting crosshead guides to engines and explain why 'ahead' and 'astern' faces are required with uni-directional engines. (5)
b) Describe how crosshead guide clearance is checked and adjusted. (6)
c) List reasons for limiting such crosshead clearance. (5)
2022/OCT/Q9 **2023/DEC/Q4**
Click Here to See the Answer

Q5. If soon after joining a motor ship, you found a number of holding down bolts slack and fretting occurred at slacked bolts. Describe how you as a second engineer deal such situation? (16)
2020/MAR/Q8 **2023/SEP/Q7** **2023/DEC/Q5**
Click Here to See the Answer

Q6. a) During an inspection it is noticed that tie rods of certain main engine units have become slack, state with reasons the possible causes of this. (6)
b) Explain how correct tension is restored and the risk of future slackness minimized. (5)
c) A tie rod has fractured and cannot be replaced immediately, State with reasons the course of action to be adopted in order to allow the engine to be operated without further damage. (5)
2022/OCT/Q2 **2023/DEC/Q6**
Click Here to See the Answer

Q7. With reference to fixed CO2 system for fighting machinery space fires:
a) sketch a CO2 bottled system. (6)
b) How the number of CO2 bottles required for ship is calculated? (4)
c) explain how the system sketched in part (a) is protected from overpressure. (3)
d) Describe the periodic maintenance required. (3)
2022/AUG/Q5 **2023/DEC/Q7**
Click Here to See the Answer

Q8. a) State what is meant by machinery condition monitoring. (6)
b) Describe how typical shipboard condition monitoring is carried out. (5)
c) State how the information obtained by monitoring may be used to indicate Machinery condition trends. (5)
2022/AUG/Q4 **2023/DEC/Q8**
Click Here to See the Answer

Q9. a) Describe TWO methods of tracing a superficial crack in a marine machinery component. (8)
b) Explain how propagation of a crack in a machinery component can be arrested. (8)
2023/DEC/Q9
Click Here to See the Answer