D. MARINE
Study Material

MEO CLASS 2 WRITTEN: MEP

(MARINE ENGINEERING PRACTICE)

FOR INDIAN COMPETENCY EXAM

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D. MARINE
Study Material

JAN-2022

Q1. 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**
Click Here to See the Answer

Q2. A). Describe the overhaul of a boiler safety valve and explain using sketches where necessary those parts which require particularly close attention;
B). Describe the setting of boiler safety valve to comply with classification society requirements.
2021/AUG/Q3 **2022/JAN/Q2**
Click Here to See the Answer

Q3: Your ship after having been accidentally grounded was taken to a dry-dock for inspection and necessary repairs. What defects would you look for in the following parts, that may have sustained damage due to grounding and suggest methods of repairs and tests that may be required to be carried out to the defects noticed:
A. Propeller and tail end shaft.
B. Main engine crankshaft.
2021/MAR/Q6 **2022/JAN/Q3**
Click Here to See the Answer

Q4. A. As a second engineer, how often would you check holding-down bolts to ascertain that they are tight? What methods are used to check tightness?

B. If, soon after joining a ship, you found a number of holding down bolts slack, and fretting occurred in the areas of the slack bolts, describe how-you would handle the situation?
2020/MAR/Q8 **2021/JAN/Q4** **2021/JUL/Q6 2021/JUL/Q4** **2021/AUG/Q4** **2021/SEP/Q8** **2022/JAN/Q4**
Click Here to See the Answer

Q5. A. During the weighment of CO2 bottles required for total flooding of Engine room, it was observed that few bottles are less than the original capacity. State the reasons for the same and checks / tests to be made prior refilling;
B. With reference to MSC1/Circ.1318/Rev.1, high pressure cylinders (CO2 bottles) are subjected to an internal inspection and hydrostatic test and periodic test. State the stipulated criteria for such hydrostatic test and periodic test interval of high-pressure cylinders (CO2 bottles).
2022/JAN/Q5
Click Here to See the Answer

Q6. (a) With the aid of a simple sketch, explain the "trouble spots" in a basic air-conditioning unit
(b) With reference to your sketch, explain the following: -
(i). How the problem of increase in humidity of cooled air is overcome?
(ii). How discomfort caused by the excessive drying effect of heated air is
2020/MAR/Q3 **2020/NOV/Q2** **2020/DEC/Q2** **2021/FEB/Q9** **2021/APR/Q3** **2021/APR/Q4** **2021/JUL/Q1** **2021/AUG/Q6** **2021/SEP/Q5** **2021/OCT/Q7** **2021/NOV/Q6** **2021/DEC/Q6** **2022/JAN/Q6**
Click Here to See the Answer

Q7. (a) Explain in detail how the engine room's hyper mist or high pressure fog fire fighting system works in auto mode and manual mode.
(b) How you would isolate hyper mist or high pressure fog firefighting system for routine maintenance. Describe all tests and inspections you would make and how you would return the system to service.
2021/JUL/Q8 **2022/JAN/Q7**
Click Here to See the Answer

Q8. As a second engineer, list out all the potential hazards with regard to hot work on a fuel oil heater located inside a bunker fuel oil tank. Explain how do you carry out risk assessment for above mentioned hot work. What control measures do you employ so that residual risk shall be reduced as low as reasonably practicable (ALARP).
2021/JAN/Q7 **2021/JUL/Q7** **2021/JUL/Q8** **2021/AUG/Q8** **2021/NOV/Q8** **2022/JAN/Q8**
Click Here to See the Answer

Q9. Sketch and show all parts of two-stroke engine's Stuffing box. Describe the procedure of in place (Without removing piston) overhauling two stroke engine's Stuffing box. Your answer should include all safety precautions taken and proper tools used during overhaul of Stuffing box.
2021/NOV/Q4 **2022/JAN/Q9**
Click Here to See the Answer

FEB-2022

Q1. (a) Explain in detail how the engine room's hyper mist or high-pressure fog firefighting system works in auto mode and manual mode.
(b) How you would isolate hyper mist or high-pressure fog firefighting system for routine maintenance. Describe all tests and inspections you would make and how you would return the system to service.
2021/JUL/Q8 **2022/JAN/Q7** **2022/FEB/Q1**
Click Here to See the Answer

Q2. Sketch and show all parts of two-stroke engine's Stuffing box. Describe the procedure of in place (Without removing piston) overhauling two stroke engine's Stuffing box. Your answer should include all safety precautions taken and proper tools used during overhaul of Stuffing box.
2021/NOV/Q4 **2022/JAN/Q9** **2022/FEB/Q2**
Click Here to See the Answer

Q3. 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/FEB/Q9 **2021/APR/Q3** **2021/APR/Q4** **2021/JUL/Q1** **2021/AUG/Q6** **2021/SEP/Q5** **2021/OCT/Q7** **2021/NOV/Q6** **2021/DEC/Q6** **2022/JAN/Q6** **2022/FEB/Q3**
Click Here to See the Answer

Q4. Accidents regularly occur due to premature or accidental release of CO2 into machinery spaces. With reference to this, enumerate the procedure or arrangement that you as second engineer would adopt with respect of the following
A. Contractors working on CO2 system;
B. Understanding between bridge and engine room in the event of a machinery space fire;
C. Familiarizing staff with the system;
D. Checks and tests are carried out before putting system in operation?
2020/DEC/Q3 **2021/APR/Q4** **2021/JUL/Q5** **2021/JUL/Q5** **2022/FEB/Q4**
Click Here to See the Answer

Q5. With reference to large two stroke engine:
(a) Explain how abnormal and excessive cylinder liner wear caused, state how it can be detected;
(b) explain the effects and consequences of excessive cylinder liner wear;
(c) explain how abnormal cylinder linear wear may be prevented.
2021/JULY/Q1 **2021/SEP/Q3** **2021/OCT/Q1** **2022/FEB/Q5**
Click Here to See the Answer

Q6. Under Continuous survey of machinery (CSM) bottom end bearing of a large 2stroke slow speed engine is due for survey.
A. As second engineer, explain the procedure involved in complete inspection of a bottom end bearing.
B. List the precaution to be taken.
C. Indicate the reasons for possible defects which could be encountered and state how they may be rectified.
D. What test are carried out on completion of survey and re-assembly.

2020/NOV/Q7 2021/JAN/Q1 2021/APR/Q1 2021/JUL/Q2 2021/OCT/Q9 2021/DEC/Q2 2022/FEB/Q6
Click Here to See the Answer

Q7. Briefly describe your action plan on following exigencies:
A. Leaky economizer tube, while at sea;
B. Leaky intercooler of main air compressor, while manoeuvring.
2020/DEC/Q4 2021/FEB/Q3 2021/JUL/Q3 2021/DEC/Q5 2022/FEB/Q7
Click Here to See the Answer

Q8. Explain how EACH of the following hull defects should be dealt with;
(a) A cracked weld;
(b) A severe indentation in way of a frame;
(c) Surfaces suffering from general corrosion although the extent of wastage does not warrant plate replacement;
(d) A bilge keel fractured at the forward end.
2021/FEB/Q5 2021/APR/Q6 2021/JUL/Q9 2021/SEP/Q7 2021/OCT/Q3 2022/FEB/Q8
Click Here to See the Answer

Q9. Using sketches explain the difference between Pulse and constant pressure turbocharger systems.
A. In the event of a Pulse turbocharger becoming inoperative due to mechanical breakdown explain the modifications required to allow the engine to operate safely.
B. State the instruction you as second engineer would issue regarding the additional engine monitoring requirements following the steps taken in (a).
2021/FEB/Q8 2021/APR/Q9 2022/FEB/Q9
Click Here to See the Answer

MARCH-2022

Q1. (a) Explain how can the cooling spaces within a cylinder jacket be examined without withdrawing the cylinder liner?
(b) To what parts of a cylinder jacket would give attention after removing an old cylinder liner prior to fitting a new one?

(c) What periodic attention must be given to the scavenge air space and piston-rod packing (Stuffing box) at the bottom of a cylinder liner?
2021/MAR/Q3 **2021/AUG/Q9** **2022/MAR/Q1**
Click Here to See the Answer

Q2. When ship is in dry dock, as a Second Engineer, describe inspections you would make prior to the start of work, during the work and after completion of the work of the following:
(a) Large sea water inlet chest and valves;
(b) Forward end of ship;
(c) Propeller and stern bush;
2020/NOV/Q1 **2021/OCT/Q2** **2022/MAR/Q2**
Click Here to See the Answer

Q3. 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 is capacity control achieved?
(b). How is humidity control achieved & why is it important? How the problem of increase in humidity of cooled air is overcome?
(c). How discomfort caused by the excessive drying effect of heated air is overcome?
(d) Why are generally blower run with v belts? State possible reasons if the blower is vibrating?
2022/MAR/Q3
Click Here to See the Answer

Q4. With reference to Auxiliary boiler safety valve;
A. Describe with the aid of Sketch the safety valve for an auxiliary boiler;
B. Identify with reasons. The parts that require particularly close attention during overhaul;
C. Describe how the safety valves are reset after an overhaul.
2020/NOV/Q4 **2021/FEB/Q4 2021/APR/Q5** **2021/OC/Q5** **2022/MAR/Q4**
Click Here to See the Answer

Q5. As a second engineer, List out all the hazards identified with regard to cylinder head lifting job during main engine overhaul. explain how do you carry out risk assessment for above mentioned job.
2020/NOV/Q1 **2020/DEC/Q5** **2021/SEP/Q1** **2021/OCT/Q6** **2022/MAR/Q5**
Click Here to See the Answer

Q6. With Reference to Main Engine Fuel Pumps.
(a) Explain how the setting of a variable injection timing fuel pump is checked and adjusted.
(b) State why it may be necessary to adjust the settings of a variable injection timed fuel pump.
2020/FEB/Q3 **2020/NOV/Q6** **2021/FEB/Q1** **2021/APR/Q2** **2021/OCT/Q8** **2021/DEC/Q4** **2022/MAR/Q6**
Click Here to See the Answer

Q7. Describe the action you would take and outline possible reasons for failure in both the following cases:
(a) The engine fails to turn on starting air, (b) The engine turns on starting air but fails to fire.
2022/MAR/Q7
Click Here to See the Answer

Q8. Describe the procedure to be undertaken when, upon a routine schedule for changing fuel injector on a main engine, it is found that the injector body is seized and cannot be removed by conventional means.
2020/NOV/Q8 **2021/APR/Q8** **2021/OCT/Q4** **2022/MAR/Q8**
Click Here to See the Answer

Q9. With regard to a U.M.S. ship having an automatic fire detection system for the machinery space,
A. Sketch a line diagram of the system showing how shipboard mains supply is fed through battery charger and emergency battery to fire detector heads and fire zone indicator panel and alarms.
B. In the event of a mains supply failure state the length of time for which the emergency battery should be capable of operating the system.

C. Sketch and describe a line termination or method of monitoring the integrity of the system

2022/MAR/Q9

Click Here to See the Answer

APRIL-2022

Q1. (a) Explain how can the cooling spaces within a cylinder jacket be examined without withdrawing the cylinder liner?
(b) To what parts of a cylinder jacket would give attention after removing an old cylinder liner prior to fitting a new one?
(c) What periodic attention must be given to the scavenge air space and piston-rod packing (Stuffing box) at the bottom of a cylinder liner?

2021/MAR/Q3 **2021/AUG/Q9** **2022/MAR/Q1** **2022/APR/Q1**

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Q2: 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**

Click Here to See the Answer

Q3. Briefly describe your action plan on following exigencies:
A. Leaky economizer tube, while at sea;
B. Leaky intercooler of main air compressor, while manoeuvring.

2020/DEC/Q4 **2021/FEB/Q3** **2021/JUL/Q3** **2021/DEC/Q5** **2022/FEB/Q7** **2022/APR/Q3**

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Q4. (a) With the aid of a simple sketch, explain the “trouble spots” in a basic air-conditioning unit.
(b) With reference to your sketch in 4(a), explain the following: -
(i). How the problem of increase in humidity of cooled air is overcome?

(ii). How discomfort caused by the excessive drying effect of heated air is overcome?

2021/FEB/Q9 **2021/APR/Q3** **2021/APR/Q4** **2021/JUL/Q1** **2021/AUG/Q6** **2021/SEP/Q5** **2021/OCT/Q7** **2021/NOV/Q6** **2021/DEC/Q6** **2022/JAN/Q6** **2022/FEB/Q3** **2022/APR/Q4**

Click Here to See the Answer

Q5. A). Describe the overhaul of a boiler safety valve and explain using sketches where necessary those parts which require particularly close attention;

B). Describe the setting of boiler safety valve to comply with classification society requirements.

2021/AUG/Q3 **2022/JAN/Q2** **2022/APR/Q5**

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Q6. (a) Explain the possible reasons T/C vibration while operating at a steady speed.

(b) State how the incidence of turbo charger vibration might be minimized.

(c) explain the action to be taken in order to maintain 2 stroke engine operation in the event of a turbo charger having to be taken out of service.

(d) Indicate the effect this action will have on engine operation

2022/APR/Q6

Click Here to See the Answer

Q7. A. During the weighment of CO2 bottles required for total flooding of Engine room, it was observed that few bottles are less than the original capacity. State the reasons for the same an checks / tests to be made prior refilling;

B. With reference to MSC1/Circ.1318/Rev.1, high pressure cylinders (CO2 bottles) are subjected to an internal inspection and hydrostatic test and periodic test. State the stipulated criteria for such hydrostatic test and periodic test interval of high-pressure cylinders (CO2 bottles).

2022/JAN/Q5 **2022/APR/Q7**

Click Here to See the Answer

Q8: Your ship after having been accidentally grounded was taken to a dry-dock for inspection and necessary repairs were carried out. What defects would you look for in the following parts, that may have sustained damage due to grounding and suggest methods of repairs and tests that may be required to be carried out to the defects noticed:
A. Propeller and tail end shaft.
B. Main engine crankshaft.
2021/MAR/Q6 **2022/JAN/Q3** **2022/APR/Q8**
Click Here to See the Answer

Q9. With Reference to Main Engine Fuel Pumps.
(a) Explain how the setting of a variable injection timing fuel pump is checked and adjusted.
(b) State why it may be necessary to adjust the settings of a variable injection timed fuel pump.
2021/FEB/Q1 **2021/APR/Q2** **2021/OCT/Q8** **2021/DEC/Q4**
2022/MAR/Q6 **2022/APR/Q9**
Click Here to See the Answer

JUNE-2022

Q1. With reference to reciprocating air compressors explain the cause of the following faults.
A. Collapse of discharge valve springs;
B. Breakage of plate valves;
C. Overheating of the discharge air with an unrestricted air intake;
D. Inoperative piston rings.
2020/MR/Q1 **2021/JUL/Q3** **2021/NOV/Q2** **2022/JUN/Q1**
Click Here to See the Answer

Q2. (a) Explain in detail how the engine room's hyper mist or high-pressure fog firefighting system works in auto mode and manual mode.
(b) How you would isolate hyper mist or high-pressure fog firefighting system for routine maintenance. Describe all tests and inspections you would make and how you would return the system to service.
2021/JUL/Q8 **2022/JAN/Q7** **2022/FEB/Q1** **2022/JUN/Q2**
Click Here to See the Answer

Q3. (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?

2020/MAR/Q3 **2020/NOV/Q2** **2020/DEC/Q2** **2021/FEB/Q9**
2021/APR/Q3 **2021/APR/Q4** **2021/JUL/Q1** **2021/AUG/Q6**
2021/SEP/Q5 **2021/OCT/Q7** **2021/NOV/Q6** **2021/DEC/Q6**
2022/JAN/Q6 **2022/FEB/Q3** **2022/APR/Q4** **2022/JUN/Q3**

Click Here to See the Answer

Q4. Using sketches explain the difference between Pulse and Constant pressure turbocharger systems.
A. In the event of a Pulse turbocharger becoming inoperative due to mechanical breakdown explain the modifications required to allow the engine to operate safely.
B. State the instruction you as second engineer would issue regarding the additional engine monitoring requirements following the steps taken in (a).

2021/FEB/Q8 **2021/APR/Q9** **2022/FEB/Q9** **2022/JUN/Q4**

Click Here to See the Answer

Q5: Your ship after having been accidentally grounded was taken to a dry-dock for inspection and necessary repairs. What defects would you look for in the following parts, that may have sustained damage due to grounding and suggest methods of repairs and tests that may be required to be carried out to the defects noticed:
A. Propeller and tail end shaft.
B. Main engine crankshaft.

2021/MAR/Q6 **2022/JAN/Q3** **2022/APR/Q8** **2022/JUN/Q5**

Click Here to See the Answer

Q6. Describe the procedure to remove a seized Main Engine Exhaust Valve from the cylinder head when it could not be removed by conventional means, Also list out preventive measures which could be implemented in the vessel so that such a seizure can be prevented in the future.

2022/JUN/Q6

Click Here to See the Answer

Q7. 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/Q2 **2021/APR/Q8** **2021/SEP/Q4** **2021/NOV/Q3** **2021/DEC/Q8** **2022/JUN/Q7**
Click Here to See the Answer

Q8. With reference to Auxiliary boiler safety valves;
A. Describe with the aid of Sketch the safety valve for an auxiliary boiler;
B. Identify with reasons. The parts that require particularly close attention during overhaul;
C. Describe how the safety valves are reset after an overhaul.
2020/NOV/Q4 **2021/FEB/Q4** **2021/APR/Q5** **2021/OC/Q5** **2022/MAR/Q4** **2022/JUN/Q8**
Click Here to See the Answer

Q9. During the past four months since you joined the ship as Second engineer a number of main engine exhaust valve have suffered from cracking and corrosion at the seating faces; Write a report to the Superintendent Engineer covering the following points:
A. An explanation detailing how the problem becomes evident;
B. Your action upon recognizing the extent and seriousness of the problem;
C. Your reasoned view regarding the possible causes of the problem;
D. Your recommendations to avoid future incidents.
2021/JUL/Q4 **2022/JUN/Q9**
Click Here to See the Answer

JULY-2022

Q1. 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**
Click Here to See the Answer

Q2. Values of some main engine exhaust temperatures displayed in the engine control room differ from those displayed on the engine for the same cylinders.
(a) Explain how it may be determined which readings are inaccurate;
(b) State possible reasons for these inaccurate readings;
(c) Explain how the location of the faults may be detected.
(d). State the periodic checks which should be carried undertaken to ensure that remote engine instrumentation is reading accurately.
2022/JUL/Q2
Click Here to See the Answer

Q3. A marine diesel engine fresh water cooler end cover is badly corroded and holed. Other than replacing it, suggest some measures of repairing it (a) while in operation. (b) When not in operation. Repair procedures must be effective. practicable and innovative.
2020/FEB/Q2 **2020/FEB/Q6** **2022/JUL/Q3**
Click Here to See the Answer

Q4. Briefly explain the objectives of planned preventive maintenance. Indicate the areas where planned preventative maintenance can be applied effectively on ships. How is the work planning and scheduling carried out.
2022/JUL/Q4
Click Here to See the Answer

Q5. A. During the weighment of CO2 bottles required for total flooding of Engine room, it was observed that few bottles are less than the original capacity. State the reasons for the same and checks / tests to be made prior refilling;

B. State how often the CO2 bottles are required to be weighed and pressure tested.
2020/FEB/Q4 **2021/AUG/Q5** **2022/JUL/Q5**
Click Here to See the Answer

Q6.(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
Click Here to See the Answer

Q7. During the overhaul of medium- speed auxiliary diesel generator you find that the white metal of one of the bottom end bearings has cracked. Explain how you would fit a spare bearing and enumerate the various tests you would carry before putting the machine back into service.
2022/JUL/Q7
Click Here to See the Answer

Q8. For vapour compression refrigeration machine, state how each of the following faults are indicated and how they are remedied:
(a) air in the system;
(b) Moisture in the system;
(c) undercharge;
(d) overcharge;
2022/JUL/Q8
Click Here to See the Answer

Q9. Write short note on the followings –
A. Metal – locking;
B.TIG and MIG welding;
C. Brazing;
D. Soldering.
2020/OCT/Q2 **2020/DEC/Q1** **2021/APR/Q3** **2022/JUL/Q9**

Click Here to See the Answer

AUG-2022

Q1.a) The UMS monitoring and control system of your ship has recently started to give false alarms and incorrect data printouts. State, with reasons, possible causes if the false alarms and readings are:
i) Localised to a particular area of engine operation
ii) General to the engine room
b) State, with reasons, the action you, as Second Engineer, would take to ensure continued safe operation of the vessel if the defects were general to the engine room
c) Explain the procedure you, as Second Engineer, would adopt in order to locate and rectify a general fault in the UMS system.
2022/AUG/Q1
Click Here to See the Answer

Q2.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
Click Here to See the Answer

Q3. With reference to fatigue in crankshafts explain:
a) Why, larger shafts are more susceptible to fatigue failure than their smaller Counterparts.
b) With sketches how it is inhibited in practice.
c) How it is identified in its initial, intermediate and final stages prior to failure.
2022/AUG/Q3
Click Here to See the Answer

Q4. a) State what is meant by machinery condition monitoring

b) Describe how typical shipboard condition monitoring is carried out
c) State how the information obtained by monitoring may be used to indicate Machinery condition trends.

2022/AUG/Q4

Click Here to See the Answer

Q5. With reference to fixed CO2 system for fighting machinery space fires:
a) sketch a CO2 bottled system.
b) How the number of CO2 bottles required for ship is calculated?
c) explain how the system sketched in part (a) is protected from overpressure
d) Describe the periodic maintenance required.

2022/AUG/Q5

Click Here to See the Answer

Q6. 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;
C. State how defect in metal can influence the expected safe life of a component;
D. State how fuel injection timing and cylinder power balance can influence the possibility of fatigue cracks developing in the bedplate.

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

Click Here to See the Answer

Q7. The steering gear operation of a vessel that recently experienced a heavy storm is found to be abnormally sluggish.
a) State the reasons for possible malfunction of the gear.
b) State the corrective actions that may be carried out at sea, that will allow the vessel to continue to the nearest port.

2022/AUG/Q7

Click Here to See the Answer

Q8. With reference to the lubrication of refrigeration compressors:
a) State the advantage of using fully synthetic oils
b) Explain why oil may be carried over from the compressor
c) Describe a device which returns oil from the compressor discharge to the compressor sump

d) State the reasons why an accumulation of oil in the evaporator is undesirable.
2022/AUG/Q8
Click Here to See the Answer

Q9. With reference to a water tube boiler :
a) State the indication that a tube is leaking.
(i) When the amount of leakage is small.
(ii) When the amount of leakage is large.
b) If the failed tube is located within the tube bank.
(i) How can it be identified.
(ii) Describe immediate actions and temporary repairs done.
2022/AUG/Q9
Click Here to See the Answer

SEP-2022

Q1. 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**
Click Here to See the Answer

Q2. 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**
Click Here to See the Answer

Q3. What is "virtual tappet" in the hydraulically actuated air spring return exhaust valves, and how is it set. Explain why the damage occurs to the seats of the exhaust valves due to furrowing and cutting. How an incident of "valve drop" leading to extensive damage to running gear can occur.
Click Here to See the Answer

Q4. Many modern turbochargers use sleeve type bearings for rotor support.
A. Explain the reasons for their preference over the rolling contact bearings;
B. With a sketch describe the lubricating system provided for this type;
C. In a turbocharger with integral type of bearings, describe the procedure for renewing the bearings.

2022/SEP/Q4

Click Here to See the Answer

Q5. a) With reference to a vapour compression refrigeration plant, explain why each of the following conditions are desirable;
(i) Superheating at the compressor suction
(ii) Undercooling at the condenser outlet
(b) Describe, with the air of a pressure-enthalpy diagram, how the evaporator cooling load is affected by the conditions stated in Q5 (a)

2022/SEP/Q5

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Q6. With reference to main shaft bearings that are excessively loaded or very lightly loaded state for each condition what are the;
a) Indications of the fault,
b) Effects on adjacent bearings
c) Remedial steps.
Explain why load distribution on main shaft bearings changes in service.

Click Here to See the Answer

Q7. (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.

2022/SEP/Q7

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Q8. a) Discuss the Merits and demerits of a condition monitoring system compared to other maintenance regimes.

b) Describe how the data is gathered, stored and evaluated on a computer-based vibration analysis system

2022/SEP/Q8

Click Here to See the Answer

Q9. a) List the design problems associated with safety valves for high-pressure boilers.
b) State the factors that determine
(i) The relationship between the working pressure of the boiler and the setting pressure of the safety valve
(ii) The blow down setting of a safety valve
c) State what determines the settings of
(i) The super heater safety valve
(ii) The drum safety valve.

Click Here to See the Answer

OCT-2022

Q1. Your ship after having been accidentally grounded was taken to a dry-dock for inspection and necessary repairs. What defects would you look for in the following parts, that may have sustained damage due to grounding and suggest methods of repairs that may be required to be carried out to the defects noticed:
A. Propeller and tail end shaft.
B. Main engine crankshaft.

2021/MAR/Q6 **2022/JAN/Q3** **2022/APR/Q8** **2022/JUN/Q5** **2022/OCT/Q1**

Click Here to See the Answer

Q2. 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.
b) Explain how correct tension is restored and the risk of future slackness minimized.
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.

Click Here to See the Answer

Q3. a) Define the following conditions relating to lubricating oil
(i) Oxidation
(ii) Emulsification
(iii) Acidity
b) Explain how each of the conditions in Q3 (a) is controlled by maintenance
c) Suggest possible consequences if the conditions in Q3 (a) change and no corrective action is taken
Click Here to See the Answer

Q4. 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.
2020/DEC/Q7 **2021/APR/Q8** **2021/SEP/Q4** **2021/NOV/Q3**
2021/DEC/Q8 **2022/JUN/Q7** **2022/OCT/Q4**
Click Here to See the Answer

Q5. a) Describe TWO methods of tracing a superficial crack in a marine machinery component;
b) Explain the procedure for arresting propagation of a crack in a machinery component.
2022/OCT/Q5
Click Here to See the Answer

Q6. Give a reasoned opinion as to the accuracy of the following assertions:
a) Absence of oil grooves in the liner wall between the oil supply points results in increased wear of liner and rings.
b) 'Timed lubrication' has little merit,
c) The most suitable position of the oil supply point is immediately below the bottom piston ring with the piston at top dead centre.
2022/OCT/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**
Click Here to See the Answer

Q8. Sketch and describe a turbocharger bearing lubrication system. State the type of bearing employed and explain the advantages and disadvantages of the lubricating system described.
2021/JUL/Q1 2022/OCT/Q8
Click Here to See the Answer

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

NOV-2022

Q1. A. Describe the survey procedure of an oil lubricated stern bearing and shaft.
B. Explain how the integrity of the outboard seal of an oil lubricated stern tube may be proved before the dry-dock is flooded.
2022/NOV-Q1
Click Here to See the Answer

Q2. Sketch and describe the arrangement of a main engine camshaft chain. Describe the repair procedure following fracture of one chain link during operation of the engine. Give possible reasons for the failure and explain how the chain is set initially at the correct degree of tension.
2022/NOV/Q2
Click Here to See the Answer

Q3. With reference to a cylindrical boiler which has undergone major repairs, explain: -
A. How is the boiler prepared for carrying our 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
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, with reference to that may occur in service.
2022/NOV/Q4
Click Here to See the Answer

Q5. Fatigue is one of the main causes of crankshaft failure.
A. Indicate on a sketch the most likely location of a fatigue crack;
B. Explain how a fatigue failure is identified;
C. Describe how a fatigue crack may be initiated;
D. Describe, with the aid of sketches, the methods used to inhibit fatigue cracks.
2022/NOV/Q5
Click Here to See the Answer

Q6. 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
Click Here to See the Answer

Q7. Discuss the advantages and disadvantages of adopting the following policies for maintenance of main and auxiliary diesel engines.
A. Planned maintenance;
B. Condition monitoring;

C. Periodic replacement of components.
D. Break down maintenance
Click Here to See the Answer

Q8. Under Continuous survey of machinery (CSM) bottom end bearing of a large 2stroke slow speed engine is due for survey.
A. As second engineer, explain the procedure involved in complete inspection of a bottom end bearing.
B. List the precaution to be taken.
C. Indicate the reasons for possible defects which could be encountered and state how they may be rectified.
D. What test are carried out on completion of survey and re-assembly.
2020/NOV/Q7 **2021/JAN/Q1** **2021/APR/Q1** **2021/JUL/Q2** **2021/OCT/Q9** **2021/DEC/Q2** **2022/FEB/Q6** **2022/NOV/Q8**
Click Here to See the Answer

Q9. A completely new unit comprising piston, rings, liners, cylinder head and valves was fitted to a six- cylinder single-acting four-stroke diesel generator. Before installing the clearance and sizes were checked and considered satisfactory. During a trial run the running characteristics were abnormal so the generator was stopped. On examination, it was seen that the new piston had badly scored and drubbed the liner and had indication of seizure in the upper part of the liner. Give your reasoned comments for this failure.
2022/NOV/Q9
Click Here to See the Answer

DEC-2022

1.Describe how a jerk type of fuel pump is replaced, making specific reference to initial setting and governor connections. Explain how the actual and effective strokes are adjusted. Identify the common faults of these pumps. State how engine performance is affected by each of these faults and why prompt attention is necessary.
2022/DEC/Q1
Click Here to See the Answer

Q2. Explain how EACH of the following hull defects should be dealt with;

(a) A cracked weld;
(b) A severe indentation in way of a frame;
(c) Surfaces suffering from general corrosion although the extent of wastage does not warrant plate replacement;
(d) A bilge keel fractured at the forward end.
2021/FEB/Q5 **2021/APR/Q6** **2021/JUL/Q9** **2021/SEP/Q7** **2021/OCT/Q3** **2022/FEB/Q8** **2022/DEC/Q2**
Click Here to See the Answer

Q3. State how each of the following practices affect piston ring life: (a) Nitriding of rings, (b) Chromium plating of ring grooves, (c) Contouring of rubbing faces, (d) Carbon or copper coating of rubbing faces.
2022/DEC/Q3
Click Here to See the Answer

Q4. Show by reference to either power, 'out of phase', or light spring diagrams how the following conditions affect engine performance: (a) Turbocharger fouled on gas side, (b) Heavily fouled air filters,
(c) Badly worn piston rings and cylinder liners. Give reasons for the deformation to which the normal diagram is subject in each case.
2022/DEC/Q4
Click Here to See the Answer

Q5. 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**
Click Here to See the Answer

Q6. 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
Click Here to See the Answer

Q7. With reference to steering gear hydraulic systems:
A. Explain the factors that could contribute to failure of connecting flange leading to total loss of oil from the system.
B. Describe an arrangement designed to ensure that the problem would not cause steering failure.
2021/MAR/Q4 **2022/DEC/Q7**
Click Here to See the Answer

Q8. For a fully automatic provisions refrigeration system incorporating a number of rooms; A. Explain how each room temperature is set; B. Describe the sequence of events following a demand for increased refrigerant flow from one room; C. State with reasons the devices incorporated into the system to protect the machinery and equipment against malfunction; D. State how satisfactory operation of the plant can be established?
2022/DEC/Q8
Click Here to See the Answer

Q9. 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.
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.
C. State with reasons the factors which may limit engine operating speed with the turbocharger out of action.
2021/JUL/Q2 **2021/SEP/Q9** **2022/DEC/Q9**
Click Here to See the Answer