D. MARINE
Study Material

MEO CLASS 2 WRITTEN: EKM

(ENGINEERING KNOWLEDGE MOTOR)

FOR INDIAN COMPETENCY EXAM

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JAN-2021

Q1. Sketch and describe an overview of the electronic controlled camshaft-less engine with respect to the following operations:
a. Fuel Injection system.
b. Exhaust valve actuator system.
c. Cylinder lubrication system.
2020/NOV/Q1 **2021/JAN/Q1**
Click Here to See the Answer

Q2. Suggest with reasons, which one or combination of the following conditions is likely to contribute most to persistent breakage / slacking of 'holding down' bolts:
I. A scavenge fire;
II. Small cracks in the traverse girder of the bedplate;
III. Highly stressed holding down bolts;
IV. Loose chocks;
V. Partially balanced reciprocating masses;
VI. One piston hung up
2021/JAN/Q2
Click Here to See the Answer

Q3. With reference to 2-Stroke Slow Speed Engine:
A. Sketch and describe Main Engine Exhaust Valve.
B. List out a procedure for test of Main Engine Exhaust Valve after overhaul.
2021/JAN/Q3
Click Here to See the Answer

Q4. A. Discuss the nature of the forces to which a main engine crankshaft is subjected in normal service and explain how the resulting stress are maintained at a safe limit by design and efficient maintenance respectively.
B. Indicate the circumstances under which the crankshaft may--
i. over stressed; ii. Become defective without being over stressed.
2021/JAN/Q4

Click Here to See the Answer

Q5. Describe the methods of checking maximum cylinder pressure. What effects are likely to be experienced, following operation with too high and too low maximum cylinder pressure? How can the maximum cylinder pressure be increased or decreased?

2021/JAN/Q5

Click Here to See the Answer

Q6. A. Outline the problems associated with effective lubrication of the liner and piston assemble of a large slow speed engine.
B. Describe the appearance and state the causes of each of the following:
i. Clover leafing; ii. Micro-seizure
C. Describe the composition of a cylinder oil suitable for an engine operating on residual fuel.

2021/JAN/Q6

Click Here to See the Answer

Q7. Why does an explosion occur in the starting air line of an internal combustion engine and how can the possibility of such an occurrence be reduced? Sketch and describe devices, which may be fitted to reduce the severity of such an explosion. State the attention which air starting valves should be given before manoeuvring passage.

2020/MAR/Q3 **2021/JAN/Q7**

Click Here to See the Answer

Q8: An Auxiliary engine exhibits a tendency to hunt to such an extent that the engine speed variation prohibits the connection of the machine to the switchboard.
A. Discuss the possible causes of hunting;
B. Explain how the problem of hunting can be rectified.

2021/JAN/Q8

Click Here to See the Answer

Q9. 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.
2020/DEC/Q9 **2021/JAN/Q9**
Click Here to See the Answer

FEB-2021

Q1. Sketch and show all parts of a two-stroke engine stuffing box. Describe the procedure of overhauling two stroke engine stuffing box, without removing piston. Answer should include all safety precautions and necessary tools used for stuffing box overhaul.
2020/NOV/Q5 **2021/FEB/Q1**
Click Here to See the Answer

Q2. Explain with a sketch "speed droop" in a governor; Answer the following
A. How is a main engine governor different from an auxiliary engine governor?
B. Explain how load is transferred to an incoming generator explaining your actions with relation to the governor's "droop line".
2020/FEB/Q1 **2021/FEB/Q2**
Click Here to See the Answer

Q3. A. Describe with the aid of sketches a fuel pump capable of variable injection timing;
B. State why injection timing might need to be changed;
C. State how injection timing is adjusted while the engine is running.
2021/FEB/Q3
Click Here to See the Answer

Q4. Fatigue is one of the main causes of crankshaft failure.
A. Indicate on a Sketch the most likely location of a fatigue crack;

B. How is a fatigue failure is identified;
C. Describe initiation of a fatigue crack;
D. Sketch and Describe the methods used to inhibit fatigue cracks.
2020/OCT/Q2 **2020/DEC/Q7** **2021/FEB/Q4**
Click Here to See the Answer

Q5. With reference to bridge control of a large slow speed propulsion engine.
A. How is starting and reversing achieved?
B. Investigate and suggest remedial action required if the engine,
(i) Fails to turn on air.
(ii) Turns on air but fails to fire on fuel;
(iii) Fails to reverse.
2020/DEC/Q1 **2021/FEB/Q5**
Click Here to See the Answer

Q6. A. A number of main engine cylinder covers have been subjected to cracking during the preceding four months –
i. Explain possible reasons for this cracking;
ii. State with reasons the action you, as Second Engineer, would take in order to reduce the possibility of future cylinder cover cracking.
B. Cylinder liner wear has increased appreciably during the past six months. Write a brief report to the engineering superintendent concerning this matter explaining the possible causes the immediate action taken to deal with the problem and the action you, as Second Engineer, intend to take in order to reduce the risk of future incidents.
2020/FEB/Q8 **2021/FEB/Q6**
Click Here to See the Answer

Q7. Sketch and Discuss the precautions and protections that are provided to minimize the possibility of a diesel engine crank case explosion and the transmission of dangerous flame into the machinery space;
A. By design and equipment; B. By operating personnel
2020/FEB/Q3 **2021/FEB/Q7**
Click Here to See the Answer

Q8. 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.
2020/DEC/Q9 **2021/JAN/Q9** **2021/FEB/Q8**
Click Here to See the Answer

Q9. Describe the phenomena of vibration in marine diesel engine. Explain the terms:
(a) Transverse Vibration (b) Torsional Vibration (c) Resonance (d) The role of vibration dampers.
2021/FEB/Q9
Click Here to See the Answer

MAR-2021

Q1. 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 vent of turbo charger having to be taken out of service.
D. Indicate the effect this action will have on engine operation.
2020/OCT/Q3 **2020/DEC/Q8** **2021/MAR/Q1**
Click Here to See the Answer

Q2. Show with the aid of a sketch how fuel can be continuously circulated through fuel injection valves on large engines while the engine is operating or under, stand-by conditions.
2021/MAR/Q2
Click Here to See the Answer

Q3. As a second engineer of a vessel, you are instructed to submit to the superintendent engineer a complete indicator cards together with relevant data. Give full account of your work in taking the cards and preparing them for submission. Tabulate the data you forward, both that extracted from the cards and otherwise obtained, giving typical figures taken from a motor ship.
2020/FEB/Q6 **2021/MAR/Q3**
Click Here to See the Answer

Q4. With reference to piston rings;
A. Analyze the causes of breakage;
B. How maintenance and engine operation can minimize breakage;
C. Explain the possible consequences with respect to performance and safety of operating the engine with broken or severely worn rings.
2021/MAR/Q4
Click Here to See the Answer

Q5. Describe the starting and reversing system of an electronically controlled diesel engine and compare with engine having cam shaft and explain the following;
A. reduction in air consumption during engine starting; B. Improved performance during astern starting and crash astern.
2021/MAR/Q5
Click Here to See the Answer

Q6. With reference to medium speed engine cylinder liners:
A. Explain the cause and effects of Polishing or glazing;
B. Describe, with the aid of sketches, an anti-polishing ring;
C. Explain the action of anti-polishing ring during the operation of the engine.
2020/DEC/Q5 **2021/MAR/Q6**
Click Here to See the Answer

Q7. With respect to large two stroke crosshead main engines;
A. Sketch and describe a crosshead designed to prevent or minimize bearing edge loading.
B. State how the arrangement describe a achieves its purpose.

C. What would be an acceptable range of bearing clearance for the top end bearing and bottom end bearings of a large two-stroke marine diesel engine.
2021/MAR/Q7
Click Here to See the Answer

Q8. With regards to connecting rod ovality of four stroke diesel Engine. Explain Following.
a) Importance of connecting rod ovality.
b) Method of measuring the connecting rod ovality.
C) Discuss the impact of ovality if it increases beyond the maximum allowance limit.
d) Method of ascertaining the elongation of connecting rod bolts.
2021/MAR/Q8
Click Here to See the Answer

Q9. With respect to Air Starting systems for 2 stroke diesel engines :
A. Sketch a Main Engine starting air starting system and describe how it operates.
B. List the safety devices and interlocks incorporated in main engine air starting system and state the purpose of each.
2020/NOV/Q6 **2020/DEC/Q2** **2021/MAR/Q9**
Click Here to See the Answer

APR-2021

Q1. With reference to a particular make of main propulsion unit, describe how the engine is reversed manually and discuss the problems involved and the safety precautions which would be required if the control were operated remote from the machinery space.
2021/APR/Q1
Click Here to See the Answer

Q2. How explosion occurs in the starting air line of an internal combustion engine and how can the possibility of such an occurrence be reduced? Sketch and describe devices, which may be fitted to reduce the severity of such an explosion. State the attention which air starting valves should be given before stand by.

2020/MAR/Q3 **2021/JAN/Q7** **2021/APR/Q2**

Click Here to See the Answer

Q3. As second engineer you have been requested to obtain a set of indicator card from the large slow speed engine of a recently purchased second hand ship.

A. Describe your initial checks and preparations;

B. State with reason the types of card you would consider necessary and explain the procedure for obtaining these;

C. State in order of importance the additional information required with the card;

D. State your procedure for analysis of the cards and obtaining cylinder powers.

2020/NOV/Q3 **2021/APR/Q3**

Click Here to See the Answer

Q4. Make a diagrammatic sketch of an engine cooling water system as applied to a medium speed diesel engine as fitted on a fishing vessel. Indicate the temperature and pressures. Describe the flow of water from entry to the engine to out let from the engine.

2021/APR/Q4

Click Here to See the Answer

Q5. Sketch and describe a system of control for manoeuvring a main diesel engine from the bridge and show how local control may be effected in case of breakdown of the system.

2021/APR/Q5

Click Here to See the Answer

Q6: With reference to Turbo-Chargers;

A. Explain why when surging occurs, the speed off the turbocharger is seen to change slightly;
B. Give examples of defects likely to result in surging;
C. Explain in simple terms what occurs in a turbocharger and the diesel engine as the speed / power increases. Based on the explanation what is meant by matching of T/C with an engine?
D. State the advantage of fitting uncooled turbochargers.

2021/APR/Q6

Click Here to See the Answer

Q7. A. Explain the term Variable Injection Timing (VIT) when applied to fuel pumps and state why a change in timing of fuel injection may be required.;
B. Describe, with the aid of sketches a VIT fuel pump and explain how the change in trimming is achieved whilst the pump is in operation
C. Explain how it may be determined that individual fuel pumps are injecting the correct quantity of fuel with the correct timing at a particular pump setting.

2021/APR/Q7

Click Here to See the Answer

Q8. (a) Describe, with the aid of a sketch, the main engine auxiliary equipment for automatic monitoring and regulation of the fuel viscosity.
(b) Explain the operation of the system, which incorporates the equipment described in Q.8(a).
(c) For an engine which is maneuvered on distillate fuel but operated on heavy residual oil at sea, static, as second engineer, the standing orders you would issue for the procedure to be adopted when changing form distillate fuel to heavy residual oil and vice versa.

2021/APR/Q8

Click Here to See the Answer

Q9. With reference to crankshafts, explain EACH of the following:
A. The cause and effects of torsional vibration;
B. The term critical speed indicating why it can be a problem;

C. The term fatigue cracking and state, with reasons, TWO factors of crankshaft operation which have greatest influence on the likelihood of fatigue cracking
D. How a torsional vibration damper can reduce the effects of torsional vibration
2020/NOV/Q7 **2021/APR/Q9**
Click Here to See the Answer

JULY-2021

Q1. Draw an "out of phase" diagram for a large 2-stroke slow speed cycle engine. Describe in detail the part of the cycle showing on this diagram. By the help of a diagram, explain the effects of burning high and low grade fuels (when fuel injection timing is not altered). Explain how good ignition and combustion can be obtained when using low grade fuel.
2021/JUL/Q1
Click Here to See the Answer

Q2. Sketch and describe a system of control for manoeuvring a main diesel engine from the bridge and show how local control may be effected in case of breakdown of the system.
2021/APR/Q5 **2021/JUL/Q2**
Click Here to See the Answer

Q3. With reference to torsional vibrations in a main propulsion installation based on medium speed engines, gearbox and controllable pitch propeller:
A. Explain how the vibrations may be caused;
B. State the possible effects and damage that could result;
C. Discuss the methods employed to minimise the potential problems associate with torsional vibration;
D. Describe how the natural vibration frequency of the system could be modified.
2021/JUL/Q3
Click Here to See the Answer

Q4. (a) Explain the factors you would consider in deciding whether to open up a cylinder unit for overhaul? After opening the unit and preparing for assembly, how would you decide whether to renew or re-use piston rings?
(b) List the causes of piston ring failure which may result in gas leakage or ring breakage.
2020/DEC/Q3 **2021/JUL/Q4**
Click Here to See the Answer

Q5: Explain why the use of residual fuels for the operation of large slow speed or of medium speed engines, may be responsible for the following problems with turbocharger nozzles, shrouds and blades and how in each, the problem may be minimized:
A. Build-up of deposits;
B. Hot corrosion;
C. Erosion
2020/FEB/Q2 **2021/JUL/Q5**
Click Here to See the Answer

Q6. A. Explain the term Variable Injection Timing (VIT) when applied to fuel pumps and state why a change in timing of fuel injection may be required.;
B. Describe, with the aid of sketches a VIT fuel pump and explain how the change in trimming is achieved whilst the pump is in operation
C. Explain how it may be determined that individual fuel pumps are injecting the correct quantity of fuel with the correct timing at a particular pump setting.
2021/APR/Q7 **2021/JUL/Q6**
Click Here to See the Answer

Q7. Fatigue is one of the main causes of crankshaft failure.
A. Indicate on a Sketch the most likely location of a fatigue crack;
B. How is a fatigue failure is identified;
C. Describe initiation of a fatigue crack;
D. Sketch and Describe the methods used to inhibit fatigue cracks.
2020/DEC/Q7 **2021/FEB/Q4** **2021/APR/Q1** **2021/JUL/Q7**
Click Here to See the Answer

Q8. During the past 4 months since you have joined the ship as second engineer a number of main engine exhaust valves have suffered cracking and corrosion at the seating faces. Write a report to the superintendent covering the following points; A. An explanation detailing how the problem became evident. B. Your action upon recognising the extent and seriousness of the problem C. Your reasoned views regarding the positive causes of the problem D. Your recommendations to avoid future incidents.
2021/JUL/Q6 **2021/JUL/Q8**
Click Here to See the Answer

Q9. 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.
2020/DEC/Q9 **2021/JAN/Q9** **2021/FEB/Q8** **2021/APR/Q5** **2021/JUL/Q9**
Click Here to See the Answer

AUG-2021

Q1. (a) Sketch a unit for automatic monitoring and regulation of the fuel viscosity.
(b) Describe fuel change over procedures that are followed for switching from distillate fuel to heavy residual oil and vice versa.
2021/JUL/Q4 **2021/AUG/Q1**
Click Here to See the Answer

Q2. 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 liner wear may be prevented.
2021/AUG/Q2
Click Here to See the Answer

Q3. A. Sketch and describe a system of control for manoeuvring a main diesel engine from the bridge
B. Explain how local control may be effected in case of breakdown of the control system described in 3 (A).
2021/APR/Q5 **2021/JUL/Q2** **2021/AUG/Q3**
Click Here to See the Answer

Q4. Misalignment of the main shafting between engine and propeller causes bearing overloads and shaft stress;
A. State the difficulties associated with checking shaft alignment and the reasons why results are unreliable due to external factors;
B. Explain with a simple sketch how a bearing load is assessed.
C. Explain how uneven loading could be rectified.
2021/AUG/Q4
Click Here to See the Answer

Q5. With reference to the crankshaft and running gear of an engine, explain static balance, Dynamic balance, Torque reaction couple and Critical speed
2021/AUG/Q5
Click Here to See the Answer

Q6. A. Explain the term Variable Injection Timing (VIT) when applied to fuel pumps and state why a change in timing of fuel injection may be required.;
B. Describe, with the aid of sketches a VIT fuel pump and explain how the change in timing is achieved whilst the pump is in operation
C. Explain how it may be determined that individual fuel pumps are injecting the correct quantity of fuel with the correct timing at a particular pump setting.
2021/APR/Q7 **2021/JUL/Q6** **2021/AUG/Q6**
Click Here to See the Answer

Q7. (A) A set of indicator diagrams including draw cards has been taken for a main diesel engine. Examine critically the following if the compression curve is normal

i. The maximum pressure is lower ;
ii. The maximum pressure is higher ;
iii. The expansion curve is lower;
iv. The expansion curve is higher;
(B). Describe how the faults as mentioned above can be rectified
2021/JUL/Q3 **2021/AUG/Q7**
Click Here to See the Answer

Q8. During the past 4 months since you have joined the ship as second engineer a number of main engine exhaust valves have suffered cracking and corrosion at the seating faces. Write a report to the superintendent covering the following points;
A. An explanation detailing how the problem became evident.
B. Your action upon recognising the extent and seriousness of the problem
C. Your reasoned views regarding the positive causes of the problem
D. Your recommendations to avoid future incidents.
2021/JUL/Q6 **2021/JUL/Q8** **2021/AUG/Q8**
Click Here to See the Answer

Q9. With reference to turbochargers –
A. Explain how corrosion can occur on the gas side of a turbocharger casing;
B. Describe the process and safeguards necessary when water washing the air side;
C. Explain the possible disadvantage of water washing the gas side.
2021/AUG/Q9
Click Here to See the Answer

SEP-2021

Q1. (a) Explain the factors you would consider in deciding whether to open up a cylinder unit for overhaul? After opening the unit and preparing for assembly, how would you decide whether to renew or re-use piston rings?
(b) List the causes of piston ring failure which may result in gas leakage or ring breakage.
2020/DEC/Q3 **2021/JUL/Q4** **2021/SEP/Q1**

Click Here to See the Answer

Q2. Show with the aid of a sketch how fuel can be continuously circulated through fuel injection valves on large engines while the engine is operating or under, stand-by conditions.
2021/MAR/Q2 **2021/SEP/Q2**
Click Here to See the Answer

Q3. A. Sketch a Main Engine air starting system and describe how it operates.
B. List the safety devices and interlocks incorporated in such a system and state the purpose of each.
2020/OCT/Q6 **2020/NOV/Q6** **2020/DEC/Q2** **2021/MAR/Q9** **2021/JUL/Q7** **2021/SEP/Q3**
Click Here to See the Answer

Q4. 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 vent of turbo charger having to be taken out of service.
D. Indicate the effect this action will have on engine operation.
2020/OCT/Q3 **2020/DEC/Q8** **2021/MAR/Q1** **2021/SEP/Q4**
Click Here to See the Answer

Q5. (a) Describe, with the aid of a sketch, a main engine hydraulically operated exhaust valve which is designed to rotate in service.
(b)Explain TWO methods how the opening of the exhaust valve described in part(a) can be controlled.
(c) Explain why the valve described in part (a) is rotated.
2021/SEP/Q5
Click Here to See the Answer

Q6. 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 liner wear may be prevented.
2021/AUG/Q2 **2021/SEP/Q6**
Click Here to See the Answer

Q7. With regards to connecting rod ovality of four stroke diesel Engine. Explain Following.
a) Importance of measuring connecting rod ovality.
b) Method of measuring the connecting rod ovality.
C) Discuss the impact of ovality if it increases beyond the maximum allowance limit.
d) Method of ascertaining the elongation of connecting rod bolts.
2021/MAR/Q8 **2021/APR/Q4** **2021/SEP/Q7**
Click Here to See the Answer

Q8. Describe the starting and reversing system of an electronically controlled diesel engine and compare with engine having CAM SHAFT and explain the following;
A. Reduction in Air Consumption during Engine Starting;
B. Improved performance during Astern starting and Crash Astern.
2021/MAR/Q5 **2021/APR/Q8** **2021/SEP/Q8**
Click Here to See the Answer

Q9. Write a report to the engineering superintendent regarding the replacement of the fuel injectors of three main engine units due to server erosion of the nozzle holes and burning of the injector tips. Explain in your report how the defects were detected, the likely cause of the damage and the action taken to prevent further incidents of this type.
2021/SEP/Q9
Click Here to See the Answer

OCT-2021

Q1. 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.
2020/DEC/Q9 **2021/JAN/Q9** **2021/FEB/Q8** **2021/APR/Q5** **2021/JUL/Q9** **2021/OCT/Q1**
Click Here to See the Answer

Q2. With reference to bridge control of a large slow speed propulsion engine.
A. How is starting and reversing achieved?
B. Investigate and suggest remedial action required if the engine,
(i) Fails to turn on air.
(ii) Turns on air but fails to fire on fuel;
(iii) Fails to reverse.
2020/DEC/Q1 **2021/FEB/Q5** **2021/APR/Q3** **2021/OCT/Q2**
Click Here to See the Answer

Q3. (a) Describe the procedure for checking and adjusting the timing of a main engine fuel injection pump.
(b) Explain how diesel engine power balance is achieved, stating why it is essential.
2021/OCT/Q3
Click Here to See the Answer

Q4. State how EACH of the following defects becomes apparent, describe its effect on engine operation or safety and indicate the corrective action required to restore normal engine condition;
A. Leaking air inlet and exhaust valves;
B. Leaking air start valve;
C. Cracked cylinder liner;
D. Broken piston rings
2020/MAR/Q5 **2021/OCT/Q4**
Click Here to See the Answer

Q5. Discuss the consequences of failure to maintain correct clearances in the case of main diesel engine crankshaft and bottom end bearings. Sketch a

bottom end bearing paying particular attention to the arrangement of ensuring uninterrupted flow of oil to the top end bearing.
2020/MAR/Q2 **2021/OCT/Q5**
Click Here to See the Answer

Q6. with reference to a slow speed diesel engine fitted with a single turbocharger. describe, with reasons, the
possible action which could be taken to enable the main engine to ne operated, If whilst on oceanic passage, a small portion of one of the impeller vanes breaks off and impacted with the charge air cooler.
2021/OCT/Q6
Click Here to See the Answer

Q7. With reference to the 4-stroke medium speed engines:
A. Define the cause and effect of thermal stressing in cylinder Heads, liners and pistons.
B. Explain why thermal stressing are aggravated with increase in cylinder bore.
C. Explain how stress concentration and its effects are relieved by maintenance and operational practices.
2020/MAR/Q7 **2021/OCT/Q7**
Click Here to See the Answer

Q8. (a) Describe, with aid of sketches, either an electronic governor or a hydraulic governor.
(b) Explain how the governor, described in Q.8(a), functions in order to increase fuel to the engine in the event of a load increase.
(c) State the defects which can impa ir operation of the governor described in
2020/MAR/Q9 **2020/OCT/Q1** **2021/OCT/Q8**
Click Here to See the Answer

Q9. (a) Explain fatigue cracking, stating its causes and propagation.
(b) Explain, how poor maintenance and engine overload may contribute to the risk fatigue cracking of cylinder head holding studs.
2021/OCT/Q9

Click Here to See the Answer

NOV-2021

Q1. A. State the reasons for the progressive slackness of an engine camshaft drive chain in service;
B. State the effect chain stretch has on engine timing and performance;
C. Describe how correct timing is restored when chain stretch becomes excessive.
2020/NOV/Q9 **2021/NOV/Q1**
Click Here to See the Answer

Q2. Sketch and describe an overview of the electronic controlled camshaft-less engine with respect to the following operations:
a. Fuel Injection system. b. Exhaust valve actuator system.
c. Cylinder lubrication system.
2020/NOV/Q1 **2021/JAN/Q1** **2021/NOV/Q2**
Click Here to See the Answer

Q3. With reference to turbocharger bearings:
A. Discuss the relative advantages and disadvantages of white metal sleeve and ball race bearings for turbocharger
rotor support.
B. State with reasons how axial location of the rotor is achieved.
C. Explain how the bearing are kept cool in service.
D. Indicate how the bearings are sealed from the atmosphere and exhaust gas.
2020/NOV/Q2 **2021/NOV/Q3**
Click Here to See the Answer

Q4. (a) Explain the factors you would consider in deciding whether to open up a cylinder unit for overhaul? After
opening the unit and preparing for assembly, how would you decide whether to renew or re-use piston rings?
(b) List the causes of piston ring failure which may result in gas leakage or ring breakage.

2020/DEC/Q3 **2021/JUL/Q4** **2021/SEP/Q1** **2021/NOV/Q4**
Click Here to See the Answer

Q5. Explain the term "cascade control' and sketch such a system suitable for use with a main engine jacket cooling water system. Show the variation of pressure and temperature at major points of the system.
2020/NOV/Q4 **2021/JUL/Q5** **2021/NOV/Q5**
Click Here to See the Answer

Q6: An Auxiliary engine exhibits a tendency to hunt to such an extent that the engine speed variation prohibits the connection of the machine to the switchboard.
A. Discuss the possible causes of hunting.
B. Explain how the problem of hunting can be rectified.
2021/JAN/Q8 **2021/NOV/Q6**
Click Here to See the Answer

Q7. A. Sketch a Main Engine air starting system and describe how it operates.
B. List the safety devices and interlocks incorporated in such a system and state the purpose of each.
2020/OCT/Q6 **2020/NOV/Q6** **2020/DEC/Q2** **2021/MAR/Q9**
2021/JUL/Q7 **2021/SEP/Q3** **2021/NOV/Q7**
Click Here to See the Answer

Q8. (a) Explain fatigue cracking, stating its causes and propagation.
(b) Explain, how poor maintenance and engine overload may contribute to the risk fatigue cracking of cylinder head holding studs.
2021/OCT/Q9 **2021/NOV/Q8**
Click Here to See the Answer

Q9. (a) Describe, with the aid of a sketch, a main engine hydraulically operated exhaust valve which is designed to rotate in service.
(b)Explain TWO methods how the opening of the exhaust valve described in part(a) can be controlled.
(c) Explain why the valve described in part (a) is rotated.

2021/SEP/Q5 **2021/NOV/Q9**
Click Here to See the Answer

DEC-2021

Q1. Describe the starting and reversing system of an electronically controlled diesel engine and compare with engine having CAM SHAFT and explain the following;
A. Reduction in Air Consumption during Engine Starting;
B. Improved performance during Astern starting and Crash Astern.
2021/MAR/Q5 **2021/APR/Q8** **2021/SEP/Q8** **2021/DEC/Q1**
Click Here to See the Answer

Q2. A. Outline the problems associated with improper lubrication of the liner and piston assembly of a large slow speed engine.
B. Describe and state the causes of each of Clover leafing and Micro-seizure
C. List out the composition of a cylinder oil suitable for an engine operating on VLSFO.
2020/JAN/Q2 **2021/APR/Q2** **2021/DEC/Q2**
Click Here to See the Answer

Q3. With reference to a large slow speed 2 stroke engine:
(a) Draw a simple sketch (cross section) of a lubricating oil type piston, showing the flow path of Lubricating oil and label the various components of piston.
(b) Explain how the piston's crown is cooled effectively during the operation of the engine by lubricating oil.
(c) Compare advantages and disadvantages of lubricating oil piston cooling systems with Fresh water piston cooling systems.
2021/DEC/Q3
Click Here to See the Answer

Q4. 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.
2021/DEC/Q4
Click Here to See the Answer

Q5. 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.
2020/DEC/Q9 **2021/JAN/Q9** **2021/FEB/Q8** **2021/APR/Q5**
2021/JUL/Q9 **2021/OCT/Q1** **2021/DEC/Q5**
Click Here to See the Answer

Q6. (a) Describe the methods of checking maximum cylinder pressure.
(b) What effects are likely to be experienced, following operation with too high and too low maximum cylinder
pressure?
(c) How can the maximum cylinder pressure be increased or decreased?
2021/JAN/Q5 **2021/DEC/Q6**
Click Here to See the Answer

Q7. Show with the aid of a sketch how fuel can be continuously circulated through fuel injection valves on large engines while the engine is operating or under, stand-by conditions.
2021/MAR/Q2 **2021/SEP/Q2** **2021/DEC/Q7**
Click Here to See the Answer

Q8. With reference to main boiler super heater arrangements :
(a) Compare the advantages and disadvantages of contra flow with parallel flow design.
(b) ow the element tube bank is supported and yet allow for expansion?
(c) How boiler carryover affects super heater effictiveness?
2021/DEC/Q8
Click Here to See the Answer

Q9. Sketch a Main Engine starting air starting distributor and describe how it operates. List the safety devices and interlocks incorporated in main engine air starting system and state the purpose of each.

2020/OCT/Q6 **2020/NOV/Q6** **2020/DEC/Q2** **2021/APR/Q9** **2021/DEC/Q9**

Click Here to See the Answer