U.S.C.G. Merchant Marine Exam

Third Assistant Engineer

Q532 Motor Plants II

(Sample Examination)
Choose the best answer to the following Multiple Choice Questions.

1. An increase in the air inlet manifold pressure of a diesel engine will result in a/an ________.
   - (A) decrease in maximum cylinder pressure
   - (B) increase in ignition lag
   - (C) decrease in fuel consumption per horsepower-hour
   - (D) decrease in exhaust manifold pressure

   *If choice C is selected set score to 1.*

2. In a naturally aspirated diesel engine, the volume of air intake is directly associated with engine ________.
   - (A) compression ratio
   - (B) displacement
   - (C) fuel pressure
   - (D) cylinder clearance volume

   *If choice B is selected set score to 1.*

3. The vessel to which you are assigned has main engines fitted with intake and exhaust systems as shown in the illustration. Assume that the vacuum between the air filter and the turbocharger blower inlet is 12" of water column (negative with respect to atmospheric pressure) when the engine is running at 50% of maximum, continuous rated load. What will happen to the suction vacuum when the load is increased to 100% of maximum continuous rated load? Illustration MO-0076
   - (A) The depth of vacuum will increase (reading more inches of water column negative with respect to atmospheric pressure).
   - (B) The depth of vacuum will decrease (reading less inches of water column negative with respect to atmospheric pressure).
   - (C) No change in the depth of vacuum will occur (reading the same inches of water column negative with respect to atmospheric pressure).
   - (D) A loss of vacuum will occur (now reading inches of water column positive with respect to atmospheric pressure).

   *If choice A is selected set score to 1.*

4. In a diesel engine exhaust system, the cooling of the exhaust gases below their dew point, will result in ________.
   - (A) increased engine back pressure
   - (B) sulfuric acid corrosion
   - (C) surface pitting of the turbocharger compressor blades
   - (D) moisture impingement on the turbocharger compressor blading

   *If choice B is selected set score to 1.*
5. Which of the listed characteristics is common to both wet and dry type diesel engine exhaust muffler systems?

- (A) Both mufflers contain moving parts.
- (B) Both have a dust collecting chamber.
- (C) They never require any maintenance.
- (D) They function as spark arresters.

*If choice D is selected set score to 1.*

6. Oil accumulating in the exhaust piping or manifold of a diesel engine can be caused by __________.

- (A) collapsed hydraulic valve lifters
- (B) worn valve guides
- (C) excessive crankcase vacuum
- (D) excessive lube oil pressure

*If choice B is selected set score to 1.*

7. The closing of the exhaust valves used on a modern, large, low-speed, main propulsion diesel engine may be directly provided by __________.

- (A) mechanical push rods
- (B) compressed air pressure
- (C) hydraulic pressure
- (D) exhaust gas pressure

*If choice B is selected set score to 1.*

8. Wet-type exhaust silencers, that are used with some lifeboat diesel engines, utilize which design feature?

- (A) The silencer is equipped with a water seal.
- (B) The exhaust gases are preheated in the silencer to reduce noise.
- (C) A cooling water spray and internal baffles break up the exhaust gas flow.
- (D) The exhaust temperature always increases when passing through the silencer.

*If choice C is selected set score to 1.*

9. The outlet from an expansion tank of a closed fresh water cooling system should be piped to the __________.

- (A) jacket water pump suction line
- (B) cylinder jacket inlet main
- (C) cylinder head water outlet header
- (D) heat exchanger inlet connection

*If choice A is selected set score to 1.*
10. In a diesel engine jacket water cooler, with sea water cooling the fresh water, the __________.  
   o (A) sea water temperature must never be warmer than 40°F  
   o (B) jacket water pressure should always be greater than the sea water pressure  
   o (C) jacket water pressure must always be less than the sea water pressure  
   o (D) jacket water temperature must always be less than 60°F  

   If choice B is selected set score to 1.

11. For corrosion to take place within the closed, re-circulating cooling water system of a marine diesel engine, an electro-chemical cell must exist where the cooling water is electrically conductive. Which of the following factors has the greatest influence on electrical conductivity?  
   o (A) The amount of dissolved solids in the water.  
   o (B) The temperature of the water.  
   o (C) The pH of the water.  
   o (D) The amount of dissolved oxygen in the water.  

   If choice A is selected set score to 1.

12. What is the function of the device labeled "3" shown in the illustration? Illustration MO-0111  
   o (A) The device specifically serves to remove the latent heat of vaporization from the jacket water.  
   o (B) The cooler removes sensible heat from the jacket water.  
   o (C) The heat exchanger serves to heat the jacket water during cold water operation.  
   o (D) The jacket water cooler is used to raise the temperature of the sea water flowing through it.  

   If choice B is selected set score to 1.

13. The operation of the lube oil cooler, shown in the illustration as item No.4, will be characterized by which of the following statements? Illustration MO-0111  
   o (A) The temperature of the lube oil entering the cooler will decrease whenever the distiller is on line.  
   o (B) The temperature of the sea water entering the cooler will be higher when operating with the distiller on line.  
   o (C) The pressure of the sea water to the lube oil cooler will increase with the distiller on line.  
   o (D) The pressure of the lube oil to the cooler will increase whenever the distiller is on line.  

   If choice B is selected set score to 1.

14. Which operating parameter may need to be decreased when running a large main propulsion diesel engine at low load conditions?  
   o (A) Control air supply pressure  
   o (B) Cooling water flow through aftercoolers  
   o (C) Lube oil temperature  
   o (D) Fuel injection pressure  

   If choice B is selected set score to 1.
15. Ethylene glycol, when used as a coolant in a closed cooling system for a diesel engine, is more advantageous than untreated raw water because it __________.

- (A) provides better vapor-phase cooling
- (B) provides a constant pH below 7
- (C) has a higher freezing point and a lower boiling point
- (D) has a lower freezing point and higher boiling point

*If choice D is selected set score to 1.*

16. As a general rule, what would be the recommended operating water jacket outlet temperature range for medium-speed marine diesels setup with closed treated fresh water cooling systems and fitted with vented expansion tanks?

- (A) 105° to 120°F
- (B) 135° to 150°F
- (C) 165° to 180°F
- (D) 195° to 215°F

*If choice C is selected set score to 1.*

17. A diesel engine cylinder head can crack as a result of __________.

- (A) heat transfer from exhaust valves
- (B) overheated intake valves
- (C) restricted cooling passages
- (D) a leaking oil control ring

*If choice C is selected set score to 1.*

18. Some diesel engines are fitted with a thermometer in the cooling water outlet from each cylinder. If the cooling water temperature from all cylinders begins to rise above normal, you should suspect __________.

- (A) overloading in all cylinders
- (B) insufficient fuel delivery to all cylinders
- (C) incomplete combustion in all cylinders
- (D) increased blow-by in all cylinders

*If choice A is selected set score to 1.*

19. The process of scavenging a two-stroke cycle diesel engine serves to __________.

- (A) improve fuel flow volume
- (B) cool the exhaust valves
- (C) reduce the intake air charge density
- (D) increase the temperature of exhaust gases

*If choice B is selected set score to 1.*
20. The average exhaust temperature of a two-stroke cycle diesel engine with a turbine-driven supercharger is lower than a similar four-stroke cycle diesel engine at equal loads because _________.

- (A) two-stroke cycle diesel engines have a higher M.E.P. than four-stroke cycle diesel engines
- (B) four-stroke cycle diesel engine exhaust is cooled by scavenging air
- (C) two-stroke cycle diesel engines have a lower M.E.P. than four-stroke cycle diesel engines
- (D) the opening of the two-stroke cycle diesel exhaust ports or valves occurs much later than in four-stroke cycle diesel engines

*If choice C is selected set score to 1.*

21. Regarding the turbocharger shown in the illustration, the part labeled "B" would be attached to the _________. Illustration MO-0228

- (A) exhaust manifold
- (B) aftercooler inlet
- (C) nozzle ring
- (D) silencer outlet

*If choice B is selected set score to 1.*

22. Which of the turbocharging systems listed operates with the least average back pressure in the exhaust manifold?

- (A) Constant volume
- (B) Constant pressure
- (C) Pulse pressure
- (D) Radial flow

*If choice C is selected set score to 1.*

23. Which of the designs listed will keep the lobes from making contact in a Roots-type blower?

- (A) Drive chain
- (B) Blower timing gears
- (C) Air trapped between blower lobes
- (D) Oil filter between blower lobes

*If choice B is selected set score to 1.*

24. Air scavenging of the cylinder shown in the illustration begins between figures _________. Illustration MO-0025

- (A) 2 and 3
- (B) 3 and 4
- (C) 4 and 5
- (D) 5 and 6

*If choice B is selected set score to 1.*
25. When preparing an engine for sea, the engineer notices water coming from both the turbo-charger exhaust casing drain and one cylinder indicator valve. Which of the following could be the possible cause?

- (A) Leak in a turbo-charger inlet air casing.
- (B) Leak in a turbo-charger exhaust gas casing.
- (C) Leak in the cylinder start air valve cage.
- (D) Leak in the cylinder exhaust valve cage.

*If choice B is selected set score to 1.*

26. What effect does nitrogen, as a volumetric component of a diesel engine’s cylinder air charge, have on the ignition and combustion?

- (A) Nitrogen impedes fuel penetration.
- (B) Nitrogen advances fuel ignition.
- (C) Nitrogen retards fuel ignition.
- (D) Nitrogen has no effect on ignition and combustion.

*If choice D is selected set score to 1.*

27. Clutching takes place nearest the bearing shown in the illustration, located at number _____.

Illustration MO-0086

- (A) 1
- (B) 2
- (C) 3
- (D) 4

*If choice A is selected set score to 1.*

28. Reduction gear casings are vented in order to __________.

- (A) allow windage to exist for cooling the gears
- (B) avoid a buildup of pressure within the gear case
- (C) minimize lube oil foaming within the case
- (D) allow for axial clearance between the gears

*If choice B is selected set score to 1.*
29. How is lubrication provided to the device shown in the illustration? Illustration MO-0120

- (A) A separate system containing oil under extremely high-pressure is used due to its ability to provide a high film strength.
- (B) The lubrication system closely resembles the system used with standard line shaft bearings.
- (C) The lube oil enters through the supply pipes shown as #11 and eventually drains to the main engine sump.
- (D) Only silicate ester based synthetic oils have the capability and necessary characteristics to be used in this type of application.

*If choice C is selected set score to 1.*

30. When installing the bearing cap on the device shown in the illustration, which of the precautions listed must be observed? Illustration MO-0121

- (A) If the device is covered with abrasive material or contaminates, the unit may be reassembled, provided an abnormal method of reassembly is followed.
- (B) Prior to installing the cap, position the thrust shoes in their proper locations.
- (C) Once the bearing cap is properly torqued, measure the end gap dimensions to ascertain even tightening of the cap.
- (D) After applying anti-seize to the external threads, torque one side at a time to the appropriate values using a quality torque wrench.

*If choice C is selected set score to 1.*

31. When an additional load is applied to a diesel engine which is using an inadequately inflated air bladder clutch unit, you can expect __________.

- (A) pneumatic seizure
- (B) overheating because of slipping shoes
- (C) chipped reduction gear teeth
- (D) excessive wear on the thrust bearings

*If choice B is selected set score to 1.*

32. The pneumatic propulsion control system used on your vessel uses a diaphragm-operated relay valve as shown in the illustration. Periodically, the valve is to be disassembled for cleaning and inspection. What statement best describes the proper technique? Illustration MO-0052

- (A) Rubber parts such as the diaphragm should be washed with soap and water, and metal parts such as the valve discs and seats should be cleaned with non-flammable solvent.
- (B) Rubber parts such as the diaphragm and metal parts such as the valve discs and seats should all be cleaned with non-flammable solvent.
- (C) Rubber parts such as the diaphragm and metal parts such as the valve discs and seats should all be washed with soap and water.
- (D) Rubber parts such as the diaphragm should be cleaned with non-flammable solvent, and metal parts such as the valve discs and seats should be washed with soap and water.

*If choice A is selected set score to 1.*
33. A propulsion engine, using the speed control circuit shown in the illustration, fails to function at speeds lower than the low end of the critical speed range. Which of the following statements describes what should be done to correct this malfunction? Illustration MO-0114

- (A) Device 17A needs to be replaced, repaired, or reset to the setpoint coinciding with the RPM value for the low end of the critical speed range.
- (B) The critical speed range will be varied as the setpoints of 17A or 17B are reset, therefore, another segment of the speed control circuit must be repaired.
- (C) To increase the critical speed range of the engine, reduce the setpoint of 17A and 17B respectively, to 0.80 bar and 1.0 bar.
- (D) Both 17A and 17B need to be reset to decrease the critical speed range, although this procedure will increase the operating range of the engine.

*If choice A is selected set score to 1.*

34. The direct acting mechanical governor used with some small diesel engines, controls fuel flow to the engine by __________.

- (A) governor flyweight action on a pilot valve which controls fuel injection
- (B) positioning a butterfly valve in the fuel delivery system
- (C) governor flyweight motion acting on fuel controls through suitable linkage
- (D) positioning a servomotor piston attached to the fuel controls

*If choice C is selected set score to 1.*

35. As the load is being decreased on the engine controlled by the governor shown in the illustration, the __________. Illustration MO-0092

- (A) pilot valve plunger will move down
- (B) speeder rod will move down
- (C) right hand end of the floating lever will move up
- (D) oil pressure under the power piston will increase

*If choice C is selected set score to 1.*

36. You are preparing to change the oil of the speed control governor on one of the main propulsion diesel engines on your vessel. What statement is true concerning the draining and flushing procedures?

- (A) The governor oil should be drained while the oil is cold and the governor should be flushed with the heaviest grade of the same type of oil.
- (B) The governor oil should be drained while the oil is hot and the governor should be flushed with the lightest grade of the same type of oil.
- (C) The governor oil should be drained while the oil is hot and the governor should be flushed with the heaviest grade of the same type of oil.
- (D) The governor oil should be drained while the oil is cold and the governor should be flushed with the lightest grade of the same type of oil.

*If choice B is selected set score to 1.*
37. Adjustments to the compensating needle valve in a hydraulic governor should be made with the engine at __________.
   - (A) maximum power at a normal load
   - (B) maximum power and load under normal conditions
   - (C) half-speed and normal temperature
   - (D) normal operating temperature without a load

   *If choice D is selected set score to 1.*

38. In the illustrated auxiliary diesel engine governor, decreasing the distance between piece No.6 and piece No.10 will affect the engine by __________. Illustration MO-0094
   - (A) decreasing the speed
   - (B) increasing the speed droop setting
   - (C) increasing the speed
   - (D) decreasing the overspeed trip setting

   *If choice C is selected set score to 1.*

39. A diesel engine operates erratically, overspeeds, and fails to restart when cranked at normal speed. Which of the following problems is the most likely cause for the engine failing to restart?
   - (A) Improper governor operation due to excess oil pressure
   - (B) Damage to the governor due to excessive speed
   - (C) Failure to reset the overspeed trip
   - (D) Failure to reposition the fuel rack

   *If choice C is selected set score to 1.*

40. A main engine speed control governor for one of your vessel's main propulsion engines hunts, surges, or is sluggish to respond to load changes. Which of the following governor oil conditions would be the greatest single source of governor troubles?
   - (A) Dirty oil (solid contaminants)
   - (B) Wrong grade of oil (viscosity)
   - (C) Foamy oil (air entrainment)
   - (D) Wrong type of oil (composition)

   *If choice A is selected set score to 1.*
41. The governor utilized with the device shown in the illustration has become inoperative while the vessel is underway at sea. Which of the following statements describes what action should be taken? Illustration MO-0119

- (A) It is necessary to disconnect the shuttle valve from the throttle lever horizontal bar, in order to effectively jump out the pneumatic engine enable control circuit.
- (B) The governor should be replaced with one that has been proven to be useful in isochronous applications.
- (C) The engine speed can be controlled using the fuel control lever without changing the position of the maximum fuel stop.
- (D) The linkage to the shutdown servomotor and the governor output shaft must be disconnected in order to operate the engine via the fuel control lever.

*If choice C is selected set score to 1.*

42. Assume that steam has formed in a boiler in which all of the steam stop valves are closed, and the water level is held constant. When there is an increase in the temperature of the steam and water in the boiler, which of the following effects will occur on the pressure and the specific volume of the steam?

- (A) The pressure will increase and the volume will remain constant.
- (B) The pressure will increase and the specific volume will decrease.
- (C) The steam pressure and volume will remain constant.
- (D) The pressure will remain constant and the volume will increase.

*If choice B is selected set score to 1.*

43. When vapor is in contact with and remains at the same temperature as the boiling liquid from which it was generated, the vapor and liquid are said to be in which of the following?

- (A) sensible contact
- (B) saturated condition
- (C) critical state
- (D) latent contact

*If choice B is selected set score to 1.*

44. With reference to the chart, if a boiler generates saturated steam at 385.3 psig, how much heat per pound was required to change the water into steam if the feedwater temperature was initially 220°F? Illustration SG-0004

- (A) 96.85 BTU
- (B) 97.15 BTU
- (C) 1016.40 BTU
- (D) 1196.45 BTU

*If choice C is selected set score to 1.*
45. Downcomers installed on auxiliary package boilers are protected from direct contact with hot gases by __________.

- (A) steel baffles
- (B) several rows of screen tubes
- (C) refractory and insulation
- (D) waterwall tubes

*If choice C is selected set score to 1.*

46. On which of the following auxiliary boiler types would soot blowers be equipped for maintaining heat transfer efficiency?

- (A) Water-tube forced-circulation steam boiler
- (B) Water-tube natural-circulation steam boiler
- (C) Fire-tube steam boiler
- (D) Electric steam boiler

*If choice B is selected set score to 1.*

47. The boiler shown in the illustration would be classed as __________. Illustration MO-0064

- (A) single-pass, fire-tube, scotch marine
- (B) two-pass, scotch marine
- (C) forced circulation, coil-type
- (D) two-pass, water-tube

*If choice A is selected set score to 1.*

48. Which of the following statements concerning fire-tube boilers is correct?

- (A) Flames impinge on the tubes.
- (B) Combustion occurs in the tubes.
- (C) Combustion gases flow through the tubes.
- (D) Water flows through the tubes.

*If choice C is selected set score to 1.*

49. The pressuretrol which is installed on an auxiliary boiler senses steam pressure changes and __________.

- (A) controls the flow of feedwater to the boiler
- (B) monitors the boiler high water level
- (C) automatically regulates the quantity of oil and air flow to the burner
- (D) secures the fires when a fusible plug burns out

*If choice C is selected set score to 1.*
50. Which of the automatic boiler controls listed should be tested prior to lighting off an auxiliary boiler?

- (A) Automatic bottom blow valve
- (B) Voltage output of the ignition transformer
- (C) Low water level cutoff switch
- (D) Insulation resistance readings in the ignition system high tension leads

*If choice C is selected set score to 1.*

51. A variable capacity, pressure atomizing, fuel oil burner functions to __________.

- (A) maintain a constant fuel temperature
- (B) provide a constant fuel return pressure
- (C) provide a wide range of combustion
- (D) maintain smokeless fuel oil atomization

*If choice C is selected set score to 1.*

52. Control of the fuel oil metering valve in an automatically fired auxiliary boiler is accomplished by a __________.

- (A) pressure magnifying device in the steam coil outlet
- (B) metering device in the air supply line
- (C) steam pressure sensing device with linkage to the damper air vanes
- (D) signal from the feedwater electrode

*If choice C is selected set score to 1.*

53. On which of the following auxiliary boiler types would soot blowers most likely be fitted?

- (A) Fire-tube steam boiler
- (B) Water-tube natural-circulation steam boiler
- (C) Electric steam boiler
- (D) Water-tube forced-circulation steam boiler

*If choice B is selected set score to 1.*
54. Which of the following statements describes pertinent criteria for performing a surface blow for the purposes of removing excess chemicals and/or salinity as indicated by boiler water testing on an auxiliary steam boiler?

- (A) The surface blow would be performed when the boiler is steaming AND the level would be maintained normal during the duration of the blow.
- (B) The surface blow would be performed when the boiler is steaming AND the level would be maintained above normal during the duration of the blow.
- (C) The surface blow would be performed when the boiler is secured AND the level would be maintained above normal during the duration of the blow.
- (D) The surface blow would be performed when the boiler is secured AND the level would be maintained normal during the duration of the blow.

*If choice B is selected set score to 1.*

55. The auxiliary oil-fired fire-tube steam boiler fitted on your vessel is equipped with a water level electrode assembly similar to that shown in the illustration. Under normal circumstances, what would be considered a normal operating water level (NOWL)? Illustration MO-0047

- (A) Anywhere from the top of the electrode labeled "C" to the bottom of the electrode labeled "C".
- (B) Anywhere from the bottom (tip) of the electrode labeled "B" to the bottom (tip) of the electrode labeled "C".
- (C) Anywhere from the top of the electrode labeled "B" to the bottom of the electrode labeled "B".
- (D) Anywhere from the bottom (tip) of the electrode labeled "B" to the bottom (tip) of the electrode labeled "E".

*If choice B is selected set score to 1.*

56. What would be the most practical and efficient way of removing hard scale deposits from the water-sides of the tubes of an auxiliary fire-tube boiler?

- (A) Use of a high-pressure water jet.
- (B) Use of an air lance.
- (C) Use of a suitable acid.
- (D) Use of a power driven wire brush.

*If choice C is selected set score to 1.*

57. Which of the following conditions best describes the reason for performing a bottom blow on an auxiliary steam boiler as fitted on your vessel?

- (A) High water.
- (B) Excess chemicals and/or salinity.
- (C) Priming and carryover.
- (D) Sludge removal.

*If choice D is selected set score to 1.*
58. High stack temperature occurring in an auxiliary boiler could be a result of __________.

- (A) insufficient air for combustion
- (B) complete combustion in the furnace
- (C) secondary combustion in the uptake
- (D) high fuel oil temperature

*If choice C is selected set score to 1.*

59. Which of the following conditions could cause the feed pump for an auxiliary boiler to lose suction?

- (A) Increased suction head pressure
- (B) Decreased feedwater temperature
- (C) Pump recirculating line being open too much
- (D) Excessive feedwater temperature

*If choice D is selected set score to 1.*

60. As shown in the illustration, if the vessel was operating at full sea speed, the area labeled "A" would be used to __________. Illustration MO-0231

- (A) collect stack gas
- (B) superheat the steam generated by the oil fired mechanical burner
- (C) collect the saturated steam generated in area "1" by the engines exhaust gases
- (D) preheat the feedwater to the waste heat boiler

*If choice C is selected set score to 1.*

61. While preparing an engine for departure, the engineer notices water coming from both the waste heat boiler and turbocharger drains. Which of the following could be the cause?

- (A) Leak in a waste heat boiler tube.
- (B) Leak from a cylinder exhaust valve cage.
- (C) Leak in a turbocharger exhaust casing.
- (D) Leak from a turbocharger inlet casing.

*If choice A is selected set score to 1.*

62. As shown in the illustration, the function of the component labeled "G" would be to __________. Illustration MO-0231

- (A) condense steam exhaust from the turbo-generator
- (B) provide a reservoir of feedwater for the boiler feed pump
- (C) provide a source of fuel for the fuel oil service system
- (D) provide a source of circulating water into the waste heat boiler

*If choice B is selected set score to 1.*
63. The correct procedure for giving an auxiliary boiler a bottom blow, is to begin __________.

- (A) when the boiler has been cooled to ambient temperature
- (B) only after raising the water level to within 1/2 inch of the high water cutout
- (C) when the boiler has been secured long enough for most solids to settle
- (D) only after bypassing the low-pressure pressuretrol

*If choice C is selected set score to 1.*

64. The water in an auxiliary boiler should be tested for chloride content to determine __________.

- (A) total dissolved solids
- (B) water hardness
- (C) salt contamination
- (D) chlorine contamination

*If choice C is selected set score to 1.*

65. What is the best way of stopping an overspeeding diesel engine?

- (A) Disconnect the battery cables from the starting motor.
- (B) Drain the hydraulic fluid from the governor sump.
- (C) Secure the fuel supply and block the air intake.
- (D) Block the flow of cooling air to the radiator.

*If choice C is selected set score to 1.*

66. When rolling over a main engine on your vessel prior to starting with the cylinder test valves open to expel any fluids accumulated within the cylinders, a rather large amount of water is discharged. What is the appropriate response?

- (A) Start the engine, but run the engine with the cylinder test valves cracked slightly open.
- (B) Start the engine, but monitor all fluid levels very closely, especially that of the jacket water.
- (C) Start the engine, but maintain the jacket water expansion tank level higher than normal.
- (D) Do not allow the engine to be started until the cause of the water discharge has been determined and corrected.

*If choice D is selected set score to 1.*

67. Which of the listed conditions could result in the failure of an auxiliary diesel engine to stop running when a normal shutdown is attempted?

- (A) Supplying high temperature inlet air.
- (B) Maintaining a high exhaust back pressure.
- (C) Lube oil entering in the air intake manifold.
- (D) Carbon buildup on the overspeed pawl.

*If choice C is selected set score to 1.*
68. After a main diesel engine on your vessel has experienced a safety shutdown due to excessive crankcase pressure, why is it important to wait 2 hours before opening the crankcase to investigate the cause of the trip?

- (A) Opening the crankcase before 2 hours has elapsed may result in a crankcase explosion.
- (B) Opening the crankcase before 2 hours has elapsed may result in crankshaft rotation.
- (C) Opening the crankcase before 2 hours has elapsed may result in the engine spontaneously restarting.
- (D) Opening the crankcase before 2 hours has elapsed may result in excessively rapid cooling.

*If choice A is selected set score to 1.*

69. If a diesel engine has been stopped because of piston seizure due to severe overheating, the crankcase __________.

- (A) ventilation system should be continued in operation for one hour for cooling
- (B) inspection covers should not be opened until the engine has cooled
- (C) explosion covers should be opened slightly to provide extra ventilation
- (D) scavenging pump should be immediately secured to prevent loss of lube oil

*If choice B is selected set score to 1.*

70. A main diesel engine on your vessel has experienced a safety shutdown due to excessive crankcase pressure. What is the appropriate response?

- (A) Allow 2 hours for the engine to cool before opening the crankcase, and determine and correct the cause of the trip before attempting to restart the engine.
- (B) Allow the engine to cool off for two minutes, then restart and monitor the crankcase pressure to verify the cause of the shutdown.
- (C) Immediately open the crankcase to make the necessary inspections to determine the cause of the high crankcase pressure safety shutdown.
- (D) Immediately restart the engine, and monitor the crankcase pressure to verify the cause of the shutdown.

*If choice A is selected set score to 1.*
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3/14/2019
MO-0052

FIG. A: APPLIED POSITION

Supply Valve Disc

FIG. B: RELEASED POSITION

Exhaust Valve Disc
Critical Speed Jump Valves Group

Speed Control Input Signal Pressure

67A

Speed Control Output Signal Pressure

67B

High End Speed Set Point Regulator

17B

Low End Speed Set Point Regulator

17A

Critical Speed Jump Control Valve

22A

Input

1

Speed Control Signal From Speed Setting Mechanism

Speed Control Signal To Governor

Output

2

Feedback

3

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MO-0119

Fuel Control
Linkage Arrangement

Fuel Control Linkage To
And From Governor Terminal
Output Shaft

Take-Up
Link

Torsional
Spring

Maximum Fuel
Limiting Screw

Fuel Control
Lever

"8"

"0"

Main Blocking
Valve For
Control Air

From Control
Air Supply
(7 Bar)

Fuel Control
Lever For Emergency
Running Without Governor
(With Multiple Position
Locking Handle)

Fuel Control
Linkage To
Fuel Injection
Pumps

Fuel Control
Linkage From
Shutdown Servomotor

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Operating Instructions for Sulzer Diesel Engines RND-M
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Thrust Bearing

<table>
<thead>
<tr>
<th>Nominal dimension</th>
<th>Normal play</th>
<th>Max. play (worn)</th>
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</table>

**RND 68 Principal Clearances**

*Crankshaft and Thrust Bearing*

All dimensions in mm

7354366 - E

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10/22/2018
### Table 1
**Thermodynamic Properties of Saturated Steam (Temperature)**

<table>
<thead>
<tr>
<th>Temp, °F</th>
<th>Absolute. Pressure, psi</th>
<th>Enthalpy (BTU/lb) of Liquid</th>
<th>Enthalpy (BTU/lb) of Evaporation</th>
<th>Enthalpy (BTU/lb) of vapor</th>
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### Table 2
**Thermodynamic Properties of Saturated Steam (Pressure)**

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<th>Absolute. Pressure, psi</th>
<th>Temp, °F</th>
<th>Enthalpy (BTU/lb) of Liquid</th>
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