

MTech CET - Marine Engineering Sample Paper

1. The main reason counterweights are added to crankshafts is to
 - A) reduce piston side thrust
 - B) reduce crankshaft end thrust
 - C) provide uniform loading and wear of main bearings
 - D) increase the strength of the crank webs

2. An advantage of aluminium pistons compared to cast iron pistons is:
 - A) greater high temperature strength
 - B) better heat conductivity
 - C) greater weight per cubic cm
 - D) increased resistance to wear

3. Which is found with both mechanical and hydraulic governors?
 - A) direct linkage between the ball head and fuel rack
 - B) a servomotor
 - C) a compensating device
 - D) flyweights

4. Theoretical perfect combustion in a diesel engine yields by-products of
 - A) aldehydes and carbon dioxide
 - B) water vapour and carbon monoxide
 - C) nitrogen and carbon monoxide
 - D) water vapour and carbon dioxide

5. Which of the bearings listed are most widely used for the main and connected rod bearings of a diesel engine?
 - A) roller
 - B) sleeve
 - C) precision insert
 - D) needle

6. Friction, engine wear, and oil consumption in a diesel engine are directly related to the
- A) acidity of the oil
 - B) pour point of the oil
 - C) flash point of the oil
 - D) viscosity of the oil
7. An individual injection pump is designed for variable beginning and constant ending of injection. For diesel engines operating at constant speeds, the start of injection will
- A) advance as the load increases
 - B) retard as the load increases
 - C) remain unchanged regardless of load
 - D) always occur at top dead center
8. Fuel oil penetration into the cylinder of a diesel engine is
- A) dependent on air turbulence
 - B) reduced by finer atomization
 - C) increased by finer atomization
 - D) non-existent in the pre-combustion chamber system
9. Which of the following will cause cavitation
- A) Low discharge pressure
 - B) Throttling the suction valve
 - C) Low water level in the wet well
 - D) High discharge pressure
10. The static suction head of a pump is the
- A) A.distance of the suction liquid level above the center line of the pump
 - B) B.distance the suction liquid level is below the center line of the pump
 - C) C.force necessary to overcome frictional losses in the pump and piping.
 - D) D.amount in inches of mercury the total suction head is below atmospheric pressure

11. Which of the following is the material used for manufacturing tube plates of a shell and tube type heat exchanger?
- A) Cupro-nickel
 - B) Aluminum Brass
 - C) Admiralty Brass
 - D) Gunmetal
12. Which of the listed conditions can lead to cavitation in a centrifugal pump?
- A) Vapor pockets formed in the suction flow stream
 - B) Rough casing volute surfaces
 - C) Worn wearing rings
 - D) Heavy fluid in the flow stream
13. If water contamination occurs in the crankcase oil of an auxiliary engine the oil viscosity will:-
- A) Increase.
 - B) Nothing happens
 - C) Stay at the same.
 - D) Decrease.
14. Too high Calculated Carbon Aromaticity Index (CCAI) of fuel oil indicates:
- A) Reduced ignition delay
 - B) Increased ignition delay
 - C) Reduced chances of knocking
 - D) None
15. The seating material for perfectly sealing type Ball valves is usually made up of
- A) Rubber
 - B) PTFE or Nylon
 - C) Rubber reinforced with steel wire
 - D) Stainless steel

16. Kinetic energy is converted into pressure energy in a turbocharger compressor by
- A) Combined diffuser and nozzle ring
 - B) Nozzle ring only
 - C) Combined diffuser and volute casing
 - D) Volute casing only
17. What long term effect will excessively high temperature have on lubricating oil quality?
- A) Cause oxidation which reduce viscosity.
 - B) Evaporates the oil giving high consumption.
 - C) The oil flashpoint will be changed.
 - D) Cause oxidation which increase viscosity.
18. Personnel working with refrigeration systems, and subject to the exposure of refrigerants should wear
- A) face shield
 - B) a respirator
 - C) rubber gloves
 - D) an all-purpose gas mask
19. Electrical fire extinguished by
- A) CO₂
 - B) DCP
 - C) FOAM
 - D) Water
20. Fuel oil tank vents are fitted with a screen which will stop _____.
- A) oil from flowing out of the tank vent
 - B) air from entering the tank vent
 - C) vapors from leaving the tank vent
 - D) flames on deck from entering the tank vent

21. Labyrinth seal fitted on the back surface of a compressor wheel of a turbocharger:
- A) Prevents bearing lube oil contamination
 - B) Prevents bearing lube oil being sucked into the air stream
 - C) Helps to keep the shaft cool by controlled leakage of air
 - D) None of the above
22. What is meant by elasto hydrodynamic lubrication?
- A) Formation of hydrodynamic film under high pressure with minor elastic deformation of mating
 - B) surfaces, distributing load over a greater area
 - C) Addition of extreme pressure additive (EP) to the lubricant
 - D) Addition of Viscosity index improvement additive
23. Inert Gas System on board tankers is used during which of the following operations_____
- A) Inerting of empty tanks
 - B) Inerting during crude oil washing
 - C) Purging before gas freeing
 - D) All of the above
24. Panting is caused by
- A) Change in the height of waves
 - B) Loss of buoyancy of forward part of ship
 - C) Vessel in shallow depth channel
 - D) None of these
25. Double entry impellers have a distinct advantage over single entry impeller. What is it?
- A) They balance out the axial thrust
 - B) It gives a higher pumping efficiency
 - C) It is cheaper and easier to manufacture
 - D) The need of installing line bearing onto the pump shaft is eliminated

26. If the boiler tubes are scaled on the water side then
- A) Heat conduction through the tubes will be very high leading to rapid evaporation
 - B) The boiler furnace can get damaged due to excessive temperatures
 - C) The surface of the tube will be overheated as heat transfer is impaired
 - D) The natural circulation of water within the boiler will be more efficient
27. Fins are installed on the generating tube surfaces in waste heat boilers to
- A) Prevent soot fires in the exhaust system
 - B) Prevent exhaust gas erosion of the tubes
 - C) Increase the velocity of exhaust gas flow
 - D) Increase the rate of heat transfer
28. Fusible plugs are installed in fire-tube boilers to
- A) provide a means of draining the boiler
 - B) warn the engineer of low water level
 - C) cool the crown sheet at high firing rates
 - D) open the burners' electrical firing circuits
29. The purpose of economizer is to:
- A) Decrease the capacity and size of the auxiliary boiler
 - B) Cooling down the exhaust gases in order to reduce NO_x emission
 - C) Allowing SO_x to react at low temperatures with water to form acids thus reducing SO_x emission
 - D) Increasing the overall efficiency of the main propulsion plant
30. The purpose of an air cooler in a supercharging system is to:
- A) Reduce temperature of supercharged air in order to condense and remove maximum possible moisture from the air prior entry to the engine
 - B) Reduce the temperature of the supercharged air in order to increase the density & also to cool down below dew point to remove moisture from air prior entry to the engine
 - C) Cool supercharged air to increase its density such that the dew point is not reached to avoid entry of moisture into the engine
 - D) Cool supercharged air to increase its density and also to keep the peak temperature and exhaust gas temperature within limits

31. What is the meaning of the term "Valve clearance"?
- A) The clearance between the rocker arm and valve pushrod.
 - B) The clearance between valve spindle disc and seat.
 - C) The clearance between the rocker arm and camshaft pushrod.
 - D) The clearance between the rocker arm and valve pushrod in either warm or cold state.
32. The centre of buoyancy of vessel is shifted when
- A) Underwater shape of the hull changes
 - B) Vessel's draft is changed
 - C) Vessel moves from fresh water to sea water
 - D) All of these
33. Why is it essential to renew turbocharger bearings after a preset number of hours of running even if the bearings are in seemingly perfect condition?
- A) Because they are prone to failure due to prolonged exposure to high temperature conditions.
 - B) Because they are subject to cyclic loading and are prone to failure due to metal fatigue.
 - C) It is not essential to renew if condition monitoring suggests perfect condition.
 - D) Lube oil contamination is bound to occur and affect the condition of the bearings.
34. The over speeding of the diesel engine driving an electric generator could cause
- A) low voltage trip to trip
 - B) reverse power trip to trip
 - C) damage to windings
 - D) excessive exhaust temperatures
35. Water carryover from boiler onboard through the steam causes
- A) Erosion of the steam plant machinery
 - B) Low water level inside the boiler
 - C) Build-up of deposits on the steam plant machinery
 - D) None of the above
36. Short cycling of a fridge compressor can occur in which of the following cases?
- A) Air ingress into the system
 - B) B.A leaking solenoid valve
 - C) High cooling water temperature going to the condenser
 - D) Excessive refrigerant charge

37. Why steel components electroplated with chromium are used in corrosive environment
- A) Chrome Plating Prevents Corrosion
 - B) Protection to the steel will be preferentially corroded
 - C) Zinc plating Is Used On Top Of Chrome Plating For Corrosion Protection
 - D) Thickness of chrome plating to increase
38. Steel is an alloy of iron carbon and alloying components what is the carbon content?
- A) Less than 1 %
 - B) Less than 2%
 - C) Greater than 2%
 - D) Any % of carbon
39. Air pipes in tanks are generally located:
- A) A.Near filling pipes
 - B) B.Near pump suctions
 - C) C.At the opposite end of filling pipes and/or the highest point in the tank
 - D) D.At the lowest point in the tank
40. The surface of each blade of propeller when viewed from aft is known as the _____
- A) A.Back
 - B) B.Leading edge
 - C) C.Trailing edge
 - D) D.Face
41. The cyclic angular motion of a ship about the fore and aft axis under the action of waves is known as:
- A) Pitching
 - B) Yawing
 - C) Rolling
 - D) Heaving

42. Curves of immersed cross-sectional area of a ship , plotted against draught for each transverse section, are known as
- A) Cross curves of Stability
 - B) Displacement Curves
 - C) Hydrostatic Curves
 - D) Bonjean Curves
43. Peak tanks are tested by:
- A) Hose test
 - B) By filling them with water up to load water line
 - C) By filling them with water up to the maximum head which can come on them in practice or 2.44 m above tank crown, whichever is higher
 - D) None of the above
44. Plates used to connect stern frames to flat plate keel are called:
- A) Shoe plates
 - B) Coffin plates
 - C) Stealer plates
 - D) Boss plates
45. Thickness of strakes of bottom plating is increased in which of the following regions of the ship?
- A) Pounding region
 - B) Over 40% of ships length amidships
 - C) Over 40% of ships length forward
 - D) Both A and B
46. In a shell expansion plan, plate D5 refers to:
- A) Fourth plate from aft and fifth strake from keel
 - B) Fifth plate from aft and fourth strake from the keel
 - C) Fourth plate from forward and fifth strake from keel
 - D) Fifth plate from forward and fourth strake from keel

47. The mass of a ship without cargo, fuel, stores, water, crew etc that a ship carries is known as:
- A) Deadweight
 - B) Lightweight
 - C) Displacement
 - D) Tonnage
48. The frictional resistance increases when the draft increases because
- A) Dead weight of the vessel increases.
 - B) Length of water plane increases.
 - C) Wetted surface increases.
 - D) Temperature of water reduces as draft increases.
49. As per conditions of assignments, the minimum height of air pipe openings must be _____ on the freeboard deck
- A) 380 mm
 - B) 450 mm
 - C) 600 mm
 - D) 760 mm
50. The primary purpose of fitting a bulbous bow is to:
- A) Improve the appearance of the ship.
 - B) Strengthen the bow
 - C) Improve propulsive efficiency
 - D) Improve resistance to pounding
51. The purpose of providing tumble home is to:
- A) Improve the appearance of the ship
 - B) Help drain off water from deck easily
 - C) Reduce the volume of water coming on deck
 - D) Help drain tanks to bilges
52. GM of ship will change with
- A) Shifting of weight longitudinally
 - B) Shifting of weight transversely
 - C) Shifting of weight vertically
 - D) All of the above

53. In longitudinally framed double bottoms, in frame spaces where there are no solid floors, the brackets on tank sides and center girder should not be more than _____ apart.
- A) 2.5m
 - B) 3.7m
 - C) 3.8m
 - D) 1.25m
54. In longitudinally framed double bottoms, solid plate floors are fitted at _____ frame space in pounding region and at _____ frame space under the main engine.
- A) Alternate, every
 - B) Alternate, alternate
 - C) Every, every
 - D) Every, alternate
55. 'kg' of ship increases with...
- A) adding weight above on present kg
 - B) ballasting db tank
 - C) moving weight in transverse direction
 - D) moving weight in fwd direction
56. In ship beam bracket are triangular plates joining the deck beam to a.
- A) Bulkhead
 - B) Frame
 - C) Stanchion
 - D) Deck longitudinal
57. The bleeder plug or docking plug located on a motor vessel double bottom tank is used to
- A) indicate when the tank is pressed up
 - B) provide a secondary means of tank sounding
 - C) vent air from the tank when bunkering.
 - D) empty the tank when in dry dock

58. Vertical support member used to strengthen bulkheads are called
- A) stiffner
 - B) panels
 - C) brackets
 - D) stanchions
59. Definition of permeability is
- A) Volume of empty space above cargo divided by total volume
 - B) Volume of loaded space divided by total volume
 - C) Volume of empty space within cargo divided by total volume
 - D) Volume of empty space below waterline divided by total volume
60. When reading electrical motor controller diagrams, it helps to know that _____.
- A) current paths in the control circuit are drawn as heavy lines and in the power circuit as lighter lines
 - B) current paths in the power circuit are drawn as heavy lines and in control circuit as lighter lines
 - C) circuits subject to 500 volts or greater are drawn as heavy lines and below 500 volts as lighter lines
 - D) circuits subject to 500 volts or greater are drawn as light lines and below 500 volts as heavy
61. The inductance of a coil is expressed in _____.
- A) ohms
 - B) mhos
 - C) Henrys
 - D) farads
62. Large cable sizes are formed as individual conductors that may be comprised of several smaller strands to _____.
- A) obtain the flexibility required for easy handling
 - B) reduce the overall weight of the wire run
 - C) reduce the number of supports needed for a horizontal overhead run
 - D) all of the above

63. Which of the following is having Di-Electric Constant 80?
- A) Air
 - B) water
 - C) Mica
 - D) Castor oil
64. Brushless generators are designed to operate without the use of
- A) Brushes
 - B) Slip rings
 - C) Commutators
 - D) All the above
65. A fuse that blows often should be replaced only with a fuse of
- A) the recommended current and voltage rating
 - B) higher current and voltage rating
 - C) higher current and lower voltage rating
 - D) lower current and higher voltage rating
66. Refrigerant compressor will run continuously
- A) Too heavy cooling load
 - B) Air in the system
 - C) Insufficient refrigerant
 - D) Any of the above
67. The coating on an electrode used for electric arc welding _____
- A) creates a gas shield to prevent oxidation of the weld material
 - B) helps the weld formation by shaping the metal transfer
 - C) provides an electrical insulation for the user
 - D) All of the above
68. As per definition of MARPOL Annex-I, a product tanker is one which can carry:
- A) Oils and chemicals
 - B) Oils other than crude oils
 - C) Oil product and occasionally crude oils
 - D) Mainly chemical products but at times refined oil products

69. EEDI is the Technical measure adopted by IMO to reduce ____.
- A) Greenhouse gas.
 - B) SO_x
 - C) NO_x
 - D) None of the above
70. If there is a dispute with the bunker supplier with respect to fuel quantity or quality which of the following document is issued
- A) BDN
 - B) MSDS
 - C) Letter of protest
 - D) All of the above
71. If the chemical analysis of a lube oil sample taken from the main propulsion machinery indicates an increased neutralization number the ____.
- A) acidity has increased
 - B) viscosity has decreased
 - C) demulsibility has improved
 - D) foaming is guaranteed to occur
72. Diameter of emergency bilge suction pipe is
- A) Smaller than that of ballast pump
 - B) larger than that of main Sea water pump
 - C) equal to the suction pipe of the pump to which it is connected
 - D) None of the above
73. Turbocharger performance is measured by
- A) It's RPM with respect to the engine load
 - B) The temperature drop across the inlet & outlet of turbine
 - C) The scavenge air pressure developed at the scavenge manifold
 - D) All of the above
74. In still water the ship experiences longitudinal bending moments due to
- A) Non uniform distribution of weight
 - B) Non uniform distribution of buoyancy
 - C) Non uniform distribution of load
 - D) All of these

75. The region where the sheer strake meets the deck plate is known as the
A) bilge
B) gunwale
C) stringer
D) transom
76. Purpose of bilge keel is to render
A) longitudinal strength to the ship
B) active roll stabilisation
C) passive roll stabilisation
D) All of these
77. Why is it important for fuel oil tanks not to be topped off when loading cold oil?
A) Increased viscosity of the product needs higher loading pressure, which increases the chance of a spill
B) Air lock may cause the fuel to bubble out
C) The change in specific volume when heated may cause overflow
D) The fuelling valve may get stuck closed and may spill fuel oil when opened
78. BLEVE is
A) Boiling liquid energising vapour exclusion
B) Boil-off liquid expanding variable efficiency
C) Boiling liquid expansion and vapourising efficiency
D) Boiling liquid expanding vapour explosion
79. Tankers are provided with smaller freeboard
A) Cargo density below sea water
B) Weight of loaded cargo is less than local buoyancy force
C) Water tightness of tanker more rigid
D) All of these
80. The pressure produced within the oil wedge of a rotating journal is_____.
A) the same as the pressure in the lubricating system
B) less than the pressure in the lubricating system
C) greater than the pressure in the lubricating system
D) highest at the oil groove location