

# MECHANICAL ENGINEERING

## Questions Shift-I (Memory Based)

1. Poisson ratio is highest for which material \_\_\_\_\_?
- A. Rubber  
B. Steel  
C. Cork  
D. Wood

Ans. A

Sol. Rubber have highest poisson ratio

2. What will be the COP of heat pump if Power input is 2 kW and heat supplied is 360 KJ/min \_\_\_\_\_.

- A. 4  
B. 3  
C. 2  
D. 1

Ans. A

Sol. COP of heat pump =  $\frac{\text{Heat rejected}}{\text{Work input}}$

$$\text{COP of heat pump} = \frac{(\text{Heat supplied} + \text{Work input})}{\text{work input}}$$

Heat supplied = 360 kJ/min = 6kW

$$\text{COP} = \frac{(6 + 2)}{2} = 4$$

3. What will be the density of fluid if specific gravity is 0.7
- A. 7000  
B. 700  
C. 70D. 7

Ans. B

Sol. Specific gravity =  $\frac{\text{Density of fluid}}{\text{Density of water}}$

$$\text{Density} = 0.7 \times 1000 = 700 \text{ kg/m}^3$$

4. How many drums in Benson boiler no. drums are used in Benson boiler?
- A. three  
B. two  
C. One  
D. Zero

Ans. D

Sol. Benson boiler is a supercritical boiler, Hence no drum is used.

5. Which of the following is a water tube boiler \_\_\_\_\_?

Sol. Water tube boilers are La-Mont, Benson, Stirling, Babcock and Wilcox, Yarrow and Loeffler boilers.

6. Which device is not used in the rankine cycle \_\_\_\_\_?

- A. Compressor  
B. Condenser  
C. Turbine  
D. Pump

Ans. A

Sol. Compressor is not used in the Rankine cycle.

Rankine cycle parts: Condenser, Pump, Boiler, Turbine.

7. In the VCRS cycle, capillary tube is placed in between \_\_\_\_\_?
- A. compressor and condenser
  - B. Evaporator and compressor
  - C. Condenser and evaporator
  - D. sub cooler and condenser

Ans. C

Sol. In the VCRS cycle, the capillary tube is placed in between the condenser and evaporator.

8. Diesel engine efficiency does not directly depend on \_\_\_\_\_?
- A. cutoff ratio
  - B. Compression ratio
  - C. specific heat ratio
  - D. Pressure ratio

Ans. A

Sol. Diesel engine efficiency does not directly depend on cut off ratio.

9. In a car engine, what are the different processes in cycle \_\_\_\_\_?

Sol. Suction, Compression, Expansion, Exhaust

10. In a locomotive boiler, draught is created by \_\_\_\_\_?
- A. Steam jet
  - B. Chimney
  - C. Fan
  - D. Blower

Ans. B

Sol. In a locomotive boiler, a draught is created by a chimney.

11. Which of the following is not the unit of viscosity \_\_\_\_\_?
- A. N-s/m<sup>2</sup>
  - B. Poise
  - C. m<sup>2</sup>/sec
  - D. Pa-S

Ans. C

Sol. m<sup>2</sup>/sec is a unit of kinematic viscosity not dynamic viscosity.

12. What is the function of a carburettor \_\_\_\_\_?
- A. to supply air only
  - B. to maintain Air fuel ratio
  - C. to supply fuel only

Ans. B

Sol. The function of a carburettor is to provide homogeneous mixture of air and fuel by maintaining A/F ratio.

13. Reversed \_\_\_\_\_ is used in gas refrigeration?
- A. Carnot
  - B. Brayton
  - C. Rankine
  - D. Stirling

Ans. B

Sol. Reversed Brayton cycle is used in gas refrigeration systems.

14. Heat addition in the Otto cycle is at \_\_\_\_\_?
- A. At constant pressure
  - B. at constant volume
  - C. at constant temperature
  - D. at constant entropy

Ans. B

Sol. Heat addition in the Otto cycle is at constant volume.

15. Use of flash chambers in the single VCERS \_\_\_\_\_?
- A. increase refrigeration                      B. decrease refrigeration  
C. increase in power consumption              D. Decrease in power consumption

Ans. (\*\*)

Sol. Use of flash chambers in the single VCERS is only used in VCERS to separate the liquid and vapour and send only liquid to the evaporator. But there is no effect on COP by flash chamber.

16. What is the value of jet ratio for a Pelton wheel \_\_\_\_\_?
- A. 1    B. 2  
C. 2 to 5                                      D. More than 6

Ans. D

Sol. What is the value of jet ratio for a Pelton wheel is more than 6.

17. What is the type of flow outside of the impeller \_\_\_\_\_?
- A. free vortex flow                              B. forced vortex flow  
C. irrotational

Ans. B

Sol. Flow outside of the impeller is forced vortex flow.

18. Find the absolute and atmospheric pressure difference at the depth of 2 m in water lake \_\_\_\_\_.
- A. 1.96 kPa                                      B. 19.62 kPa  
C. 0.196 kPa                                      D. 196 kPa

Ans. B

Sol. Absolute and atmospheric pressure is equal to gauge pressure:  
Gauge pressure =  $1000 \times 9.81 \times 2 = 19.62 \text{ kPa}$

19. What is the number of ports in a 2 stroke engine \_\_\_\_\_?
- A. 0    B. 1  
C. 2    D. 4

Ans. B

Sol. Number of ports in a 2 stroke engine is 2 ports.

20. Air refrigeration is most commonly used in \_\_\_\_\_?
- A. Automobiles                                      B. Aircrafts  
C. Domestic refrigerator                      D. Chillers

Ans. B

Sol. Air refrigeration is most commonly used in aircrafts.

21. For Newtonian fluid, what is the relation between shear stress and rate of shear strain \_\_\_\_\_?
- A. Hyperbolic                                      B. Parabolic  
C. Linear    D. Inversely proportional

Ans. B

Sol. For Newtonian fluid, the relation between shear stress and rate of shear strain is linear.

22. Kinematic viscosity is the ratio of \_\_\_\_\_?

- A. dynamic viscosity and density
- B. dynamic viscosity and relative density

Ans. A

Sol. Kinematic viscosity is the ratio of dynamic viscosity and density

23. Babcock wilcox is a water tube boiler because \_\_\_\_\_.

- A. water flows inside the tubes and surrounded by gases
- B. water flows outside the pipes
- C. Water and flue gases flow inside the tubes
- D. water surrounds the flue gases flowing in tube

Ans. A

Sol. Babcock wilcox is a water tube boiler because water flows inside the tubes and is surrounded by gases.

24. Impact load will be \_\_\_\_\_?

- A. dynamic
- B. static
- C. compressive
- D. tensile

Ans: A

Sol. Impact load is Dynamic loading.

25. Chaplets in the casting are used for \_\_\_\_\_.

Sol. Chaplets are used to support cores in casting.

26. Foaming in a boiler occurs due to \_\_\_\_\_?

Sol. Foaming in a boiler occurs due to high concentration of any solids.

27. Where is the fusible plug located in the boiler \_\_\_\_\_?

Sol. The fusible plug is located in the boiler at the crown plate of the furnace.

28. Splash lubrication system can not be used for \_\_\_\_\_?

- A. Piston rings
- B. Tappets
- C. Gears and bearings
- D. connecting rod

Ans. B

Sol. In Tappets pressurized lubrication systems are used.

29. Entropy can be increased by \_\_\_\_\_?

- A. by heat
- B. mass

Ans. A

Sol. Entropy is a low grade energy i.e Heat.

30. In which welding, coated electrode is used \_\_\_\_\_?

- A. Gas Tungsten arc welding
- B. Metal inert gas welding
- C. shielded metal arc welding
- D. Submerged arc welding

Ans. A

Sol. In Gas Tungsten arc welding, coated filler is used.

31. Which of the following is not the unit of pressure \_\_\_\_\_?

- A. N/m<sup>2</sup>
- B. Pa
- C. Stoke
- D. bar

Ans. C

Sol. Unit of Kinematic Viscosity is stokes.

32. Smoke pattern from lighter shows \_\_\_\_\_?

- A. Streamline
- B. Streakline
- C. Pathline
- D. timeline

Ans. B

Sol. Smoke pattern follows Streaklines.

33. Which of the following materials do not show sufficient elongation before fracture \_\_\_\_\_?

Sol. Brittle Materials do not show sufficient elongation before fracture.

34. Properties flow at a point in steady flow is \_\_\_\_\_.

Sol. In steady flow, the properties do not vary with time at a given point in space.

35. Power plants operate on which type of coal \_\_\_\_\_?

- A. Anthracite
- B. Pulverized coal
- C. Lignite
- D. Peat

Ans. B

Sol. Pulverized coal is used in Power plants.

36. Velocity at the throat is \_\_\_\_\_ for maximum discharge condition.

- A. Sonic
- B. Subsonic
- C. Supersonic
- D. Hypersonic

Ans. A

Sol. Velocity at the throat is sonic for maximum discharge condition.

37. Venturi meter is used over orifice meters due to\_\_\_\_\_.

Sol. Losses are less as compared to orifice meter.

38. Which of the following is Direct flow measuring device

- A. rotameter
- B. venturi meter
- C. orifice meter
- D. disc type flowmeter

Ans. A

Sol. Rotameter is a direct flow measuring device.

39. Governing of turbines is done to\_\_\_\_\_.

Sol. Governing of turbines is done to control the speed of the turbines.

40. Which type of Impeller used for handling mud typed fluid \_\_\_\_\_?

- A. Open impeller type
- B. Single shrouded pump
- C. Double shrouded pump
- D. Double suction pump

Ans. A

Sol. Open impeller type is used for handling mud typed fluid.

41. What is the relation between discharge and speed of a turbine \_\_\_\_\_?

- A. directly proportional speed
- B. Inversely proportional to speed
- C. directly proportional to square of speed
- D. directly proportional to cube of speed

Ans. A

Sol. Discharge is directly proportional speed:  $Q \propto D^3N$

42. Laminar flow is which type of flow \_\_\_\_\_?

Sol. It is a type of flow in which fluid flows in the form of layers and there is no intermixing of the fluid layers.

43. Which of the following assumptions made during analysis of IC engine air standard cycles \_\_\_\_\_?

Sol. These are the assumptions of IC engine air standard cycles: -

1. The working fluid is air, which continuously circulates in a closed loop (cycle). Air is considered as ideal gas.

2. All the processes in (ideal) power cycles are internally reversible.

3. Combustion process is modeled by a heat-addition process from an external source.

4. The exhaust process is modeled by a heat-rejection process that restores the working fluid (air) at its initial state

44. Which of the following is not an intensive property \_\_\_\_\_?

A. Pressure

B. Volume

C. Temperature

D. Density

Ans. B

Sol. Volume is an extensive property.

45. Which type of valve is used in reciprocating compressors \_\_\_\_\_?

A. Poppet

B. Plate

C. Disc

D. Diaphragm

Ans. A

Sol. Poppet / Ring valve is used in reciprocating compressors

46. Use of seat belts in cars \_\_\_\_\_?

Sol. Use of seat belts in cars prevents forward motion

47. Steam quality can be increased at turbine outlets by \_\_\_\_\_?

A. Regeneration

B. Reheating

C. Subcooling

D. Intercooling

Ans. B

Sol. Steam quality can be increased by reheating at the exhaust of the turbine.

48. Nozzle is used to convert\_\_\_\_\_.

Sol. Nozzles are used to convert pressure energy into kinetic energy.

49. If the value of dryness fraction is Zero, the state of fluid is\_\_\_\_\_.

A. Saturated vapour

B. Saturated liquid

C. Subcooled liquid

D. Supercooled liquid

Ans. B

Sol. Saturated liquid, the value of dryness fraction is Zero.

50. Thermodynamics is defined as\_\_\_\_\_.

Sol. Thermodynamics is a branch of science that deals with energy interactions in the form of heat and work and its effect on the system and surrounding.

## GENERAL AWARENESS

1. CSIR headquarter is located at \_\_\_\_\_?

Sol. CSIR HQ located at New Delhi

2. What was the target to increase the public investment in the education sector education in NEP 2020 \_\_\_\_\_?

Sol. NEP 2020 has set the target to increase the public investment in the education sector to reach 6 percent of Gross Domestic Product (GDP) at the earliest.

3. Shubash Chandra Bose resigned from INC in which session \_\_\_\_\_?

Sol. Shubhash Chandra Bose resigned from INC in 1939, tripuri session

4. Mahatma Gandhi started the dandi march from which place \_\_\_\_\_?

Sol. Dandi march started from sabarmati ashram on 20th march 1930

5. Who was the captain of the T20 team of the decade \_\_\_\_\_?

Sol. MS dhoni

6. How many members are nominated by the president in rajya sabha \_\_\_\_\_?

Sol. 12 members nominated by president to rajya sabha.

7. Article 300 A related to \_\_\_\_\_.

Sol. Article 300 A states that No person shall be deprived of his property save by authority.

8. Jim Corbett national park is located in which state?

Sol. Jim Corbett national park is located in Nainital district of Uttarakhand.

9. Which state has 100% tap connections \_\_\_\_\_?

Sol. Goa has become first state in country to provide 100% tap water connection in rural area

10. Which state's boundary is shared with Tripura \_\_\_\_\_?

Sol. Tripura state, shares its boundary with assam, mizoram and bangladesh

11. Zika virus name derived from \_\_\_\_\_?

Sol. Zika virus name derived from *Zika forest* of Uganda, where the virus was first isolated in 1947.

12. Red cliff line separates which country from India \_\_\_\_\_?

Sol. Boundary demarcation line between India and pakistan known as Radcliffe line.

13. Neiphiu Rio is chief minister of which state \_\_\_\_\_?

Sol. Neiphiu Rio is chief minister of Nagaland.

14. Which of the following games has been introduced in the 2024 Olympic games \_\_\_\_\_?

Sol. Skateboarding, Sport climbing, Surfing and Breaking have been added as the additional sports proposed for inclusion at paris olympic games 2024

15. Who won the ICC spirit of cricket award for Decade \_\_\_\_\_?

Sol. MS Dhoni, won the ICC cricket of spirit award of the decade

16. Nizam shahi Sultanate ruled from \_\_\_\_\_.

Sol. Nizam shahi sultanate ruled from 1490 to 1633. Founder was Malik Ahmed, who fixed his capital Ahmed nager after himself.

17. Which of the following is noble gas\_\_\_?

Sol. Noble gases are any of the seven chemical element that make up Group 18 of the periodic table Helium, Neon, Argon, Krypton, Xenon, Radon

18. kudankulam nuclear power plant is aided by which country \_\_\_\_\_?

Sol. Russia assisted India in establishing Kudankulam nuclear power plant located in Tamil Nadu.

19. In the human body, oxygenated blood is pumped from \_\_\_\_\_.

Sol. In human body, left ventricle pumps oxygenated blood to aorta which distributes the oxygenated blood in all parts of body

20. **how much money is allocated for the health sector in Union budget 2021 .....**?

Sol. In Union budget 2021, Finance minister proposed 2.23 lakh crore towards health sector.

21. Which of the following added in water to make is disinfectant \_\_\_\_\_?

Sol. Commonly three chemicals used as primary disinfectant are chlorine, Chlorine dioxide and Ozone monochloramine.

22. Two plant species recently discovered by pune scientists, belong to which place \_\_\_\_\_?

Sol. Two plant species from western Ghats recently discovered by pune scientists.

23. Who discovered the anthrax \_\_\_\_\_.

Sol. Scientist Robert Koch studied Bacillus anthracis, the bacterium that causes anthrax.

24. Ansupa lake is located in which state \_\_\_\_\_.

Sol. Ansupa Lake is a horseshoe shaped freshwater lake on the left bank of the Mahanadi river, Odisha.

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