

DMRC ME PAPER-III

1. Which of the following is not considered a method of input control in a CAD system?
- Programmable function box
 - joystick
 - plotter
 - touch terminal

Ans: c

2. If attempts are made to make an instrument very sensitive, it is likely to be impaired is
- Precision
 - Accuracy
 - Readability
 - Rangeability

Ans: a

3. If a body transmits all the radiations all the radiations incident on it, then it is known as a
- Black body
 - White body
 - Grey body
 - Transparent body

Ans: d

4. Thermodynamic cycles are
- Otto cycle
 - Diesel cycle
 - Dual cycle
 - Carnot cycle

The cycles with two constant volume processes are

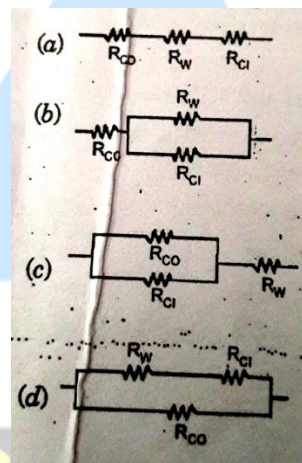
- I and II only
- I and III only
- II and III only
- III and IV only

Ans: b

5. Internal loss in a turbine is
- Nozzle loss
 - Blade friction loss
 - Wheel friction loss
 - All of these
- Solar energy is absorbed by the wall of a building

Ans: d

6. Solar energy is absorbed by the wall of a building as shown in the above figure. Assuming that the ambient temperature inside and outside are equal and considering steady – state, the equivalent circuit will be as shown in (symbols: R_{co} = R convection, outside, R_{ci} = Convection, inside and R_w = R_{wall})



7. Air refrigeration cycle is used in

- Commercial refrigerators
- Domestic refrigerators
- Gas liquefaction
- Air – conditioning

Ans: d

8. The flash chamber in a stage simple vapour compression cycle
- Increase the refrigerating effect
 - Decreases the refrigerating effect
 - Increase the work of compression

d) Has no effect on refrigerating effect

Ans: a

9. Consider the following statements in a vapour compression system, a thermometer placed in the liquid line can indicate whether the

1. Refrigerant flow is too low
2. Water circulation is adequate.
3. Condenser is fouled.
4. Pump is functioning properly of these statements
 - a) 1,2 and 3 are correct
 - b) 1,2 and 4 are correct
 - c) 1,3 and 4 are correct
 - d) 2,3 and 4 are correct

Ans: a

10. Evaporating pressure of a refrigerant as compared

- a) More
- b) less
- c) equal
- d) none of these

Ans: b

11. the desirable combination of properties for a refrigerant include

- a) high specific heat and low specific volume
- b) high heat transfer coefficient and low latent heat
- c) high thermal conductivity and low freezing point
- d) high specific heat and high boiling point,

Ans: d

12. Which of the following method (s) is /are adopted in the design of air duct system?

1. Velocity reduction
2. Equal friction method
3. Static regain method

Select the correct answer using the codes given below:

- a) 1 alone
- b) 1 and 2
- c) 2 and 3
- d) 1,2 and 3

Ans: d

13. To fix the state point in respect of air – vapour mixtures, three intrinsic properties are needed. Yet, the psychrometric chart requires only two because

- a) Water vapour is in the superheated state
- b) The chart is for a given pressure
- c) The chart is an approximation to true values
- d) The mixtures can be treated as a perfect gas

Ans: b

14. During sensible cooling air,

- a) Its wet bulb temperature increases and dew point remains constant
- b) Its wet bulb temperature decreases and the dew point remains constant
- c) Its wet bulb temperature increases and the dew point remains constant
- d) Its wet bulb temperature decreases and the dew point remains constant

Ans: a

15. In compresses, the cylinder clearance should be

- a) Maximum
- b) Minimum
- c) Zero
- d) About 100% of swept volume

Ans: b

16. The effective temperature is a measure of the combined effective of

- a) Dry bulb temperature and relative humidity

- b) Dry bulb temperature and relative air motion
- c) Wet bulb temperature and relative air motion
- d) Dry bulb temperature relative humidity and air motion

Ans: d

17. In air – conditioning design for summer months, the condition inside a factory where heavy work is performed as compared to a factory in which light work is performed should have
- a) Lower dry bulb temperature and lower relative humidity
 - b) Lower dry bulb temperature and higher relative humidity
 - c) Lower dry bulb temperature and same relative humidity
 - d) Same dry bulb temperature and relative humidity

Ans: a

18. For low bypass factor a cooling coil, the fin spacing and the number of tube rows will be respectively
- a) High and high
 - b) High and low
 - c) Low and high
 - d) Low and low

Ans: c

19. The normal stress is the same in all directions at a point in a fluid only when
- a) The fluid is frictional
 - b) The fluid is frictional and incompressible
 - c) The fluid has zero viscosity and is at rest
 - d) One fluid layer has no motion relative to an adjacent layer.

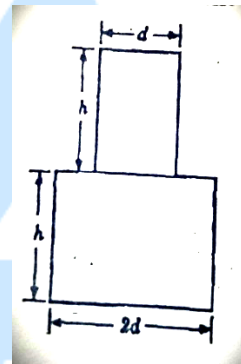
Ans: c

20. A heat engine gives an output of 3kW and input is 10000J/s. the thermal efficiency of the engine will be

- a) 30%
- b) 48.5%
- c) 60%
- d) 70%

Ans: a

21. A stepped cylindrical container is filled with a liquid as shown in the given figure the container with its axis vertical, is first placed with its larger diameter downward and then upward. the ratio of the forces at the bottom in the two cases will be



a) $\frac{1}{2}$

b) 2

c) 4

d)

Ans: d

22. A house – top water tank is made of flat plates and is full to the brim its height is twice that of any side. the ratio of force on the bottom of the tank to that on any side will be

- a) 2
- b) 1
- c) 1/2

Ans: d

23. A right – circular cylinder, open at the top is filled with liquid of relative density 1.2 it is rotated about its vertical axis at such a speed that half the liquid spills out. The pressure at the centre of the bottom will be
- Zero
 - One- fourth of the value when the cylinder was full
 - Half of the value when the- cylinder was full
 - Not determinable from the given data.

Ans: a

24. Consider the following assumptions
- The fluid is compressible.
 - The fluid is inviscid.
 - The fluid is incompressible and homogeneous.
 - The fluid is in viscid and compressible.

The Euler's equation of motion requires as assumptions indicated in

- 1 and 2
- 2 and 3
- 1 and 4
- 3 and 4

Ans: b

25. In sub cooling the refrigerant
- Increases C,O,P of the cycle
 - Decreases C,O,P of the cycle
 - Decreases refrigerating effect
 - None of these

Ans: a

26. Surface tension is due to
- Viscous forces
 - Cohesion
 - Adhesion
 - The difference between adhesive and cohesive forces

Ans: b

27. Newton's law of viscosity depends upon the

- Stress and strain in a fluid
- Shear strain pressure and velocity
- Shear stress and rate of strain
- Viscosity and stress

Ans: c

28. I rotational flow occurs when
- Flow takes place in a duct of uniform cross section at constant mass flow rate
 - Streamlines are curved
 - There is no net rotation of the fluid element about its mass centre
 - Fluid element does not undergo any change in size or shape.

Ans: c

29. In a fully turbulent flow through a rough a pipe, the friction factor P is (Re is the Reynolds number and ξ_{2s}/D is relative roughness)
- A function of Re
 - A function of Re and x_s/D
 - A function of x_s/D
 - Independent of Re and x_s/D

Ans: a

30. In turbulent flow
- Fluid particles move in an orderly manner
 - Momentum transfer is on molecular scale only
 - Shear stresses are generally larger than in similar laminar flow
 - Cohesion is more effective than momentum transfer in causing shear stress

Ans: c

31. Which one of the following statements is true of flow around a submerged body?
- For subsonic non – viscous flow, the drag is zero

- b) For subsonic equally on mach number and Reynolds number
- c) The lift and drag coefficient of an aerofoil is independent of Reynolds number
- d) For incompressible flow around an aerofoil, the profile drag is the sum of form drag and skin friction drag.

Ans: d

32. If 'n' variables in a physical phenomenon contained 'm' fundamental dimensions, then the variables can be arranged into
- a) N dimensionless terms
 - b) M dimensionless terms
 - c) (n-m) dimensionless terms
 - d) (n +m) dimensionless terms

Ans: c

33. Given power 'P' of a pump, then head 'H' and the discharge 'Q' and the specific weight 'w' of the liquid dimensional analysis would lead to the result that 'P' is proportional to
- a) $H^{1/2} Q^2 w$
 - b) $H^{1/2} Qw$
 - c) $HQ^{1/2} w$
 - d) $H Qw$

Ans: d

34. A 1:20 model of a spillway dissipates 0.25 ho. The corresponding prototype horsepower dissipated will be
- a) 0.25
 - b) 5.00
 - c) 447.20
 - d) 8944.30

Ans: d

35. If the stream function is given by $\Psi = 3xy$, then the velocity at a point (2,3) will be
- a) 7.21 unit
 - b) 10.83 unit

- c) 18 unit
- d) 54 unit

Ans: b

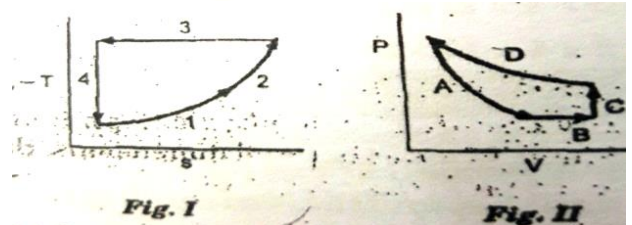
36. The stagnation temperature of an isentropic flow of air ($k=1.4$ is 400^0 K, if the temperature is 200^0 K at a section, then the Mach number of the flow will be
- a) 1.046
 - b) 1.264
 - c) 2.236
 - d) 3.211

Ans: c

37. In isentropic flow between two points, the stagnation
- a) Pressure and stagnation temperature may vary
 - b) Pressure would decrease in the decrease in the direction of the flow
 - c) Pressure and stagnation temperature would decrease with an increase in velocity
 - d) Pressure and stagnation temperature and stagnation density would remain constant throughout the flow.

Ans: d

38. Four processes of thermodynamic cycle are shown above in fig I on the T-s plane in the sequencers 1-2-3-4 the corresponding correct sequence of these processes in p-V plane as shown above in Fig. II will be

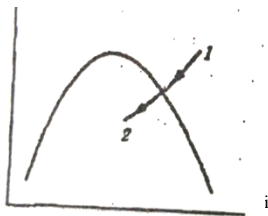


- a) (C-D-A-B)

- b) D-A-B-C
- c) A-B-C-D
- d) B-C-D-A

Ans: d

39. The given diagram shown as isometric cooling process 1-2 of a pure substance. The ordinate and abscissa are respectively



- a) Pressure and volume
- b) Enthalpy and entropy
- c) Temperature and entropy
- d) Pressure and entropy

Ans: c

40. According to kinetic theory of gases, the kinetic energy of molecules is proportional to
- a) T
 - b) \sqrt{T}
 - c) $\frac{1}{T}$
 - d) $\frac{1}{\sqrt{T}}$

Where T is absolute temperature

Ans: a

41. Neglecting changes in kinetic energy and potential energy, for unit mass the availability in a non-flow process becomes $a = \phi - \phi_0$, where ϕ is the availability function of the
- a) Open system
 - b) Closed system

- c) Isolated system
- d) Steady flow process

Ans: a

42. Consider the following statements. In an irreversible process

1. Entropy always increases
2. The sum of the entropy of the bodies taking part in a process always increase
3. One created entropy cannot be destroyed

Of these statements

- a) 1 and 2 are correct
- b) 1 and 3 are correct
- c) 2 and 3 are correct
- d) 1, 2 and 3 are correct

Ans: c

43. Consider the following statements. regarding Otto cycle

1. It is not a reversible cycle.
2. Its efficiency can be improved by using a working fluid of higher value of ratio of specific heats.
3. The practical way of increasing its efficiency is to increase the compression ratio.
4. Carbureted gasoline engines working Otto cycle can work with compression ratios more than 12.

Of these statements

- a) 1, 3 and 4 are correct
- b) 1, 2 and 3 are correct
- c) 1, 2 and 4 are correct
- d) 2, 3 and 4 are correct

Ans: d

44. Consider the following statements the difference between higher and lower heating values of the fuels is due to

1. Heat carried by steam from the moisture content of fuel.
2. Sensible heat carried away by the fuel gases.
3. Heat carried away by steam from the combustion of hydrogen in the fuel.
4. Heat lost by radiation.

Of these statements

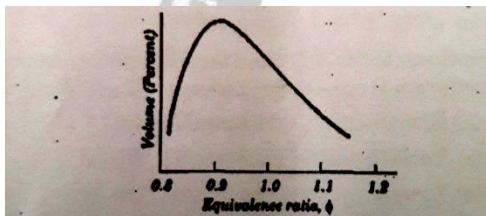
- a) 2,3 and 4 are carried
- b) 1 and 2 are carried
- c) 3 alone is carried
- d) 1,2,3 and 4 are carried

Ans: c

45. In centrifugal casting method, impurities are
- a) Forced outside the surface
 - b) Collected at the centre of the casing
 - c) Uniformly distributed
 - d) None of these

Ans: b

46. The graph shown in the given figure represents the emission of a pollutant from an SI engine for different fuel/air ratios. The pollutant in question is



- a) CO
- b) CO₂
- c) Hydrocarbons
- d) NOx

Ans: d

47. Which of the following are the assumptions involved in the auto-ignition theory put forth for the onset of knock in SI engines?

1. Flame velocity is normal before the onset of auto ignition.
2. A number of end-gas elements autognite simultaneously.
3. Pre-flame reactions are responsible for preparing the end-gas to ignite.

Select the correct answer using the codes given below:

- a) 1 and 2
- b) 1 and 3
- c) 2 and 3
- d) 1,2 and 3

Ans: d

48. In some carburetors meter rod and economizer device is used for

- a) Cold starting
- b) Idling
- c) Power enrichment
- d) Acceleration

Ans: c

49. Which of the following pairs of engine and performance /characteristic is/are correctly matched?

- 1) Turbojet /Efficiency increases with flight speed
- 2) SI Engine-Lowest specific fuel consumption
- 3) Turboprop-suitable for low flight speeds

Select the correct answer using the codes given below:

Codes:

- a) 1 and 2
- b) 2 and 3
- c) 1 and 3
- d) 2 alone

Ans: c

50. Heat treatment process used for casting is

- a) Normalizing
- b) Annealing
- c) Tempering
- d) Hardening

Ans: a

