NEET : CHAPTER WISE TEST-13

SUBJECT :- PHYSICS **DATE.....**
CLASS :- 11th **NAME.....**
CHAPTER :- THERMAL PROPERTIES OF MATTER **SECTION.....**

(SECTION-A)

1. The absolute zero is the temperature at which
(A) Water freezes
(B) All substances exist in solid state
(C) Molecular motion ceases
(D) None of the above

2. The temperature on Celsius scale is 25°C. What is the corresponding temperature on the Fahrenheit scale
(A) 40°F (B) 77°F
(C) 50°F (D) 45°F

3. Two thermometers are used to record the temperature of a room. If the bulb of one is wrapped in wet hanky
(A) The temperature recorded by both will be same
(B) The temperature recorded by wet-bulb thermometer will be greater than that recorded by the other
(C) The temperature recorded by dry-bulb thermometer will be greater than that recorded by the other
(D) None of the above

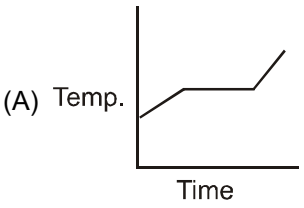
4. A centigrade and a Fahrenheit thermometer are dipped in boiling water. The water temperature is lowered until the Fahrenheit thermometer registers 140°. What is the fall in temperature as registered by the Centigrade thermometer
(A) 30° (B) 40°
(C) 60° (D) 80°

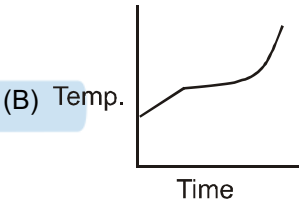
5. A constant volume gas thermometer shows pressure reading of 50cm and 90cm of mercury at 0°C and 100°C respectively. When the pressure reading is 60 cm of mercury, the temperature is
(A) 25°C (B) 40°C
(C) 15°C (D) 12.5°C

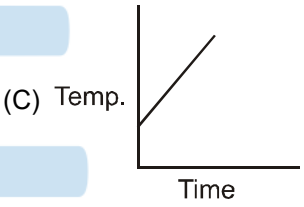
6. The heat is flowing through two cylindrical rods of same material. The diameters of the rods are in the ratio 1 : 2 and their lengths are in the ratio 2 : 1. If the temperature difference between their ends is the same, the ratio of rate of flow of heat through them will be
(A) 1 : 1 (B) 2 : 1
(C) 1 : 4 (D) 1 : 8

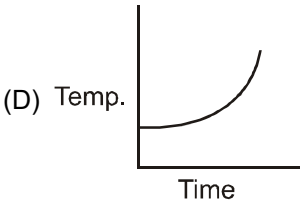
7. If temperature of an object is 140°F, then its temperature in centigrade is
(A) 105°C (B) 32°C
(C) 140°C (D) 60°C

8. Liquid oxygen at 50K is heated to 300 K at constant pressure of 1 atm. The rate of heating is constant. Which one of the following graphs represents the variation of temperature with time ?

(A) 

(B) 

(C) 

(D) 

9. If a cylinder of diameter 1.0 cm at 30°C is to be solid into a hole of diameter 0.9997 cm in a steel plate at the same temperature, then minimum required rise in the temperature of the plate is : (Coefficient of linear expansion of steel $= 12 \times 10^{-6} / ^\circ C$)
(A) 25°C (B) 35°C
(C) 45°C (D) 55°C

10. When vapour condenses into liquid
(A) It absorbs heat
(B) It liberates heat
(C) Its temperature increases
(D) Its temperature decreases

11. The latent heat of vaporization of a substance is always
(A) Greater than its latent heat of fusion
(B) Greater than its latent heat of sublimation
(C) Equal to its latent heat of sublimation
(D) Less than its latent heat of fusion

12. If mass energy equivalence is taken into account, when water is cooled to form ice, the mass of water should
(A) Increase
(B) Remain unchanged
(C) Decrease
(D) First increase then decrease

13. The value of coefficient of volume expansion of glycerin is $5 \times 10^{-4}\ K^{-1}$. The fractional chage in the density of glycerin for a rise of 40°C in its temperature, is:
(A) 0.020 (B) 0.025
(C) 0.010 (D) 0.015

14. A sample of 0.1 g of water at 100ºC and normal pressure ($1.013 \times 10^5\ Nm^{-2}$) requires 54 cal of heat energy to convert to stream at 100ºC. If the volume of the steam produced is 167.1 cc, the change in internal energy of the sample, is :
(A) 104.3 J (B) 84.5 J
(C) 42.2 J (D) 208.7 J

15. When we rub our palms they gets heated but to a maximum temperature because
(A) Heat is absorbed by our palm
(B) Heat is lost in the environment
(C) Produced of heat is stopped
(D) None of the above

16. A bullet moving with a uniform velocity v, stops suddenly after hitting the target and the whole mass melts be m, specific heat S, initial temperature 25°C, melting point 475°C and the latent heat L. Then v is given by

(A) $mL = mS\,(475 - 25) + \frac{1}{2} \cdot \frac{mv^2}{J}$

(B) $mS(475 - 25) + mL = \frac{mv^2}{2J}$

(C) $mS\,(475 - 25) + mL = \frac{mv^2}{J}$

(D) $mS\,(475 - 25) - mL = \frac{mv^2}{2J}$

17. A metal rod of Young's modulus Y and coefficient of thermal expansion α is held at its two ends such that its length remains invariant. If its temperature is raised by tºC, the linear stress developed in its is :

(A) $\frac{Y}{\alpha t}$ (B) $Y\alpha t$

(C) $\frac{1}{(Y\alpha t)}$ (D) $\frac{\alpha t}{Y}$

18. Hailstone at 0°C falls from a height of 1 km on an insulating surface converting whole of its kinetic energy into heat. What part of it will melt $(g = 10\ m/s^2)$

(A) $\frac{1}{33}$

(B) $\frac{1}{8}$

(C) $\frac{1}{33} \times 10^{-4}$

(D) All of it will melt

19. The temperature at which the vapour pressure of a liquid becomes equals to the external (atmospheric) pressure is its
(A) Melting point
(B) Sublimation point
(C) Critical temperature
(D) Boiling point

20. When the pressure on water is increased the boiling temperature of water as compared to 100°C will be
(A) Lower
(B) The same
(C) Higher
(D) On the critical temperature

21. A liquid boils when its vapour pressure equals
(A) The atmospheric pressure
(B) Pressure of 76.0 cm column of mercury
(C) The critical pressure
(D) The dew point of the surroundings

22. The freezing point of the liquid decreases when pressure is increased, if the liquid
(A) Expands while freezing
(B) Contracts while freezing
(C) Does not change in volume while freezing
(D) None of these

23. A hammer of mass 1kg having speed of 50 m/s, hit a iron nail of mass 200 gm. If specific heat of iron is 0.105 cal/gm°C and half the energy is converted into heat, the raise in temperature of nail is
(A) 7.1°C (B) 9.2°C
(C) 10.5°C (D) 12.1°C

24. Which of the following has maximum specific heat
(A) Water (B) Alcohol
(C) Glycerine (D) Oil

25. Solids expand on heating because
(A) Kinetic energy of the atoms increases
(B) Potential energy of the atoms increases
(C) Total energy of the atoms increases
(D) The potential energy curve is asymmetric about the equilibrium distance between neighbouring atoms

26. A metal ball immersed in alcohol weighs W_1 at 0°C and W_2 at 59°C. The coefficient of cubical expansion of the metal is less than that of alcohol. Assuming that the density of metal is large compared to that of alcohol, it can be shown that
(A) $W_1 > W_2$ (B) $W_1 = W_2$
(C) $W_1 < W_2$ (D) $W_2 = (W_1 / 2)$

27. The coefficient of volumetric expansion of mercury is 18 × 10^{-5}/ºC. A thermometer bulb has a volume 10^{-6} m^3 and cross section of stem is 0.004 cm^2. Assuming that bulb is filled with mercury at 0ºC then the length of the mercury column at 100°C is
(A) 18.8 mm (B) 9.2 mm
(C) 7.4 cm (D) 4.5 cm

28. It is known that wax contracts on solidification. If molten wax is taken in a large vessel and it is allowed to cool slowly, then
(A) It will start solidifying from the top downward
(B) It will start solidifying from the bottom upward
(C) It will start solidifying from the middle, upward and downward at equal rates
(D) The whole mass will solidify simultaneously

29. **Assertion :** Specific heat capacity is the cause of formation of land and sea breeze.
Reason : The specific heat of water is more than land.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If the assertion and reason both are false.

30. For cooking the food, which of the following type of utensil is most suitable
(A) High specific heat and low conductivity
(B) High specific heat and high conductivity
(C) Low specific heat and low conductivity
(D) Low specific heat and high conductivity

31. The coefficient of thermal conductivity depends upon
(A) Temperature difference of two surfaces
(B) Area of the plate
(C) Thickness of the plate
(D) Material of the plate

32. When two ends of a rod wrapped with cotton are maintained at different temperatures and after some time every point of the rod attains a constant temperature, then
(A) Conduction of heat at different points of the rod stops because the temperature is not increasing
(B) Rod is bad conductor of heat
(C) Heat is being radiated from each point of the rod
(D) Each point of the rod is giving heat to its neighbour at the same rate at which it is receiving heat

33. Two rods A and B are of equal lengths. Their ends are kept between the same temperature and their area of cross-sections are A_1 and A_2 and thermal conductivities K_1 and K_2. The rate of heat transmission in the two rods will be equal, if
(A) $K_1A_2 = K_2A_1$ (B) $K_1A_1 = K_2A_2$
(C) $K_1 = K_2$ (D) $K_1A_1^2 = K_2A_2^2$

34. If the ratio of coefficient of thermal conductivity of silver and copper is 10 : 9, then the ratio of the lengths upto which wax will melt in Ingen Hausz experiment will be
(A) 6 : 10 (B) $\sqrt{10}$: 3
(C) 100 : 81 (D) 81 : 100

35. A heat flux of 4000 J/s is to be passed through a copper rod of length 10 cm and area of cross-section 100 sq. cm. The thermal conductivity of copper is 400 W/mC. The two ends of this rod must be kept at a temperature difference of–

(A) 1ºC (B) 10ºC

(C) 100ºC (D) 1000ºC

(SECTION-B)

36. A piece of glass is heated to a high temperature and then allowed to cool. If it cracks, a probable reason for this is the following property of glass

(A) Low thermal conductivity

(B) High thermal conductivity

(C) High specific heat

(D) High melting point

37. Two walls of thicknesses d_1 and d_2 and thermal conductivities k_1 and k_2 are in contact. In the steady state, if the temperatures at the outer surfaces are T_1 and T_2, the temperature at the common wall is

(A) $\frac{k_1T_1d_2 + k_2T_2d_1}{k_1d_2 + k_2d_1}$

(B) $\frac{k_1T_1 + k_2d_2}{d_1 + d_2}$

(C) $\left(\frac{k_1d_1 + k_2d_2}{T_1 + T_2}\right)T_1T_2$

(D) $\frac{k_1d_1T_1 + k_2d_2T_2}{k_1d_1 + k_2d_2}$

38. If two metallic plates of equal thicknesses and thermal conductivities K_1 and K_2 are put together face to face and a common plate is constructed, then the equivalent thermal conductivity of this plate will be

(A) $\frac{K_1K_2}{K_1 + K_2}$ (B) $\frac{2K_1K_2}{K_1 + K_2}$

(C) $\frac{(K_1^2 + K_2^2)^{3/2}}{K_1K_2}$ (D) $\frac{(K_1^2 + K_2^2)^{3/2}}{2K_1K_2}$

39. The quantity of heat which crosses unit area of a metal plate during conduction depends upon

(A) The density of the metal

(B) The temperature gradient perpendicular to the area

(C) The temperature to which the metal is heated

(D) The area of the metal plate

40. Match the column I with column II

Column I

(a) Temperature

(b) Heat

(c) Melting

(d) Expansion of substance

Column II

(p) Internal energy

(q) Kinetic energy

(r) No change in temperature

(s) Measurement of temperature

(A) a→q, b→p, c→s, d→r

(B) a→q, b→r, c→p, d→s

(C) a→p, b→r, c→q, d→s

(D) a→q, b→p, c→r, d→s

41. In order that the heat flows from one part of a solid to another part, what is required

(A) Uniform density

(B) Density gradient

(C) Temperature gradient

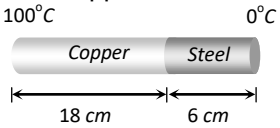
(D) Uniform temperature

42. Temperature of water at the surface of lake is -20^oC. Then temperature of water just below the lower surface of ice layer is

(A) -4^oC (B) 0^oC

(C) 4^oC (D) -20^oC

43. The coefficient of thermal conductivity of copper is nine times that of steel. In the composite cylindrical bar shown in the figure. What will be the temperature at the junction of copper and steel



(A) 75^oC (B) 67^oC

(C) 33^oC (D) 25^oC

44. Consider a compound slab consisting of two different materials having equal thickness and thermal conductivities K and 2K respectively. The equivalent thermal conductivity of the slab is

(A) $\sqrt{2K}$ (B) $3K$

(C) $\frac{4}{3}K$ (D) $\frac{2}{3}K$

45. Woollen clothes are used in winter season because woolen clothes

(A) Are good sources for producing heat

(B) Absorb heat from surroundings

(C) Are bad conductors of heat

(D) Provide heat to body continuously

46. A cylindrical rod having temperature T_1 and T_2 at its ends. The rate of flow of heat is Q_1 cal/sec. If all the linear dimensions are doubled keeping temperature constant then rate of flow of heat Q_2 will be

(A) $4Q_1$ (B) $2Q_1$

(C) $\frac{Q_1}{4}$ (D) $\frac{Q_1}{2}$

47. A body of length 1m having cross sectional area $0.75m^2$ has heat flow through it at the rate of 6000 Joule/sec. Then find the temperature difference if $K = 200\ Jm^{-1}K^{-1}$

(A) 20°C (B) 40°C

(C) 80°C (D) 100°C

48. It is hotter for the same distance over the top of a fire than it is in the side of it, mainly because

(A) Air conducts heat upwards

(B) Heat is radiated upwards

(C) Convection takes more heat upwards

(D) Convection, conduction and radiation all contribute significantly transferring heat upwards

49. In heat transfer, which method is based on gravitation

(A) Natural convection

(B) Conduction

(C) Radiation

(D) Stirring of liquids

50. **Assertion :** Woolen clothes keep the body warm in winter.

Reason : Air is a bad conductor of heat.

(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.

(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(C) If assertion is true but reason is false.

(D) If the assertion and reason both are false.