


CLASS : XITH
DATE :

SUBJECT : PHYSICS
DPP NO. 5

Topic :- THERMAL PROPERTIES OF MATTER

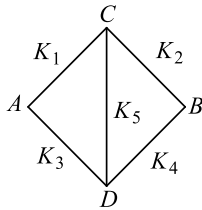
- A black body at a high temperature T radiates energy at the rate of U (in Wm^{-2}). When the temperature falls to half (*ie*, $\frac{T}{2}$), the radiated energy (in Wm^{-2}) will be
 - $\frac{U}{8}$
 - $\frac{U}{16}$
 - $\frac{U}{4}$
 - $\frac{U}{2}$
- If two metallic plates of equal thicknesses and 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
 - $\frac{K_1 K_2}{K_1 + K_2}$
 - $\frac{2K_1 K_2}{K_1 + K_2}$
 - $\frac{(K_1^2 + K_2^2)^{3/2}}{K_1 K_2}$
 - $\frac{(K_1^2 + K_2^2)^{3/2}}{2K_1 K_2}$
- If the temperature of the sun were to increase from T to $2T$ and its radius from R to $2R$, when the ratio of radiant energy received on earth to what it was previously, will be
 - 4
 - 16
 - 32
 - 64
- The gas thermometers are more sensitive than liquid thermometers because
 - Gases expand more than liquids
 - Gases are easily obtained
 - Gases are much lighter
 - Gases do not easily change their states
- 1 g of a steam at 100°C melts how much ice at 0°C ? (Latent heat of ice = 80 cal/gm and latent heat of steam = 540 cal/gm)
 - 1 gm
 - 2 gm
 - 4 gm
 - 8 gm
- A body radiates energy $5W$ at a temperature of 127°C . If the temperature is increased to 927°C , then it radiates energy at the rate of
 - 410W
 - 81W
 - 405W
 - 200W
- According to 'Newton's Law of cooling', the rate of cooling of a body is proportional to the
 - Temperature of the body
 - Temperature of the surrounding
 - Fourth power of the temperature of the body
 - Difference of the temperature of the body and the surroundings

8. 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
9. The quantities of heat required to raise the temperatures of two copper spheres of radii r_1 and r_2 ($r_1 = 1.5r_2$) through 1 K are in the ratio of
 a) 1 b) $\frac{3}{2}$ c) $\frac{9}{4}$ d) $\frac{27}{8}$
10. 'Stem Correction' in platinum resistance thermometers are eliminated by the use of
 a) Cells b) Electrodes c) Compensating leads d) None of the above
11. 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) $\frac{k_1 T_1 d_2 + k_2 T_2 d_1}{k_1 d_2 + k_2 d_1}$ b) $\frac{k_1 T_1 + k_2 d_2}{d_1 + d_2}$ c) $\left(\frac{k_1 d_1 + k_2 d_2}{T_1 + T_2}\right) T_1 T_2$ d) $\frac{k_1 d_1 T_1 + k_2 d_2 T_2}{k_1 d_1 + k_2 d_2}$
12. The coefficient of thermal conductivity of a rod depends on
 a) Area b) Length
 c) Material of rod d) Temperature difference
13. 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
14. A 5cm thick ice block is there on the surface of water in a lake. The temperature of air is -10°C ; how much time it will take to double the thickness of the block
 ($L = 80 \text{ cal/g}$, $K_{ice} = 0.004 \text{ erg/s-k}$, $d_{ice} = 0.92 \text{ g cm}^{-3}$)
 a) 1 hour b) 191 hours c) 19.1 hours d) 1.91 hours
15. 80 gm of water at 30°C are poured on a large block of ice at 0°C . The mass of ice that melts is
 a) 30 gm b) 80 gm c) 1600 gm d) 150 gm

16. 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
- It will start solidifying from the top to downward
 - It will start solidifying from the bottom to upward
 - It will start solidifying from the middle, upward and downward at equal rates
 - The whole mass will solidify simultaneously

17. A black body is heated from 27°C to 927°C . The ratio of radiation emitted will be
- 1:4
 - 1:8
 - 1:16
 - 1:256

18. Five rods of same dimensions are arranged as shown in figure. They have thermal conductivities K_1, K_2, K_3, K_4 and K_5 . When points A and B are maintained at different temperature, no heat would flow through central rod, if



- $K_1 K_4 = K_2 K_3$
 - $\frac{K_1}{K_4} = \frac{K_2}{K_3}$
 - $K_1 = K_4$ and $K_2 = K_3$
 - $K_1 K_2 = K_3 K_4$
19. The thermal conductivity of a rod is 2. What is its thermal resistivity?
- 0.5
 - 1
 - 0.25
 - 2
20. When two ends of a rod wrapped with cotton are maintained at different temperatures and after same time every point of the rod attains a constant temperature, then
- Conduction of heat at different points of the rod stops because the temperature is not increasing
 - Rod is bad conductor of heat
 - Heat is being radiated from each point of the rod
 - Each point of the rod is giving heat to its neighbour at the same rate at which it is receiving heat