Resonance®
Educating for better tomorrow

TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

PHYSICS
DPP
DAILY PRACTICE PROBLEMS
DPP NO. 1

PHYSICS: HEAT TRANSFER

DPP No. : 1

1. 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–

(1) 1ºC (2) 10ºC (3) 100ºC (4) 1000ºC

2. Which of following qualities suit for a cooking utensil?

(1) High specific heat and low thermal conductivity

(2) High specific heat and high thermal conductivity

(3) Low specific heat and low thermal conductivity

(4) Low specific heat and high thermal conductivity

3. The lengths and radii of two rods made of same material are in the ratios 1 : 2 and 2 : 3 respectively; If the temperature difference between the ends for the two rods be the same, then in the steady state, the amount of heat flowing per second through them will be in the ratio:

(1) 1 : 3 (2) 4 : 3 (3) 8 : 9 (4) 3 : 2

4. One end of a metal rod of length 1.0m and area of cross-section 100 cm^2 is maintained at 100ºC. If the other end of the rod is maintained at 0ºC, the quantity of heat transmitted through the rod per minute will be (coefficient of thermal conductivity of materal of rod = 100W/mK)

(1) 3×10^3 J (2) 6×10^3 J (3) 9×10^3 J (4) 12×10^3 J

5. The coefficients of thermal conductivity of a metal depends on

(1) temperature difference between the two sides

(2) thickness of the metal plate

(3) area of the plate

(4) none of the above

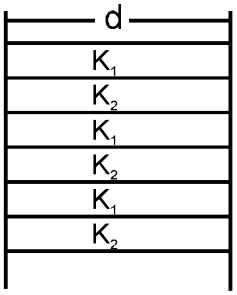
6. Area of cross-section of two rods of equal lengths are A_1 and A_2 and thermal conductivities are K_1 and K_2. Specific heats are S_1 and S_2. condition for equal heat flow is–

(1) $K_1 = K_2$ (2) $K_1S_1 = K_2S_2$ (3) $\frac{K_1}{A_1S_1} = \frac{K_2}{A_2S_2}$ (4) $K_1A_1 = K_2A_2$

7. The ends of the two rods of different materials with their thermal conductivities, radii of cross-section and lengths in the ratio 1 : 2 are maintained at the same temperature difference. If the rate of flow of heat in the larger rod is 4 cal/sec., that in the shorter rod will be- (in cal/sec)

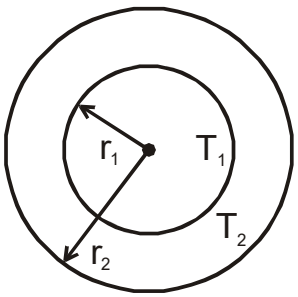
(1) 1 (2) 2 (3) 8 (4) 16

8. A wall consists of alternating blocks with length 'd' and coefficient of thermal conductivity k_1 and k_2. The cross sectional area of the blocks are the same. The equivalent coefficient of thermal conductivity of the wall between left and right is :-



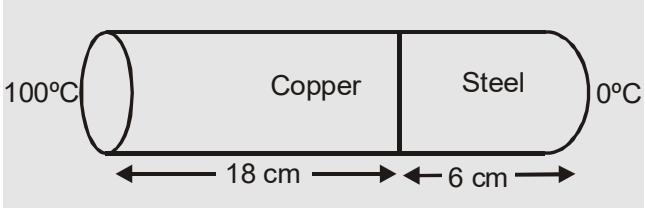
(1) $K_1 + K_2$ (2) $\frac{(K_1 + K_2)}{2}$ (3) $\frac{K_1 \ K_2}{K_1 + K_2}$ (4) $\frac{2 \ K_1 \ K_2}{K_1 + K_2}$

9. The figure shows a system of two concentric spheres of radii r_1 and r_2 and kept at temperature T_1 and T_2, respectively. The radial rate of flow of heat in a substance between the two concentric spheres is proportional to :



(1) $\frac{(r_2 - r_1)}{(r_1 r_2)}$ (2) $\ln \frac{(r_2)}{(r_1)}$ (3) $\frac{r_1 r_2}{(r_2 - r_1)}$ (4) $(r_2 - r_1)$

10. 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?



(1) 75ºC (2) 67ºC (3) 33ºC (4) 25ºC