# Physicsaholics

**DPP – 1**

Video Solution on Website:- https://physicsaholics.com/home/courseDetails/47

Video Solution on YouTube:- https://youtu.be/awMuuv1goWA

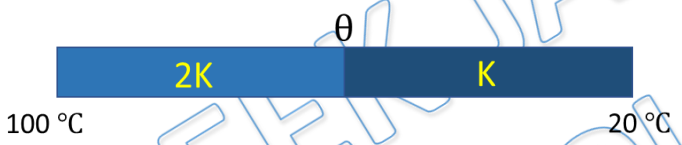
Written Solution on Website:- https://physicsaholics.com/note/notesDetalis/48

Q 1. Which of the following cylindrical rods, (given radius r and length $l$) each made of the same material and whose ends are maintained at the same temperature will conduct most heat?

(a) $r = 2r_o; l = 2l_o$ (b) $r = 2r_o; l = l_o$

(c) $r = r_o; l = 2l_o$ (d) $r = r_o; l = l_o$

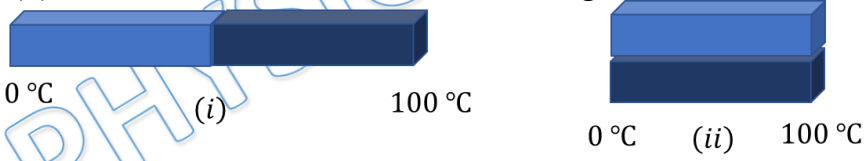
Q 2. In the following situations, the length and area of cross-section of each rod is same. Find temperature θ at junction of rods




(a) $\frac{220}{3}$ °C (b) $\frac{220}{5}$ °C

(c) $\frac{160}{5}$ °C (d) $\frac{160}{3}$ °C

Q 3. Two identical square rods of metal are welded end to end as shown in figure (i), 20 calories of heat flows through it in 4 minutes. If the rods are welded as shown in figure (ii), the same amount of heat will flow through the rods in




(a) 1 minute
(b) 2 minutes
(c) 4 minutes
(d) 16 minutes

Q 4. 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

Q 5. If the coefficient of conductivity of aluminium is 0.5 cal/cm-sec-°C, then in order to conduct 10 cal/sec-$cm^2$ in steady state, the temperature gradient in aluminium must be:

(a) 0.5 °C/cm (b) 10 °C/cm
(c) 20 °C/cm (d) 10.5 °C/cm

Q 6. One end of a brass rod 2m long and having 1cm radius is maintained at 250 °C. When a steady state is reached, the rate of heat flow across any cross-section is 0.5 cal/s. What is the temperature of the other end (K = 0.26 cal/sec-cm-°C)
(a) 100 °C (b) 266.5 °C
(c) 127.5 °C (d) 127.5 K

Q 7. The length of a rod of aluminium is 1.0 m and its area of cross-section is 5.0 $cm^2$. Its one end is kept at 250 °C and the at 50 °C. How much heat will flow in the rod in 5.0 minutes . (Thermal conductivity 'K' for Al = $2.0 \times 10^{-1}\ KJs^{-1}m^{-1}°C^{-1}$)
(a) 2000 J (b) 4000 J
(c) 6000 J (d) 8000 J

Q 8. Find the thermal resistance of an aluminium rod of length 0.20 m and area of cross section $1 \times 10^{-4}m^2$. The heat current is along the length of the rod. [Thermal conductivity of aluminium = 200 W/m-K]
(a) 10 k $W^{-1}$ (b) 20 k $W^{-1}$
(c) 30 k $W^{-1}$ (d) 40 k $W^{-1}$

Q 9. Two rods A and B of same length and radius are joined together in series. the thermal conductivity of A and B are 2K and K. Under steady state conditions, if the temperature difference between the open ends of A and B is 36°C, the temperature difference across 'A' is:
(a) 12 °C (b) 18 °C
(c) 24 °C (d) 9 °C

Q 10. If the temperature difference between the two side of a wall is doubled, its thermal conductivity
(a) Is doubled (b) Is halved
(c) Become four times (d) None of these

Q 11. A cotton sheet is ironed with hot electricity iron. How is energy transferred through the metal base of the iron to the sheet?
(a) By conduction (b) By convection only
(c) By radiation only (d) By convection & Radiation only

Q 12. In a steady state the temperature of the ends A and B of a 20 cm long rod AB is 100°C and 0°C. The temperature at the point C distant 9 cm from A is :
(a) 45 °C (b) 55 °C
(c) 60 °C (d) 65 °C

# Answer Key

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|---|---|---|---|---|
| **Q.1 b** | **Q.2 a** | **Q.3 a** | **Q.4 d** | **Q.5 c** |
| **Q.6 c** | **Q.7 c** | **Q.8 a** | **Q.9 a** | **Q.10 d** |
| **Q.11 a** | **Q.12 b** | | | |