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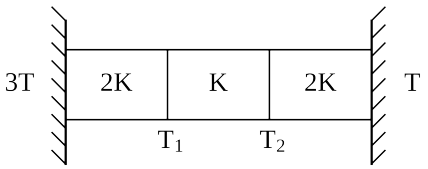
NEET THERMAL PROPERTIES OF MATTER — HEAT TRANSFER: CONDUCTION — PYQS

Max. Marks: 56 **Questions:** 14

Section A (MCQ) — 14 questions

Q.1 Three identical heat conducting rods are connected in series as shown in the figure. The rods on the sides have thermal conductivity 2K while that in the middle has thermal conductivity K. The left end of the combination is maintained at temperature 3T and the right end at T. The rods are thermally insulated from outside. In steady state, temperature at the left junction is T_1 and that at the right junction is T_2. The ratio T_1/T_2 is [NEET (UG) 2025]



(1) $\frac{5}{3}$ (2) $\frac{5}{4}$ (3) $\frac{3}{2}$ (4) $\frac{4}{3}$

Scan or tap for the full solution

Q.2 Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A): Houses made of concrete roofs overlaid with foam keep the room hotter during summer.

Reason (R): The layer of foam insulation prohibits heat transfer, as it contains air pockets.

In the light of the above statements, choose the correct answer from the options given below. [RE-NEET (UG) 2024]

(1) A is true but R is false.
(2) A is false but R is true.
(3) Both A and R are true and R is the correct explanation of A.
(4) Both A and R are true but R is NOT the correct explanation of A.

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Q.3 Two rods one made of copper and other made of steel of same length and same cross sectional area are joined together. The thermal conductivity of copper and steel are 385 J s^{-1} K^{-1} m^{-1} and 50 J s^{-1} K^{-1} m^{-1} respectively. The free ends of copper and steel are held at 100°C and 0°C respectively. The temperature at the junction is, nearly : [NEET (UG) 2022 (Phase 2)]

(1) 88.5°C (2) 12°C (3) 50°C (4) 73°C

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Q.4 The unit of thermal conductivity is : [NEET (UG) 2019]

(1) J m^{-1} K^{-1} (2) W m K^{-1}
(3) J m K^{-1} (4) W m^{-1} K^{-1}

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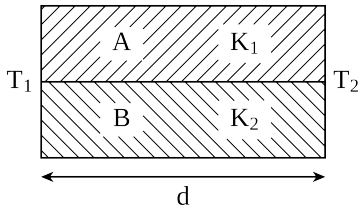
Q.5 Two rods A and B of different materials are welded together as shown in figure. Their thermal conductivities are K_1 and K_2. The thermal conductivity of the composite will be [NEET 2017]



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

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Q.6 The two ends of a metal rod are maintained at temperatures 100°C and 110°C. The rate of heat flow in the rod is found to be 4.0 J/s. If the ends are maintained at temperatures 200°C and 210°C, the rate of heat flow will be [AIPMT 2015 (Cancelled)]

(1) 8.0 J/s (2) 4.0 J/s (3) 44.0 J/s (4) 16.8 J/s

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Q.7 Two metal rods 1 and 2 of same lengths have same temperature difference between their ends. Their thermal conductivities are K_1 and K_2 and cross sectional areas A_1 and A_2, respectively. If the rate of heat conduction in 1 is four times that in 2, then

[NEET 2013 (Karnataka)]

(1) $K_1A_1 = 4K_2A_2$ (2) $K_1A_1 = 2K_2A_2$
(3) $4K_1A_1 = K_2A_2$ (4) $K_1A_1 = K_2A_2$

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Q.8 A slab of stone of area 0.36 m^2 and thickness 0.1 m is exposed on the lower surface to steam at 100 °C. A block of ice at 0 °C rests on the upper surface of the slab. In one hour 4.8 kg of ice is melted. The thermal conductivity of slab is
(Given latent heat of fusion of ice = 3.36×10^5 J kg^{-1}) [AIPMT 2012 (Mains)]

(1) 1.24 J/m/s/°C (2) 1.29 J/m/s/°C
(3) 2.05 J/m/s/°C (4) 1.02 J/m/s/°C

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Q.9 A cylindrical metallic rod in thermal contact with two reservoirs of heat at its two ends conducts an amount of heat Q in time t. The metallic rod is melted and the material is formed into a rod of half the radius of the original rod. What is the amount of heat conducted by the new rod, when placed in thermal contact with the two reservoirs in time t?

[AIPMT 2010 (Prelims)]

(1) $\frac{Q}{4}$ (2) $\frac{Q}{16}$ (3) 2Q (4) $\frac{Q}{2}$

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Q.10 The two ends of a rod of length L and a uniform cross-sectional area A are kept at two temperatures T_1 and T_2 ($T_1 > T_2$). The rate of heat transfer, $\frac{dQ}{dt}$ through the rod in a steady state is given by :

[AIPMT 2009]

(1) $\frac{dQ}{dt} = \frac{k(T_1 - T_2)}{LA}$ (2) $\frac{dQ}{dt} = kLA(T_1 - T_2)$
(3) $\frac{dQ}{dt} = \frac{kA(T_1 - T_2)}{L}$ (4) $\frac{dQ}{dt} = \frac{kL(T_1 - T_2)}{A}$

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Q.11 Which of the following 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? [AIPMT 2005]

(1) $r = r_0, l = l_0$ (2) $r = 2r_0, l = l_0$
(3) $r = r_0, l = 2l_0$ (4) $r = 2r_0, l = 2l_0$

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Q.12 Consider a compound slab consisting of two different materials having equal thicknesses and thermal conductivities K and 2K, respectively. The equivalent thermal conductivity of the slab is

[AIPMT 2003]

(1) $\frac{2}{3}K$ (2) $\sqrt{2}K$ (3) 3K (4) $\frac{4}{3}K$

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Q.13 Consider two rods of same length and different specific heats (S_1, S_2), conductivities (K_1, K_2) and area of cross-sections (A_1, A_2) and both having temperatures T_1 and T_2 at their ends. If rate of loss of heat due to conduction is equal, then

[AIPMT 2002]

(1) $K_1A_1 = K_2A_2$ (2) $\frac{K_1A_1}{S_1} = \frac{K_2A_2}{S_2}$
(3) $K_2A_1 = K_1A_2$ (4) $\frac{K_2A_1}{S_2} = \frac{K_1A_2}{S_1}$

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Q.14 A cylindrical rod has temperatures T_1 and T_2 at its ends. The rate of flow of heat is Q_1 cal/s. If all the linear dimensions are doubled keeping the temperatures constant, then the rate of flow of heat Q_2 will be [AIPMT 2001]

(1) $4Q_1$ (2) $2Q_1$ (3) $\frac{Q_1}{4}$ (4) $\frac{Q_1}{2}$

Scan or tap for the full solution

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	**1**	**2**	**1**	**4**	**4**	**2**	**1**	**1**	**2**	**3**	**2**
Ques.	12	13	14								
Ans.	**4**	**1**	**2**								