Assignment 9

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-04-03, 23:59 IST.

1) A uniform slab of dimensions 10 cm×10 cm×1 cm is kept between two heat reservoirs at temperatures 10°C and 90°C. The larger surface areas touch the reservoirs. The thermal conductivity of the material is 0.80 W/m°C. Find the amount of heat flowing through the slab per second.

(a) 54 J
(b) 64 J
(c) 74 J
(d) 84 J

No, the answer is incorrect.
Score: 0
Accepted Answers:
(b)

2) One end of a brass rod 2 m long and having 1 cm radius is maintained at 250°C. When a steady state is reached, the rate of heat flow across any cross section of the rod is 0.5 cal/s. What is the temperature of the other end of the rod? (Thermal conductivity of brass \( K = 0.26 \text{ cal s}^{-1} \text{ cm}^{-1} \text{ K}^{-1} \) and \( \pi = 3.142 \))

(a) 127.6°C
(b) 57°C
(c) 157°C
(d) 337°C
No, the answer is incorrect.
Score: 0
Accepted Answers: (a)

3) In an experiment on specific heat of a metal, a 200 gm block of the metal at 150°C is dropped into a copper calorimeter (of water equivalent 25 g) containing 150 cm³ of water at 27 °C and temperature of the system become 40 °C. Compute the specific heat of the metal.

(a) 0.1 cal/gm·°C⁻¹
(b) 0.3 cal/gm·°C⁻¹
(c) 0.5 cal/gm·°C⁻¹
(d) 0.7 cal/gm·°C⁻¹

No, the answer is incorrect.
Score: 0
Accepted Answers: (a)

4) Thermocouple thermometer is based on
(a) Seebeck Effect
(b) Compton Effect
(c) Raman Effect
(d) Photoelectric Effect

No, the answer is incorrect.
Score: 0
Accepted Answers: (a)

5) The resistances of a platinum resistance thermometer at the ice point, the steam point and boiling point of Sulphur are 2.5, 3.5 and 6.5 Ω respectively. Find the boiling point of Sulphur on the platinum scale. The ice point and the steam point measure 0° and 100°C respectively. As the resistance of a platinum wire varies with Celsius temperature t as \( R_t = R_0 (1 + \alpha t) \)

(a) 100°C
(b) 200°C
(c) 300°C
(d) 400°C
The junction of a Ni-Cu thermocouple is maintained at 0°C and 100°C. Calculate the e.m.f produced in the loop. \( \alpha_{\text{Ni-Cu}} = 16 \times 10^{-6} \text{V/°C} \) and \( \beta_{\text{Ni-Cu}} = -0.04 \times 10^{-6} \text{V/(°C)}^2 \)

(a) \( 1.60 \times 10^{-2} \text{V} \)

(b) \( 1.40 \times 10^{-3} \text{V} \)

(c) \( 2.30 \times 10^{-4} \text{V} \)

(d) \( 2.80 \times 10^{-5} \text{V} \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a)  
(b)  
(c)  
(d)  

7)

Thermal conductivity of metal A is three times the thermal conductivity of metal B. Two rods of the same dimensions made of metals A and B are joined end to end (fig.). The free end of A maintained at 0°C and that of B is maintained at 100°C. The temperature of the junction between A and B in the steady state will be

(a) \( 25^\circ \text{C} \)

(b) \( 33.3^\circ \text{C} \)

(c) \( 66.6^\circ \text{C} \)

(d) \( 75^\circ \text{C} \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a)  
(b)  
(c)  
(d)  

8)
Resistance of silver wire is 3 Ohm at 30°C and at 100°C, it is 3.5 Ohm. Find its temperature coefficient of resistance.

(a) 2.56 x 10^-5/°C
(b) 1.85 x 10^-3/°C
(c) 2.05 x 10^-5/°C
(d) 1.41 x 10^-5/°C

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a)

9)
For Cu-Fe thermocouple when cold junction is at 0°C the inversion temperature occurs at 5!
If the cold junction is kept at 20°C, the inversion temperature will be at

(a) 550°C
(b) 520°C
(c) 530°C
(d) 400°C

No, the answer is incorrect.
Score: 0
Accepted Answers:
(c)

10) Heat transfer takes place as per –
(a) zeroth law of thermodynamics
(b) first law of thermodynamics
(c) second law of the thermodynamics
(d) Kirchhoff’s law

No, the answer is incorrect.
Score: 0
Accepted Answers:
(c)