Week 10 Assignment 10

The due date for submitting this assignment has passed. **Due on 2018-10-10, 23:59 IST.**

As per our records you have not submitted this assignment.

1) The specific heat \( c_p \) of gold is 129 J/kg K. What is the quantity of heat energy required to raise the temperature of 100 g gold by 50 K?

(a) 215 J  
(b) 1290 J  
(c) 645 J  
(d) 345 J

- (a)  
- (b)  
- (c)  
- (d)  

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

2) A pot of water is heated by transferring 1676 kJ of heat energy to the water. If there is 2 kg of water in the pot and temperature is raised by 80 K. What is the specific heat \( c_p \) of water?

(a) 4190 J/kg K  
(b) 1190 J/kg K  
(c) 2190 J/kg K  
(d) 3190 J/kg K
3)
If 1500 J of heat is applied to a copper ball with mass 45 g what will be the change in temperature? Specific heat \( c_p \) of copper is 0.39 J/g K.
(a) 45.87 K
(b) 56.12 K
(c) 23.84 K
(d) 85.47 K

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

4)
Calculate the thermal diffusivity of a material having density \( \rho \) 2700 kg/m³, thermal conductivity \( k \) 155 W/mK and specific heat \( c_p \) 900 J/kg K.
(a) \( 6.37 \times 10^{-5} \text{m}^2/\text{s} \)
(b) \( 2.37 \times 10^{-5} \text{m}^2/\text{s} \)
(c) \( 4.52 \times 10^{-5} \text{m}^2/\text{s} \)
(d) \( 0.64 \times 10^{-5} \text{m}^2/\text{s} \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a)
(b)
(c)
(d)
Which of the following statement is correct?

1. In conduction, heat transfer takes place through physical contact
2. In convection, heat transfer takes place by emission of electromagnetic radiation

(a) Both of them are correct
(b) Only 2 is correct
(c) Only 1 is correct
(d) None of them are correct

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

6)

The correct expression of Duhamel-Neumann constitutive relationship of an isotropic material is \([\lambda \text{ and } \mu \text{ are Lame}\text{'s Constants}]

(a) \(\sigma_{ij} = 2\mu\varepsilon_{ij} + \lambda\varepsilon_{kk}\delta_{ij}\)
(b) \(\sigma_{ij} = 2\mu\varepsilon_{ij} + \lambda\varepsilon_{kk}\delta_{ij} - (3\lambda + 2\mu)\alpha (T - T_0) \delta_{ij}\)
(c) \(\sigma_{ij} = 2\mu\varepsilon_{ij} + \lambda\varepsilon_{kk}\delta_{ij} - (2\lambda + 3\mu)\alpha (T - T_0) \delta_{ij}\)
(d) None of the above

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

7)

For plane strain formulation of uncoupled thermo-elasticity problem, the compatibility equation is given by

(a) \(\nabla^2 (\sigma_{xx} + \sigma_{yy}) = 0\)
(b) \(\nabla^2 (\sigma_{xx} + \sigma_{yy}) + E\alpha \nabla^2 T = 0\)
(c) \(\nabla^2 (\sigma_{xx} + \sigma_{yy}) + \frac{E\alpha}{(1-\nu)} \nabla^2 T = 0\)
(d) None of the above

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

(d)
8) A mild steel straight bar is clamped between two walls at 300 K. Determine the thermal stress induced in the bar when it is heated up to 375 K. \( E = 200 \text{ GPa} \) and \( \alpha = 11.2 \times 10^{-6} \)

(a) 54 MPa
(b) 168 MPa
(c) 112 MPa
(d) 224 MPa

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

9) Wall of an industrial furnace is constructed from 0.20 m thick fire-clay brick having thermal conductivity of 1.5 W/m K. The temperature inside and outside of the furnace are 800 K and 400 K respectively. Calculate the rate of heat loss through the wall having a cross sectional area of 0.6 m².

(a) 3400 W
(b) 1530 W
(c) 1800 W
(d) 3600 W

No, the answer is incorrect.
Score: 0
Accepted Answers:
(c)
A mild steel straight bar is free at both ends at 300 K. Determine the thermal stress induced in the bar when it is heated up to 400 K. $E = 200$ GPa and $\alpha = 11.2 \times 10^{-6}$. 

(a) 0 MPa  
(b) 168 MPa  
(c) 112 MPa  
(d) 224 MPa

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