Sheet- 2

1. Heat conduction equation of one dimension with heat generation and steady state is_____.

(a) $\frac{d}{dx}\left(k\frac{dT}{dx}\right)-\dot{g}=0$ (b) $\frac{d^2T}{dx^2}+\dot{g}=0$

(c) $\frac{d^2T}{dx^2}-\frac{\dot{g}}{k}=0$ (d) $\frac{d}{dx}\left(k\frac{dT}{dx}\right)+\dot{g}=0$ (e)No one of above

2. Heat conduction equation of one dimension for steady flow with no heat source and constant thermal conductivity in cylindrical coordinate is _____.

(a) $\frac{d^2T}{dr^2}=0$ (b) $\frac{d}{dr}\left(r\frac{dT}{dr}\right)=0$ (c)) $\frac{d}{dr}\left(r^2\frac{dT}{dr}\right)=0$

(d) $\frac{d}{dr}\left(r^3\frac{dT}{dr}\right)=0$ (e) $\frac{d}{dr}\left(kr^2\frac{dT}{dr}\right)=0$

3. Heat transfer by convection through spherical surface is calculated by the _____.

(a) $4\pi r^2h(T_s-T_\infty)$ (b) $\pi r^2h(T_s-T_\infty)$ (c) $4\pi r^2k(T_s-T_\infty)$

(d) $2\pi rLh(T_s-T_\infty)$ (e) $r^2h(T_s-T_\infty)$

4. Thermal resistance for a plane wall is _____.

(a) $R_{th}=\frac{k}{A\Delta x}$ (b) $R_{th}=\frac{A}{k\Delta x}$ (c) $R_{th}=\frac{\Delta x}{kA}$ (d) $R_{th}=\frac{Ak}{\Delta x}$ (e) $R_{th}=\frac{k\Delta x}{A}$

5. Heat transfer rate by conduction in the wall is _____

(a)$\dot{Q}=\frac{k\Delta x(T_1-T_2)}{A}$ (b) $\dot{Q}=\frac{\Delta x(T_1-T_2)}{Ak}$ (c) $\dot{Q}=\frac{kA(T_1-T_2)}{\Delta x}$ (d) $\dot{Q}=\frac{kAx(T_2-T_1)}{\Delta x}$

(e) No one of the above

6. Heat conduction resistance for cylindrical shell is_____.

(a) $R_{cyl}=\frac{1}{4\pi kr^2}ln\frac{r_2}{r_1}$ (b) $R_{cyl}=\frac{1}{4\pi rLk}ln\frac{r_2}{r_1}$ (c) $R_{cyl}=\frac{1}{2\pi kr^2}ln\frac{r_2}{r_1}$

(d) $R_{cyl}=\frac{1}{2\pi Lk}ln\frac{r_2}{r_1}$ (e) $R_{cyl}=\frac{1}{2\pi Lh}ln\frac{r_2}{r_1}$

7. Thermal resistance of spherical shell is _____.

(a) $R_{sph} = \frac{1}{4\pi k} ln \frac{r_2}{r_1}$ (b) $R_{sph} = \frac{1}{4\pi k} ln \frac{r_1}{r_2}$ (c) $R_{sph} = \frac{1}{4\pi k}\left(\frac{1}{r_2} - \frac{1}{r_1}\right)$

(d) $R_{sph} = \frac{1}{4\pi k}\left(\frac{1}{r_1} - \frac{1}{r_2}\right)$ (e) $R_{sph} = \frac{1}{4\pi Lk}\left(\frac{1}{r_1} - \frac{1}{r_2}\right)$

8. Overall heat transfer coefficient is combination of _____

(a) conduction-convection-conduction (b) convection- radiation-conduction

(c) convection-conduction-convection (d) radiation-conduction-radiation

(e) convection-convection-conduction

9. Composite wall of two layers in series has the two resistances R_{th1} and R_{th2}. The resultant resistance is _____.

(a) $R_{th}=R_{th1}/R_{th2}$ (b) $R_{th}=R_{th1}+R_{th2}$ (c) $R_{th}=\frac{R_{th1}R_{th2}}{R_{th1}+R_{th2}}$ (d) $R_{th}=R_{th1}-R_{th2}$

(e) $R_{th}=R_{th1}xR_{th2}$

10. The overall heat transfer for cylindrical shell based on the outer surface area _____.

(a) $U_o = \left[\frac{1}{h_i} + \frac{r_o}{k} ln \frac{r_i}{r_o} + \frac{1}{h_o}\right]^{-1}$ (b) $U_o = \left[\frac{r_o}{h_i} + \frac{r_o}{k} ln \frac{r_o}{r_i} + \frac{1}{h_o}\right]^{-1}$

(c) $U_o = \left[\frac{r_o}{r_i h_i} + \frac{r_o}{k} ln \frac{r_o}{r_i} + \frac{1}{h_o}\right]^{-1}$ (d) $U_o = \left[\frac{1}{h_i} + \frac{r_o}{k} ln \frac{r_i}{r_o} + \frac{r_i}{r_o h_o}\right]^{-1}$

(e) $U_o = \left[\frac{r_i}{h_i} + \frac{r_o}{k} ln \frac{r_i}{r_o} + \frac{r_o}{h_o}\right]^{-1}$

11. The differential equation of temperature distribution in a plane wall for steady state with no heat generation and thermal conductivity if function of temperature is _____.

(a) $\frac{d^2T}{dx^2} = 0$ (b) $\frac{d^2T}{dx^2} + \frac{\dot{g}}{k} = 0$ (c) $\frac{\partial^2 T}{\partial x^2} = \frac{1}{\alpha}\frac{\partial T}{\partial \tau}$ (d) $\frac{d}{dx}\left(k\frac{dT}{dx}\right) = 0$ (e) $\frac{dT}{dx} = 0$