Practice Example

Que. 1	Solve: Define Exact differential Equation (2M)
Que. 2	Define Linear differential Equation & Formula for I.F (2M)
Que. 3	State Newton's law of cooling (2M)
Que. 4	What is orthogonal trajectory (2M)
Que. 5	Show that D.E $(x^3 + y) dx + (y^2 + x) dy = 0$ is exact D.E (2M)
Que. 6	Find I.F for $\dfrac{dy}{dx} + \dfrac{y}{x} = x^6$ (2M)
Que. 7	Find I.F for $\dfrac{dy}{dx} - \dfrac{y}{x} = x$ (2M)
Que. 8	Find I.F for $(y^2 - xy) dx + x^2 dy = 0$ (2M)
Que. 9	Find I.F for $y(x+y) dx + x(x-y) dy = 0$ (2M)
Que. 10	Find I.F for $(3y^2 + 4x) dx + 3xy \, dy = 0$ (2M)
Que. 11	Solve: $(x+y) dx + (x-y) dy = 0$ (4M)
Que. 12	Solve: $(4x^3 - y) dx + (y^2 - x) dy = 0$ (4M)
Que. 13	Solve: $y(x+1) dx + x(x) dy = 0$ (4M)
Que. 14	Solve: $y(y) dx + x(1+y) dy = 0$ (4M)
Que. 15	Solve: $\dfrac{dy}{dx} + \dfrac{y}{x} = x^2$ (4M)
Que. 16	Solve: $\dfrac{dy}{dx} + \dfrac{y}{x} = x^7$ (4M)
Que. 17	Solve: $\dfrac{dy}{dx} - \dfrac{y}{x} = x^3$ (4M)
Que. 18	Solve: $\dfrac{dy}{dx} - \dfrac{y}{x+1} = e^x (x+1)$ (4M)
Que. 19	Find orthogonal trajectory for the family of straight line $y = mx$ (4M)

Que. 20	Find orthogonal trajectory of family $y^2 = 4ax$
Que. 21	A body temperature is $100°c$ is placed in a room whose temperature is $20°c$ & cools to $60°c$ in 5 min what will be its temperature after 10 min? (4M)
Que. 22	A body temperature is $100°c$ is placed in a room whose temperature is $20°$ & cools to $60°c$ in 5 Min find the temperature of body after 15 Min. (4M)
Que. 23	A resistance of 150 ohms & inductance of 0.3 H are connected in series with battery of 25 volts find the current in the circuit if $i=0$ at $t=0$ (4M)
Que. 24	A resistance of 250 ohms & inductance of 640 H are connected in series with a battery of 500 V Find the current in circuit if $i=0$ at $t=0$ (4M)
Que. 25	A steam pipe 40 cm in diameter contains steam at $150°c$ & is protected with a covering 10cm thick for which $k = 0.0012$. If the temperature of outer surface of covering is $30°c$, find the temperature at a distance of 25 cm from the centre of pipe under steady-state conditions

	Answers:
Que. 6	$I.F = x$
Que. 7	$I.F = \dfrac{1}{x}$ or x^{-1}
Que. 8	$I.F = \dfrac{1}{xy^2}$
Que. 9	$I.F = \dfrac{1}{2xy^2}$
Que. 10	$I.F = x$
Que. 11	Ans: $\dfrac{x^2}{2} + xy - \dfrac{y^2}{2} = C$
Que. 12	Ans: $x^4 - yx + \dfrac{y^3}{3} = C$
Que. 13	Ans: $x + \log x = C$
Que. 14	Ans: $-[y\log x + \log y + y] = C$
Que. 15	Ans: $xy = \dfrac{x^4}{4} + C$
Que. 16	Ans: $xy = \dfrac{x^9}{9} + C$
Que. 17	Ans: $\dfrac{y}{x} = \dfrac{x^3}{3} + C$
Que. 18	Ans: $\dfrac{y}{x+1} = e^x + C$
Que. 19	Ans: $\dfrac{-x^2}{2} = \dfrac{y^2}{2} + C$
Que. 20	Ans: $-x^2 = \dfrac{y^2}{2} + C$
Que. 21	Ans: - $\theta = 40^\circ C$

Que.22 $\theta = 30^\circ C$

Que.23   Ans: $i = \frac{1}{6}\left(1 - e^{-500t}\right)$

Que.24   Ans: $i = 2\left(1 - e^{-\frac{25}{64}t}\right)$

Que.25   Ans: $T = 83.96^\circ C$