F.E. Sem – II

May – June – 2012 **[4161] – 107**

Seat No.	

F.E. (Semester – II) Examination, 2012
ENGINEERING MATHEMATICS – II
(2008 Pattern)

Time : 3 Hours Max. Marks : 100

Instructions : *1) In Section **I**, solve Q. No. **1** or Q. No. **2**, Q. No. **3** or Q. No. **4**, Q. No. **5** or Q. No. **6**. In Section – **II**, solve Q. No. **7**. or Q. No. **8**, Q. No. **9** or Q. No. **10**, Q. No. **11** or Q. No. **12**.*

*2) Answers to the **two** Sections should be written in **separate** answer books.*

*3) Black figures to the **right** indicate **full** marks.*

*4) **Use** of electronic pocket calculator is **allowed**.*

*5) Assume suitable data, if **necessary**.*

SECTION – I

1. A) Form the differential equation whose general solution is $y = ae^{-2x} + be^{-3x}$, a and b are arbitrary constants. **6**

B) Solve the following (**any two**) : **10**

i) (cosx cosy – sinx siny) dy = dx

ii) $\frac{dy}{dx} = \frac{2x + 3y - 1}{6x + 9y + 6}$

iii) $\frac{dy}{dx} - \frac{\tan y}{1 + x} = (1 + x)e^{x} \sec y$

OR

P.T.O.

2. A) Form the differential equation whose general solution is $y = A\cos\left(\frac{4x}{3}\right) + B\sin\left(\frac{4x}{3}\right)$, where A and B are arbitrary constants. **6**

B) Solve the following (**any two**) : **10**

i) $(2x^2y + e^x)\,dx = (e^x + y^3)dy$

ii) $2xydy = (3y^2 + x^2)dx$

iii) $\frac{dy}{dx} + (1+2x)y = e^{-x^2}$

3. Solve **any three** : **18**

i) Water at temperature 100°C cools in 10 minutes to 88°C in a room of temperature 25°C. Find the temperature of water after 20 minutes.

ii) A particle is moving in a straight line with an acceleration $k\left[x + \frac{a^4}{x^3}\right]$ directed towards origin. If it starts from rest at a distance 'a' from the origin, prove that it will arrive at origin at the end of time $\frac{\pi}{4\sqrt{k}}$.

iii) The equation of an L-R circuit is given by $L\frac{dI}{dt} + RI = 10\cos t$. If I = 0 at t = 0, express I as a function of t, if L = 5 henries and R = 12 ohms.

iv) Find the orthogonal trajectories of the family of curves $r^2 = a^2\cos 2\theta$

OR