Total No. of Questions : 4]

SEAT No. :

PE-537

[Total No. of Pages : 2

[6578]-10
S.E. (Electrical) (Insem.)
ENGINEERING MATHEMATICS - III
(2019 Pattern) (Semester - III) (2072006)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data if necessary.***
4) ***Use of electronic pocket calculator is allowed.***

Q1) a) Attempt any two : **[10]**

i) $(D^3+4D)y = \sin 2x$

ii) $(D^2 + 3D + 2)y = \sin(e^x)$

iii) $(2x+1)^2 \frac{d^2y}{dx^2} - 6(2x+1)\frac{dy}{dx} + 16y = 8(2x+1)^2$

b) Solve : **[5]**

$$\frac{dx}{3z-4y} = \frac{dy}{4x-2z} = \frac{dz}{2y-3x}$$

OR

Q2) a) Attempt any two. **[10]**

i) $(D^2 - 4D + 3)y = x^3e^{2x}$

ii) $(D^2 - 1)y = \frac{2}{1+e^x}$

iii) $x^2\frac{d^2y}{dx^2} + 5x\frac{dy}{dx} + 3y = \log x$

b) An electromotive force 200 v is in series with a 100 hms resistor a 1 henry inductor and 0.02 Farad capacitor. At $t = 0$ charge $q = 0$ and current $i = 0$. Find the charge q and current i at any time t. **[5]**

P.T.O.

Q3) a) Solve any Two of the following : **[10]**

i) Find the Laplace transform of $e^{-4t} \int_0^t t \sin 3t \, dt$.

ii) Find the inverse Laplace transform of $\frac{3s+1}{(s+1)(s^2+2)}$.

iii) Find L $[t^2 u(t-2)]$.

b) Solve the differential equation by Laplace transform. $\frac{dy}{dt} + y = \cos 2t$, $y(0) = 1$. **[5]**

OR

Q4) a) Solve any Two of the following : **[10]**

i) Find the Laplace transform of $\frac{e^{-at} - e^{-bt}}{t}$.

ii) Find the inverse Laplace transform of $\frac{1}{s(s^2+a^2)}$.

iii) Find L $[tu(t-4) + t^2 \delta(t-4)]$.

b) Solve the differential equation by Laplace transform, $y'' + y = t$; $y(0) = 1$, $y'(0) = 0$. **[5]**

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