RGM COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

24th November 2021

I B.Tech I Semester (R20) End Examinations (Supplementary)

LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

ECE

Time: 3 Hrs **Total Marks: 70**

Note 1:Answer Question No.1 (Compulsory) and 4 from the remaining

2:All Questions Carry Equal Marks

1a Define exact differential equation and write the method to find its general solution.

b Write the quadratic form corresponding to the matrix $\begin{bmatrix} 1 & -3 & -2 \\ -3 & 2 & 5 \\ -2 & 5 & 3 \end{bmatrix}$

c Find L{Sin at} and L{Cos at}.

d Find $L\{u(t-3)\}$.

e Find rank of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 2 & 2 \\ 3 & 3 & 3 \end{bmatrix}$

f Find the particular integral of $(D^2 - 4D + 4)y = e^{2x}$.

g Find the integrating factor of the differential equation $(1-x^2)\frac{dy}{dx} + 2xy = x\sqrt{1-x^2}$.

2 Find the Rank, Index, Signature and Nature of the quadratic from $4x^2 + 9y^2 + 2z^2 + 8yz + 6zx + 6xy$.

3 Solve $(D^2 + 2D + 5)y = e^{-t}\sin t$, when $y(0) = 0, y'(0) = 1$, by using Laplace transform.

4 a) Solve $(D^2 + 16)y = e^{-3x} + \cos 4x$. (7)

b) Solve $(D^2 - 8D + 9)y = 8\sin 5x$. (7)

5 a) Reduce the matrix $\begin{bmatrix} 2 & 1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$ to Normal form and hence find its rank. (7)

b) Solve the following system of equations, x+y-2z + 3w = 0; x-2y+z-w=0; 4x+y-5z+8w =0; 5x-7y+2z-w=0. (7)

6 a) Solve the differential equation (7)

$(xy\sin xy + \cos xy)ydx + (xy\sin xy - \cos xy)xdy = 0$.

b) Solve $x\frac{dy}{dx} + y = x^3y^6$. (7)

7 a) Find $L^{-1}\left\{\frac{s+2}{(s^2+4s+13)^2}\right\}$ by using derivatives theorem. (7)

b) Find $L\{t^2\cos 3t\}$. (7)

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