Branch - ELECTRONICS

MATHEMATICS-1

Time : Three Hours   **Maximum : 75 Marks**

SECTION-A (20 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (10x2 = 20)

1   Find grad $<j>$ for $<(>=xyz^2$ at (1,0,3).
2   State Gauss Divergence theorem.
3   What is Singular Matrix?
4   Define Orthogonal matrix.
5   Find the n differential coefficient of cos x?

6   Find $\dfrac{}{dx}$, if $x^3+y^3=3axy$.

7   Find $L[e^{2t} \sin 3t]$,

8   Find L^{-i} $\dfrac{\blacksquare + 4}{(s + 3\,Y}$

9   Give Cauchy-Riemann's equation for a function to be analytic.
10 State Cauchy Integral theorem.

SECTION - B (25 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5x5= 25)

11 a Find div curl $F = yz^2\, i + xyj + yzk$.

OR

b Find the constants a,b,c if $F = (x + 2y + az)\, i + (bx - 3y - z)\, j + (4x + cy + 2z)k$
is irrational.

12 a Find the inverse of the matrix A= $\begin{matrix} 3 & 1 & -1 \\ 2 & -2 & 0 \\ 1 & 2 & -1 \end{matrix}$

OR

b Verify Cayley Hamilton theorem for the matrix A= $\begin{matrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{matrix}$

13 a Find y_n where $y = \dfrac{}{(x + 1)(x + 2)}$

OR

b   Find $\dfrac{du}{dt}$ if $u=x^2+y+z^2$, $x=e^{\backslash}$ $y=e^{l}\sin t$, $z=e^{l}\cos t$.

14 a   Find $L[t\, e^{3t}\sin t]$.

OR

b Find L^{1} $\dfrac{3s+ 5}{(s + 1Xs-3)}$

Cont...

15 a   Verify $u = -\log(x^2 + y^2)$ as an harmonic function.

<div align="center">OR</div>

b   Find poles and residues for $f(z)$ $\dfrac{z+2}{(z-2)(z+lR)}$

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SECTION - C (30 Marks!
Answer any THREE Questions
ALL Questions Carry EQUAL Marks (3 x 1 0 = 3 0)

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16   Verify stokes theorem for $F = (x^2 - y^2)i + 2xyj$ in the rectangular region in the XOY plane bounded by the lines x=0, x=a, y=0, y=b.

17   Find C.E, Eigen value and Eigen vector for the matrix A= $\begin{pmatrix} 1 & 0 & 1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{pmatrix}$

18   If $y=\sin(m\sin^{-1}x)$, prove that
(i) $(l-x^2)y_2-xy,+m^2y=0$.
(ii) $(l-x^2)y_{n+2}-(2n+l)xy_{n+1}+(m^2-n^2)y_n=0$.

19   Solve using Laplace transform.
$(D^2-4D+3)y=e^{'t}$, given y(0)=l and y'(0)=0.

20   State and prove Cauchy Integral formula.

<div align="center">Z–Z–Z   END</div>