QP CODE: 19101898

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Reg No : ....

Name : ....

B.Sc.DEGREE (CBCS) EXAMINATION, MAY 2019

Second Semester

B.Sc Electronics Model III

Complementary Course - **MM2CMT07 - MATHEMATICS-LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS**

2017 ADMISSION ONWARDS

EBF35514

Maximum Marks: 80 **Time: 3 Hours**

Part A

Answer any **ten** questions.

Each question carries **2** marks.

1. Find the dimension of the vector space spanned by (1,2,0) and (1,3,0) in R^3.
2. Find the standard matrix for the transformation T where T(x,y)=(x+y,x-y)
3. Find skew Hermitian matrix of $\begin{bmatrix} 3i & -3+4i & 4-5i \\ -3+4i & -4i & 5+6i \\ -4-5i & -5+6i & 0 \end{bmatrix}$
4. Define minor.
5. Define eigen values of a matrix.
6. State Cayley Hamilton theorem.
7. Write the nature of characteristic roots of skew-Hermitian matrix.
8. What do you mean by an exact differential equation? Explain.
9. Write down the Bernoulli's Equation.Give an example.
10. Define a partial differential equation with an example.
11. Solve the differential equation dx=dy=dz.
12. Expain the terms of a linear partial differential equation Pp+Qq=R

(10×2=20)

Part B

Answer any **six** questions.

Each question carries **5** marks.

13. Define vector subspace.

Turn Over

14. Show that $A=\frac{1}{3}\begin{bmatrix} 1-2i & 2i \\ -2i & -1-2i \end{bmatrix}$ is unitary

15. Explain normal form or first canonical form of the matrix .

16. Find the characteristic equation of $A=\begin{bmatrix} 1 & 2 & 3 \\ 0 & -4 & 2 \\ 0 & 0 & 7 \end{bmatrix}$

17. Find the eigen vector of the matrix $A=\begin{bmatrix} 4 & -5 \\ 1 & -2 \end{bmatrix}$

18. Solve the initial value problem $\frac{dy}{dx} = \frac{-y}{x}$, y(4)=3

19. Solve $(\frac{dy}{dx})^2 + \frac{dy}{dx}x + \frac{dy}{dx}y + xy = 0$

20. If z = x+y+f(xy) then form the partial differential equation for the surface.

21. Find the integral curve of the equation $\frac{dx}{y+zx} = \frac{dy}{-(x+yz)} = \frac{dz}{x^2-y^2}$

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **15** marks.

22. (a) Write the standard basis of M_{2x2} .

(b)Find the matrix representation for the linear transformation T: $M_{2x2} \longrightarrow M_{2x2}$ defined by T $\begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} a+2b+3c & 2b-3c+4d \\ 3a-4b-5d & 0 \end{bmatrix}$ using standard basis

23. Reduce the normal form and find the rank of the matrix $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 2 & 3 & 4 \\ 4 & 3 & 2 & 1 \end{bmatrix}$

24. Check whether the consistency of equations,

x+y+z=3

x+2y+3z=4

x+4y+9z=6

25. Solve the initial value problem $(1+x^2)\frac{dy}{dx} + 4xy = x$,y(2)=1

(2×15=30)