23104757

QP CODE: 23104757

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR/IMPROVEMENT/REAPPEARANCE EXAMINATIONS, FEBRUARY 2023

First Semester

B.Sc Information Technology Model III

Complementary Course - MM1CMT06 - MATHEMATICS - MATRICES, DETERMINANTS, DIFFERENTIAL CALCULUS, PARTIAL DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

2017 Admission Onwards

C267DDBB

Time: 3 Hours Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Define singular matrix.
2. What is the condition for the product AB of two matrices A and B to be defined?
3. If A is a square matrix of order 3 x 3 and if |A| =8, what is the determinant of the Matrix 4A?
4. Find the rank of the matrix $\begin{bmatrix} 0 & 0 \\ 0 & 2 \end{bmatrix}$
5. Differentiate $\sqrt{3x^2 + 2x + 5}$
6. Find the derivative of (x^5e^{3x}).
7. Find the derivative of $\frac{dp}{dx}$ where $x = 3p^4 - 2p + 4$.
8. What is second derivative of $y= e^{ax}$?
9. Define $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ in partial differential equation
10. Defind the Laplace transform of a function f(t).
11. Define $L(t^n f(t))$ in multiplication by t in laplace trasform.
12. Define division by t in laplace transform.

(10×2=20)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ then prove that $A^2 - 4A - 5I = 0$

14. If A and B are symmetric matrices, then show that AB is also symmetric if AB=BA

15. Solve completely the following equations 2x-3y=3 4x-y =11 using matrices.

16. Differentiate $\log\left(\frac{a + b\,tanx}{a - b\,tanx}\right)$

17. Find the derivative of $y = 2\sqrt{t}\tanh(\sqrt{t})$

18. $z = axe^y + 1/2\ a^2\ e^{2y} + b$ Eliminate arbitrary constants.

19. Form PDE by Lagrange's method , ptanx+qtany=tanz

20. Find the Laplace transofrm of $\sin^3 2t$

21. Find $L^{-1}\left(\frac{3(s^2-1)}{2s^5}\right)$

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. a. Define adjoint of a matrix b. Give the matrix A = compute adj A Verify A(adj A) =(adj A) A= |A| I

23. Differentiate a) $\sin^3 x\ (x^2+4)^x$

    b) $(\tan^{-1} x)^x$

24. Eleminate arbitary function from PDE

    a) $z=f(x)+e^y g(x)$

    b) $z=(x+y).f(x^2-y^2)$

25. Find the Laplace transforms of

    (a) $e^{-3t}\cos^2 t$

    (b) $\left(\sqrt{t} + \frac{1}{\sqrt{t}}\right)^3$

(2×15=30)