



QP CODE: 21100167

21100167

Reg No :

Name :

BSc DEGREE (CBCS) EXAMINATION, FEBRUARY 2021

Fifth Semester

Core Course - MM5CRT02 - DIFFERENTIAL EQUATIONS

B.Sc Computer Applications Model III Triple Main ,B.Sc Mathematics Model I, B.Sc Mathematics

Model II Computer Science

2017 Admission Onwards

4FC2E0D1

Time: 3 Hours

Max. Marks : 80

Part A

Answer any ten questions.

Each question carries 2 marks.

1. Solve the differential equation $y' \sin y = x^2$
2. Determine whether the equation $(1 + y^2 \sin 2x)dx - 2y \cos^2 x dy = 0$ is exact
3. Make the equation exact $(x + 2) \sin y dx + x \cos y dy = 0$
4. Find the general solution of $y^{11} - 4y^1 + 4y = 0$
5. Find a particular solution of $y^{11} - 3y^1 + 2y = e^{-x}$
6. Find the general solution of the differential equation $y^{(3)} + 3y^{(2)} + 3y^{(1)} + y = 0$
7. Find the differential equation of the general solution $A + Be^{2x}$
8. Define a polynomial of degree n . Give an example.
9. Write Bessel's equation of order p .
10. Find functions P, Q and R so that $PP' + QQ' + RR' = 0$ if $P = xz, Q = -yz, R = y^2 - x^2$ and verify it.
11. Generate a partial differential equation by eliminating the constants a and b from $2z = (ax + y)^2 + b$.
12. Define Lagrange's first order partial differential equation.

(10×2=20)





Part B

Answer any **six** questions.

Each question carries **5** marks.

13. Show that the function $y = e^{x^2} \int_0^x e^{-t^2} dt$ is a solution of the differential equation $y' = 2xy + 1$
14. Find the orthogonal trajectory of the family $y = c(1 + \cos x)$
15. Solve the differential equation $(x + y)dx - xdy = 0$
16. Solve the differential equation $y'' - k^2y = 0$, k is an unknown real constant.
17. Find a particular solution of $y^{11} - 2y^1 - 3y = 64xe^{-x}$
18. The equation $(1 - x^2)y^{11} - 2xy^1 + 2y = 0$ has $y_1 = x$ as a solution. Find the general solution
19. Find a power series solution of the differential equation $y' = 2xy$.
20. Define an ordinary point of a differential equation. Check whether 0 is an ordinary point of
 - a) $(1 + x^2)y'' + xy' + y = 0$
 - b) $y'' + (1 + x)y' - y = 0$.
21. Find the general solution of $x^2p + y^2q = (x + y)z$.

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **15** marks.

22. (i) Solve the differential equation $(y + 1) \frac{dy}{dx} + x(y^2 + 2y) = x$
(ii) Solve the initial value problem $x \frac{dy}{dx} + y = (xy)^{\frac{3}{2}}$, $y(1) = 4$
23. 1 Find the general solution of $y^{(3)} - 3y^{(2)} + 2y^{(1)} = 10 + 42e^{3x}$
2 Find the solution of $y^{(3)} - y^{(1)} = 1$ that satisfies the initial condition $y(0) = y'(0) = y''(0) = 4$
24. The equation $4x^2y'' - 8x^2y' + (4x^2 + 1)y = 0$ has only one Frobenius series solution. Find the general solution.
25. Find the equation of the integral surface of the differential equation $(2xy - 1)p + (z - 2x^2)q = 2(x - yz)$ which passes through the line $x = 1, y = 0$

(2×15=30)

