QP CODE: 22103520

22103520

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, NOVEMBER 2022

Fifth Semester

CORE COURSE - MM5CRT02 - DIFFERENTIAL EQUATIONS

Common for B.Sc Mathematics Model I, B.Sc Mathematics Model II Computer Science & B.Sc Computer Applications Model III Triple Main

2017 Admission Onwards

F1FD79B4

Time: 3 Hours Max. Marks : 80

Part A

*Answer any **ten** questions.*

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

1. Solve the differential equation $xy' = (1 - 2x^2)tany$
2. Determine whether the equation $(1 + y^2 sin2x)dx - 2ycos^2 xdy = 0$ is exact
3. Find the integrating factor of $(2x^2 + y)dx + (x^2 y - x)dy = 0$
4. Find the general solution of $y^{11} + y^1 + y = 0$
5. Find a particular solution of $y^{11} - y^1 - 6y = 20e^{-2x}$
6. Find the general solution of the differential equation $y^{(4)} - 8y^{(2)} + 16y = 0$
7. Find the general solution of $y^{(3)} - 3y^{(2)} + 4y^{(1)} - 2y = 0$
8. Define a power series in $x - a$.
9. Write Legendre's equation.
10. Find functions P', Q' and R' so that PP'+QQ'+RR'=0 if $P = 2y(z - 3), Q = 2x - z, R = y(2x - 3)$ and verify it.
11. Generate a partial differential equation by eliminating the arbitrary function f from $z = f(\frac{xy}{z})$.
12. Give the general solution of Lagrange's first order partial differential equation.

(10×2=20)

Part B

*Answer any **six** questions.*

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

13. Find particular solution of the differential equation $(x^2-1)y'=1,\ y=0$ when $x=2$

14. Solve $\frac{dy}{dx}+xsin2y=x^3cos^2y$

15. Find the orthogonal trajectory of $y^2=4c(x+c)$

16. Solve the differential equation $xy''-y'=3x^2$

17. Verify that $y_1=x^2$ is one solution 0f $x^2y^{11}+xy^1-4y=0$ and then find $y_2$and the general solution

18. Find the general solution of $y^{(3)}-6y^{(2)}+11y^{(1)}-6y=0$

19. Find a power series solution of the differential equation $y'-y=2.$

20. Locate and classify singular points on X-axis for the differential equation $x^3(x-1)y''-2(x-1)y'+3xy=0.$

21. Find the general solution of $x^2(y^3-z^3)p+y^2(z^3-x^3)q=z^2(x^3-y^3).$

(6×5=30)

Part C

*Answer any **two** questions.*

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

22. i)Solve $\frac{dy}{dx}=\frac{x+2y-3}{2x+y-3}$
ii)Solve $(x^2-2y^2)dx+xydy=0$

23. 1 Find the particular solution of $y^{11}+y=cot2x$
2 find the general solution of $(1-x)y^{11}+xy^1-y=(1-x)^2$

24. For the differential equation, $x^2y''+xy'+(x^2-\frac{1}{4})y=0$, show that $m_1-m_2=1$, but that the equation has two independent Frobenius series solutions. Also find the solutions.

25. Find the equation of the integral surface of the differential equation $y^2(x-y)p+x^2(y-x)q=z(x^2+y^2)$ which passes through the curve $xz=a^3, y=0.$

(2×15=30)