QP CODE: 21101716

21101716

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) SPECIAL SUPPLEMENTARY EXAMINATION, JULY 2021

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

2018 Admission Only

BF61CB6D

Time: 3 Hours Max. Marks : 80

Part A

*Answer any **ten** questions.*

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

1. Verify that $y = xtanx$ is a solution of the differential equation $xy' = y + x^2 + y^2$
2. Solve the differential equation $xy' = (1 - 4x^2)tany$
3. Find the differential equation of the one parameter family of curve $y = xsin(x + c)$
4. Find the general solution of $4y^{11} + 20y^{1} + 25y = 0$
5. Write linear ordinary differential equation of order n with constant coefficients.
6. Find the general solution of the differential equation $y^{(4)} + 5y^{(2)} + 4y = 0$
7. Find the differential equation of the general solution $A e^{3x} + B e^{-x}$
8. Check whether 0 is an ordinary point of the differential equation $(1 + x^2)y'' + xy' + y = 0.$
9. Define exponents of a differential equation at a regular singular point.
10. Find functions P', Q' and R' so that PP'+QQ'+RR'=0 if $P = x(y - z), Q = y(x - z), R = z(x - y)$ and verify it.
11. Generate a partial differential equation by eliminating the constants a and b from $z = (x + a)(y + b).$
12. Define linear partial differential equation with an example.

(10×2=20)

Part B

*Answer any **six** questions.*

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

13. Show that the equation $(1+4xy+2y^2)dx+(1+4xy+2x^2)dy=0$ is exact and solve it.

14. Solve $\frac{dy}{dx}=\frac{x^2+3y^2}{2xy}, y(2)=6$

15. Solve the differential equation $ydx+(x^2y-x)dy=0$

16. Solve the differential equation $xy''=y'+(y')^3$ using the method of reduction of order.

17. Find the general solution of $y^{11}+y^1=10x^4+2$

18. If $y_1(x)=x$ is a solution of $x^2y^{11}+2xy^1-2y=0$ then find the general solution

19. Define radius of convergence of a power series . Find the radius of convergence of $\sum_{j=0}^{\infty}x^j$.

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

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 $x\frac{dy}{dx}+y=xy^3$
ii)Solve the initial value problem $\frac{dy}{dx}+\frac{y}{2x}=\frac{x}{y^3},\ y(1)=2$

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

24. Find power series solution of the differential equations
a) $y'-y=2$ b) $y'+y=1$ c) $y'+y=0.$

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

(2×15=30)