

(4)

23. Solve $(p^2 + q^2)y = qz$ by using Charpit's method.
24. Solve $\cos(x+y)p + \sin(x+y)q = z$ by Lagrange's method.
25. Solve $z^2 = pqxy$ by using Charpit's method.
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Total Pages : 4

B.Sc./2nd Sem (G)/MTM/24(CBCS)

2024

2nd Semester Examination

MATHEMATICS (General)

Paper : DSC 1B/2B/3B-T

[Differential Equations]

[CBCS]

Full Marks : 60

Time : Three Hours

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

Group - A

Answer any **ten** of the following questions :

2×10=20

1. Solve $2xy \frac{dy}{dx} = (y^2 - x^2)$.
2. Solve $p \tan x + q \tan y = \tan z$, where $p = \frac{\partial z}{\partial x}$, $q = \frac{\partial z}{\partial y}$.
3. Solve $y^2 + qx^2 = x^2 y^2 z^2$, where $p = \frac{\partial z}{\partial x}$, $q = \frac{\partial z}{\partial y}$.
4. Solve $x dx + y dy + \frac{x dx + y dy}{x^2 + y^2} = 0$.

P.T.O.

(2)

5. Solve $\left(x + y \cos \frac{y}{x}\right) dx = x \cos \frac{y}{x} dy$.

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

7. Solve $\frac{dy}{dx} = \frac{y}{x} + \tan \frac{y}{x}$.

8. Determine y , such that $\frac{dy}{dx} = \frac{x+y+1}{x+y-1}$.

9. Solve $y = p^2x + p$, where $p = \frac{dy}{dx}$.

10. Solve $p^2y + 2px = y$, where $p = \frac{dy}{dx}$.

11. Solve $(px - y)(x - py) = 2p$, where $p = \frac{dy}{dx}$.

12. Solve $(x^3 + y^3)dx = xy^2dy$.

13. Solve $(x^4y^2 - y)dx + (x^2y^4 - x)dy = 0$.

14. Solve $xy - \frac{dy}{dx} = y^3e^{-x^2}$.

15. Solve $y = px + p^2x$, where $p = \frac{dy}{dx}$.

(3)

Group - B

Answer any **four** of the following questions :

5×4=20

16. Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = 3x^2e^{2x} \sin 2x$.

17. Solve $\frac{d^2x}{dt^2} - 3x - 4y = 0$
 $\frac{d^2y}{dt^2} + y + x = 0$

18. Solve
 $(xy \sin xy + \cos xy)ydx + (xy \sin xy - \cos xy)x dy = 0$.

19. Solve $(x^2y^2 + xy + 1)ydx - (x^2y^2 - xy + 1)x dy = 0$.

20. Solve $\frac{dy}{dx} + \frac{y}{x} \log y = \frac{y}{x} (\log y)^2$.

21. Solve $y(xy + 2x^2y^2)dx + x(xy - x^2y^2)dy = 0$, when
 $x = 1, y = 1$.

Group - C

Answer any **two** of the following questions :

10×2=20

22. Solve $\frac{d^2y}{dx^2} + a^2y = \tan ax$.

P.T.O.