



Mahila Vikas Sanstha's

**INDRAPRASTHA NEW ARTS
COMMERCE & SCIENCE
COLLEGE,** AT POST NALWADI, DIST. WARDHA (M.S.)

Accredited 'B' by NAAC

Approved by government
of Maharashtra

Affiliated to Rashtrasant Tukadoji
Maharaj Nagpur University, Nagpur

Recognised by U.G.C New Delhi
under section 2 (f) & 12 (b) of
UGC act 1956

Unit 1

1. Find the integral curves of the set of equations $\frac{dx}{x(y-z)} = \frac{dy}{y(z-x)} = \frac{dz}{z(x-y)}$
2. Find the integral curves $\frac{dx}{xz-y} = \frac{dy}{yz-x} = \frac{dz}{1-z^2}$
3. Theorem Pfaffian or Total differential equations
4. Theorem Exact or integrable DE
5. $ydx + xdy = 2zdz = 0$
6. Solve the equations $(x^2z - y^3)dx + 3xy^2dy + x^3dz = 0$, first showing that it is integrable
7. Solve $ydx + xdy + 2zdz = 0$
8. Verify the equation $yz(y+z)dx + xz(x+z)dy + xy(x+y)dz = 0$ is integrable and find its solution
9. Natani's Method
10. Solve $(1+yz)dx + x(z-x)dy - (1+xy)dz = 0$

Unit 2

11. Theorem: Solution of the PDE
12. Find general integral of the PDE $y^2p - xyq = x(z-2y)$
13. Find the general integral of PDE $px(x+y) = qy(x+y) - (x-y)(2x+2y+z)$
14. Find the integral surface of the equation $(x-y)y^2p + (y-x)x^2q = (x^2+y^2)z$



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15. Show that the equations $xp-yq=x$ and $x^2p+q=xz$ are compatible and find their solutions
16. Charpit's Method
17. Find the complete integral of $pq=1$, by charpit's method
18. Find the complete integral of $z^2 = pqxy$
19. Jacobi's Method for Solving $F(x,y,z,p,q)=0$
20. Find the complete integral of $p^2x+q^2y=z$

Unit 3

21. Solve $xys=1$
22. Solve $ys+p=\cos(x+y)-y(\sin x+y)$
23. Solve $s-t=x/y^2$
24. $(D^3-6D^2D'+11DD'^2-6D'^3)=0$
25. Solve $(2D^2-DD'-3D'^2)z=5e^{x-y}$
26. $4r-4s+t=16\log(x+y)$
27. Theorem:(1 or 2)_ Reducible no-homogeneous PDE
28. $(D^2+D'^2-2DD'-3D+3D'+2)z=e^{2x-y}$
29. $(D^2-D')z=xe^{x+y}$
30. Solve $yt-q=xy$



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Unit 4

31. Find the distance of order zero between the functions $y=x^2$ and $y=x$ on the interval $[0,1]$
32. Theorem: Euler's Differential Equation
33. If the function F is independent of x then $F-y'dF/dy'=constant$
34. If the function f depends on y alone i.e., $F=f(y)$ then $dF/dy=0$
35. Find the shortest curve joining the points (x_1,y_1) and (x_2,y_2) in a plane
36. Brachistochrone Problem
37. Functional Dependent on Higher Order Derivatives Theorem(Euler-Poisson Equations)
38. Invariance of Euler's Equation under Co-ordinate Transformation
39. Find the curves joining the points $A(x_1,y_1)$ and $B(x_2,y_2)$ that yields a surface of revolution of minimum area when revolved about the x -axis
40. Euler's Ostrogradsky Equation