SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
M.Sc.(Appl.Maths) - END SEMESTER EXAMINATIONS APRIL - 2023
SEMESTER - III
20PAMCT3008 - Differential Equations

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. One solution of x^2y"- 2y=0 on 0 < x < ∞ is $\Phi_1(x) = x^2$. Find all solutions of x^2y"- 2y = 2x - 1 on 0 < x < ∞.
2. Solve y'= xy, given y(0)=1.
3. Determine whether the equation (x+y)dx + (x-y)dy = 0, is exact and hence solve it.
4. Classify and find the canonical form of the partial differential equations. $sin^2x\ u_{xx} + sin2x$ u_{xy} + $cos^2x u_{yy} = x$ and solve it.
5. Solve (y+z)p + (z+x)q = x+y.
6. Solve ($p^2 + q^2$)y = qz, By using Charpits method.
7. Find the indicial polynomial for x^2 y" + a(x)xy' + b(x)y=0.
8. Determine whether the equation cosxcos2ydx - sinxsin2y dy=0.

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Derive the solution of legendre equations.
10. Obtain the two linearly independent solution of x^2 y" + 5xy' + (3-x^2)y = 0 which are valid near x = 0.
11. State and prove the existence theorem on convergence of the successive approximation.
12. Show that the PDEs $uu_x^2 + u_y^2$ - 4 = 0 and u_x - au_y = 0 are compatible equation.

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Derive the canonical form for parabolic equation.

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