CHRIST UNIVERSITY,BENGALURU - 560029

End Semester Examination March - 2017

Bachelor of Science II SEMESTER

Code: MAT231 **Max.Marks: 100**

Subject: DIFFERENTIAL EQUATIONS **Duration: 3Hrs**

SECTION A

Answer any TEN questions **10X3=30**

1 Solve: $e^x \tan y dx + (1 - e^x) \sec^2 y dy = 0$.

2 Solve: $\frac{dy}{dx} + y \tan x = y^3 \sec x$.

3 Solve: $(x^2y^3 - 3x^2y + 4x)dx + (y^2x^3 - x^3 + 4y)dy = 0$.

4 Find the general and singular solution of $y = px + 2p^2$.

5 Solve: $\frac{d^3y}{dx^3} - 13\frac{dy}{dx} + 12y = 0$.

6 Find the particular integral of $\frac{d^2y}{dx^2} + 4y = x^2 + 3$.

7 Verify the condition of exactness: $(1 - x^2)\frac{d^2y}{dx^2} - 3x\frac{dy}{dx} - y = 0, x \neq 1$.

8 Solve: $\frac{dx}{z^2y} = \frac{dy}{z^2x} = \frac{dz}{xy^2}$.

9 Find the partial differential equation of all planes which are at a constant distance a from the origin.

10 Solve: $p^2 + q^2 = npq$.

11 Solve: $z - px - qy - \log pq = 0$.

12 Classify the partial differential equation: $x^2r + 2xys + y^2t = 0$.

SECTION B

Answer any TEN questions **10X5=50**

13 Solve: $(3y + 2x + 4)dx - (4x + 6y + 3)dy = 0$.

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

15 Solve: $(x + \tan y)dy = \sin 2y dx$.

16 Solve: $\frac{dy}{dx} + \frac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0$.

17 Solve: $(D^3 + 1)y = 3 + e^{-x} + 5e^{2x}$.

18 Solve: $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + 9y = 3x^2 + \sin(3\log x)$.

19 Solve the simultaneous differential equations: $\frac{dx}{dt} = 3x - y$; $\frac{dy}{dt} = x + y$.

20 Solve $x^2y'' - xy' - y = 2x^2; (x > 0)$ given that $\frac{1}{x}$ is a part of complementary function.

21 Solve the following by changing the dependent variable:
$\frac{d^2y}{dx^2} - 4x\frac{dy}{dx} + (4x^2 - 1)y = -3e^{x^2}\sin 2x$.

22 Solve: $\frac{dx}{x(y-z)} = \frac{dy}{y(z-x)} = \frac{dz}{z(x-y)}$.

23 Form the partial differential equation from $xyz = f(x^2 + y^2 + z^2)$.

24 Solve: $(x^2 - yz)p + (y^2 - zx)q = (z^2 - xy)$.

25 Solve: $z^2(p^2x^2 + q^2) = 1$.

26 Solve: $yp = 2yx + \log q$.

SECTION C

Answer any TWO questions **2X10=20**

27 Solve: $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$.

28 Solve $\frac{d^2y}{dx^2} - y = \frac{2}{1+e^x}$, by the method of variation of parameters.

29 Find the complete integral of $2(z + px + qy) = yp^2$ by Charpit's method.