QP Code: RM22MSC027 | Reg. No | | | | | | | | | | | AR 22

GIET UNIVERSITY, GUNUPUR – 765022

M. Sc. (First Semester) Examinations, March – 2023

22MTPC103 - Ordinary Differential Equation

(Mathematics)

Time: 3 hrs | Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 10 = 20 Marks)**

		CO#	Blooms Level
Q.1	**Answer ALL questions**		
a.	Define Bernoulli Equation.	CO1	K2
b.	Find the differential equation of all circles touching a given straight line at a given point.	CO1	K2
c.	Find the Wronskian of 1, x, x^2	CO1	K2
d.	Solve $p^2(x^2-a^2)$ -2pxy +y^2 – b^2 = 0	CO2	K2
e.	Find particular solution of $(D^3 - 2D)y = coc2x$	CO2	K2
f.	Solve (D- 1) (D^2 –D – 2) y = 0	CO2	K2
g.	Solve $\left(D^3 - \frac{1}{x}D^2 + \frac{2}{x^2}D - \frac{2}{x^3}\right)y = 0$	CO3	K2
h.	Define variation of parameter method for solution of the linear differential equation.	CO3	K2
i.	Define Picard's method.	CO4	K2
j.	State Strum's separation theorem	CO4	K2

PART – B **(10 x 5 = 50 Marks)**

	Answer ***ANY FIVE*** questions	Marks	CO#	Blooms Level
2. a.	State and prove Abel's Formula	7	CO1	K2
b.	Find the differential equation of all circles of radius $'a'$	3	CO1	K2
3.a.	Solve the differential equation $\frac{dy}{dx} = \frac{x+y+4}{x-y-6}$	5	CO1	K2
b.	Solve the differential equation $(cosy\ sin2x)dx + (\cos^2 y - \cos^2 x)dy = 0$	5	CO1	K2
4. a.	Solve the differential equation $x^2p^2 - 2xyp + y^2 - x^2y^2 - x^4 = 0$	5	CO2	K2
b.	Solve $(D^6 - 64)\ y = e^{2x}$	5	CO2	K2
5.a.	Solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 3y = \cos x + x^2$ by Undetermined Coefficient method	7	CO2	K2
b.	Solve the differential equation $\frac{(y-px)^2}{1+p^2} = a^2$	3	CO2	K2
6. a.	Solve the Differential Equation $(D^2 + 3D + 2)y = x + cosx$ by using variation of parameter	5	C03	K2
b.	Solve $x^2\frac{d^2y}{dx^2} - 3x\frac{dy}{dx} + y = \frac{\log x \sin\log x + 1}{x}$	5	CO3	K2
7.	Solve the simultaneous differential equation $\frac{dx}{dt} + \frac{dy}{dt} - 2y = 2cost - 7sint$ and $\frac{dx}{dt} - \frac{dy}{dt} + 2x = 4cost - 3sint$	10	C03	K2
8.	Apply Picard's method Find three successive approximations of the solution of $\frac{dy}{dx} = 2 - (\frac{y}{x})$, $y(1) = 2$,	10	CO4	K2

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