QPC: MS | AR 19 | Reg. No | | | | | | | | | |

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (First Semester) Examinations, April / May – 2021

BBSBS1010 – Engineering Mathematics – I

(Common to all branches)

Time: 2 hrs | Maximum: 50 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 = 10 Marks)**

Q.1. Answer ***ALL*** questions			[CO#]	[PO#]
a.	The Stationary point at which the function f*(x, y)* has neither maximum nor minimum is called as…….		CO1	PO1
	(i) Stationary point	(ii) saddle point		
	(iii) maximum	(iv) none of these		
b.	The degree of $z = ax^2 + 2hxy + by^2$ is _____.		CO1	PO2
	(i) 2	(ii) 1		
	(iii) -1	(iv) 0		
c.	The value of z_{xy} is ___ ___, where z = 3x sin 2x		CO1	PO2
	(i) 0	(ii) 1		
	(iii) -1	(iv) 2		
d.	What is the order of differential equation $y'^2 + y = 0$.		CO2	PO1
	(i) 2	(ii) 1		
	(iii) -1	(iv) 0		
e.	The integrating factor of y' + 4 y = 20 is _____.		CO2	PO1
	(i) e^{2x}	(ii) e^{-2x}		
	(iii) e^{-4x}	(iv) e^{4x}		
f.	The function $Y = Ax + B x^2$ is the solution of _____ order differential equation.		CO2	PO1
	(i) 1	(ii) 2		
	(iii) 3	(iv) None of these		
g.	what is the general solution of (D - 2)y =0		CO2	PO1
	(i) $y = k e^{2x}$	(ii) $y = k x e^{2x}$		
	(iii) $y = k x^2 e^{2x}$	(iv) none of these		
h.	The value of cos nπ. is_____.		CO3	PO1
	(i) π	(ii) 2 π		
	(iii) 0	(iv) none of these		
i.	The absolute value of an orthogonal matrix is _____		CO4	PO1
	(i) 0	(ii) 1		
	(iii) 2	(iv) 3		
j.	Set of Eigen value of a matrix is called _____.		CO4	PO1
	(i) Eigen vector	(ii) Eigen space		
	(iii) Spectrum	(iv) none of these		

PART – B: (Short Answer Questions) **(2 x 5 = 10 Marks)**

Q.2. Answer ***ALL*** questions	[CO#]	[PO#]
a. Define Taylor's theorem of two variable	CO1	PO1
b. Integrate Integrate $\int 2x^3 \sin x \, dx$	CO1	PO2
c. Solve $(x^2 \ D^2 + 3 \text{ x D} + 1)\text{y} = 0$	CO2	PO2
d. Define periodic function.	CO3	PO1
e. Find the Eigen values of the matrix $\begin{bmatrix} 0 & 3i \\ -3i & 0 \end{bmatrix}$	CO4	PO1

PART – C: (Long Answer Questions) **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions	Marks	[CO#]	[PO#]
3. If $U = \log \frac{x^4 + y^4}{x + y}$ then show that $x\frac{\partial U}{\partial x} + y\frac{\partial U}{\partial y} = 3$	(6)	CO1	PO2
4. Discuss the maxima or minima value of $U = x^3 + y^3 - 3axy$	(6)	CO1	PO2
5. Solve $x^2 y'' - 4x y' + 6 y = 0$	(6)	CO2	PO2
6. Solve $y'' + 3y' - 18y = 9 \sin x$ by using undetermined coefficient method	(6)	CO2	PO2
7. Find the Fourier series of $f(x) = 3x^2$, $-1 < x < 1$.	(6)	CO3	PO2
8. Prove that the Eigen values of a Unitary matrix have absolute value 1.	(6)	CO4	PO2
9. Find out which type of conic section is represented by Quadratic function $11x^2 + 84xy + 24y^2 = 156$	(6)	CO4	PO2
10. Diagonalize $\begin{bmatrix} -19 & 7 \\ -42 & 16 \end{bmatrix}$	(6)	CO4	PO2

--- End of Paper ---