BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : I**
BRANCH: BIOTECHNOLOGY **SESSION : MO/2022**

SUBJECT: BE001 FOUNDATION TO ENGINEERING MATHEMATICS

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	In a dinner party both fish and meat were served. Some took only fish and some only meat. There were some vegetarians who did not accept either. The rest accepted both fish and meat. Justify your answer with Venn diagram.	[5]	4	4
	Let $A=\begin{bmatrix} -5 & -2 \\ 4 & 1 \end{bmatrix}$. Find its eigenvalues and eigenvectors.			
Q.1(b)	Find the determinant of matrix A $\begin{bmatrix} \mathbf{3} & \mathbf{4} & \mathbf{1} \\ \mathbf{1} & \mathbf{2} & \mathbf{0} \\ \mathbf{5} & \mathbf{-6} & \mathbf{15} \end{bmatrix}$	[5]	2	4
Q.2(a)	Find the equation of the line that passes through the points (-2, 4) and (1, 2). Compare cartesian and polar coordinate system.	[5]	3	4
Q.2(b)	Find the dot and cross product for following two vectors a = 4i+2j -3k and b= 2i +j-4k	[5]	2	3
Q.3(a)	If $x^3+y^3 = 3axy$; then calculate d^2y/dx^2	[5]	3	4
Q.3(b)	Find the equation of tangent and Normal to the curve $x^3 + y^3 = a^3$	[5]	3	4
Q.4(a)	Integrate $\int \frac{3}{5y^2+4}\, dy$	[5]	4	4
Q.4(b)	Solve $\int e^x \sin(x)\, dx$	[5]	3	3
Q.5(a)	A body originally at 80°C cools down to 60°C in 20 minutes, the temperature of the air being 40°C. what will be the temperature of the body after 40 minutes from the original?	[5]	4	4
Q.5(b)	Find the general solution of the differential equation $xdy -(y + 2x^2)dx = 0$	[5]	3	4

::::::22/03/2023::::::M