BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO2022)

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

SUBJECT: BE001 FOUNDATION TO ENGINEERING MATHEMATICS
TIME: 02 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Find the determinant of matrix A $A=\begin{bmatrix}5 & 3 & 8\\ 2 & 0 & 1\\ 1 & 2 & 3\end{bmatrix}$	[2]	**CO2, CO3**	**5**
Q.1(b)	Find the eigen values of the matrix $\begin{pmatrix}3 & -5\\ -6 & 4\end{pmatrix}$	[3]	**CO2, CO4**	**4**
Q.2(a)	Compare the equations of a circle, parabola, ellipse, and hyperbola.	[2]	**CO2, CO1**	**3**
Q.2(b)	i. Simplify, $\frac{sin\alpha}{1+cos\alpha}+\frac{1+cos\alpha}{sin\alpha}$ ii. Calculate the exact value of **sin15°**	[3]	**CO4, CO5**	**5**
Q.3(a)	Find the equation of a straight line that passes through the point (-2, 3) and perpendicular to the straight line 2x + 4y + 7 = 0.	[2]	**CO2, CO3**	**4**
Q.3(b)	Find the cross product of two vectors, **A**=3i+2j−4k and **B**=2i−3j−6k Also find the magnitude of **A×B**	[3]	**CO4, CO5**	**4**
Q.4(a)	Differentiate: $y = 1 - 5x^2 + x^3$	[2]	**CO2, CO4,**	**3**
Q.4(b)	Find the equation of Normal to the curve: y (x – 2) (x – 3) – x +1 = 0; at y = 0	[3]	**CO2, CO4**	**4**
Q.5(a)	Calculate $\lim_{x\to 0}(logx/cotx)$	[2]	**CO3, CO5**	**4**
Q.5(b)	Calculate maxima and minima of $3x^4-2x^3-6x^2+6x+1$ within 0 and 2	[3]	**CO4, CO1**	**5**

:::::21/01/2023 M:::::