COEP Technological University

End Semester Examination

(MA - 20001) Calculus and Vector Mathematics

Program : SY BTech Sem III

Maximum Marks : 60

Time : 10:00 am - 1:00 pm

Academic Year : 2022-23

Date : 15/09/2022

MIS :

Instructions:

1. Write your MIS on question paper

2. Unless otherwise mentioned symbols and notations have their usual meanings

3. Use of any kind of electonic device is not allowed

4. Any essential result , formula or theorem assumed for answering of question must be clearly stated

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Attempt the following questions

Q1) Evaluate the following for its maximum value of $3\sin(x) - 4\cos(x)$

Q2) Solve the following equation.Find all possible roots for the given equation

$$f(x) = 34x^5 - 23x^4 + 12x^3 + 8x^2 - 34 = 0$$

Q3)Solve the following simulatneous equations

$$f(x) = 3x^2 + 2x + 1 - 23$$
$$f(x) = 2x^2 - 3x + 12$$

Q4) Evaluate the following matrix

$$\begin{bmatrix} 2 & 3 & 9 \\ 4 & 6 & 1 \\ 0 & 7 & 8 \end{bmatrix}$$

Q5) Solve the following round matrix

$$\begin{pmatrix} 10 & 5 & 9 \\ 4 & 6 & 1 \\ 0 & 2 & 9 \end{pmatrix}$$

Q6)Evaluate the following vector matrix

$$\begin{vmatrix} 18 & 23 & 19 \\ 42 & 61 & 13 \\ 10 & 12 & 29 \end{vmatrix}$$

Q7)Find the determinant of following matrix

$$\det \begin{bmatrix} 2 & 3 & 9 \\ 4 & 6 & 1 \\ 0 & 7 & 8 \end{bmatrix}$$

Q8)Solve the following generalized matrix

$$\begin{bmatrix} 1 & 0 & \cdots & \cdots & \cdots & 0 \\ 1 & 0 & \cdots & \cdots & \cdots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots \\ 1 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

Q9)Solve the following mixed operation equation

$$f(x) = \sqrt{\sin^3(x) + \cot^2(x) + log_3(75)}$$

Q10)Evaluate the following

$$\frac{x^2 + 5x + 3}{2x + 9} \tag{1}$$

Q11)Solve the following integral

$$\int_1^5 x^3 + 2x^2 + 5x + 10 \, dx$$

ALL THE BEST !!