Maths Mid Term

Shruti Ravichandran

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Contents

College of Engineering Pune
Department of Mathematics
MA-19002 : Univariate Calculus
End Semester Examination

Date : 8th November 2022 **Max Marks : 60**
Branches : All **Semester : 2**
Programme : BTech

Section A

Q1.Solve the equation to obtain roots:

$$x^2 + 2x + 9 = 0$$

Q2.Solve the following inequation and write down the solution set:

$$11x - 4 < 15x + 4 <= 13x + 14, x \in W$$

Q3.State whether the following differential equations are linear or non linear,justify and solve.

$$a)xy' + 2y = e^{3x}/x, x > 0 b)x^2 y dy/dx - xy^2 = 1$$

Section B

Q4.Which of the given values of x and y will make the following pairs of matrices equal?

$$\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix} = \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$$

$a)x = \frac{-1}{3}, y = 7$ $b)Notpossible$

$c)y = 7, x = \frac{-2}{3}$ $d)x = \frac{-1}{3}, y = \frac{-2}{3}$

Q5.Solve the following integral

$$\int_7^8 (3x^4 + 2x + 3x^2)dx$$

Q6. Evaluate the limit of the following

$$\lim_{x \to +\infty} \sqrt[3]{x} + 12x - 2x^2$$

Q7.Solve the determinant

$$\begin{vmatrix} 3 & 4 & 5 & 9 \\ 1 & 4 & 8 & 9 \\ 2 & 6 & 84 & 6 \\ 7 & 4 & 0 & 2 \end{vmatrix}$$

Section C

Q8.The distribution in the table below shows the number of wickets taken by bowlers in one-day cricket matches. Find the mean number of wickets using the correct method. What does the mean signify?

Table 1:

Number of wickets	**Number of bowlers**
20-60	7
60-100	5
100-150	16
150-250	12
250-300	2

Q9.Solve the following puzzle

Q10.Find the median height.

Table 2: Autogenerated table from .csv file.

$Height$	$Numberofgirls$
140.00	4.00
145.00	11.00
150.00	29.00
155.00	40.00
160.00	46.00
165.00	51.00

1 Differential Equations

1.1 Types

1.1.1 Ordinary Differential Equations.

1.1.2 Partial Differential Equations.

1.1.3 Linear Differential Equations.

1.1.4 Non Linear Differential Equations.

1.1.5 Homogenous Differential Equations.

1.1.6 Non-Homogenous Differential Equations.