Maths Mid Term

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January 1, 2023

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.

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

Section B

Q4.Which of the given values of x and y will make the following pairs of matrices equal?
$$\begin{bmatrix} 3x + 7 & 5 \\ y + 1 & 2 - 3x \end{bmatrix} = \begin{bmatrix} 0 & y - 2 \\ 8 & 4 \end{bmatrix}$$

$a)x = \frac{-1}{3}, y = 7$ $b)Not possible$

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

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

This lock has a 3-digit code.
Can you crack it
using only these hints?

6 8 2 — One number is correct and in the right place

6 1 4 — One number is correct but in the wrong place

2 0 6 — Two numbers are correct but in the wrong place

7 3 8 — Nothing is correct

7 8 0 — One number is correct but in the wrong place

? ? ?

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Q10.Find the median height.

Table 2: Autogenerated table from .csv file.

$Height$	$Number of girls$
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.

References

[Bon96] Boney, L., Tewfik, A.H., and Hamdy, K.N., "Digital Watermarks for Audio Signals," *Proceedings of the Third IEEE International Conference on Multimedia*, pp. 473-480, June 1996.

[Goo94] Goossens, M., Mittelbach, F., Samarin, *A LaTeX Companion*, Addison-Wesley, Reading, MA, 1994.

[Kop99] Kopka, H., Daly P.W., *A Guide to LaTeX*, Addison-Wesley, Reading, MA, 1999.

[Pan98] Pan, D., "A Tutorial on MPEG/Audio Compression," *IEEE Multimedia*, Vol.2, pp.60-74, Summer 1998.