Mizoram Board Class 12 Mathematics Question Paper (Memory Based)

Time Allowed :3 Hour	Maximum Marks :60	Total Questions :24

> ## General Instructions
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> **Read the following instructions very carefully and strictly follow them:**
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> - Answers to this Paper must be written on the paper provided separately.
> - You will not be allowed to write during the first 15 minutes
> - This time is to be spent in reading the question paper.
> - The time given at the head of this Paper is the time allowed for writing the answers,
> - The paper has four Sections.
> - Section A is compulsory - All questions in Section A must be answered.
> - You must attempt one question from each of the Sections B, C and D and one other question from any Section of your choice.

1. Show that the relation R in the set $A = \{1, 2, 3, 4, 5\}$ given by

$$R = \{(a, b) : |a - b| \text{ is even}\}$$

is an equivalence relation.

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2. Find the principal value of $\tan^{-1}(\sqrt{3}) - \sec^{-1}(-2)$.

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3. If

$$A = \begin{bmatrix} 2 & 3 \\ 1 & -4 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 1 & -2 \\ -1 & 3 \end{bmatrix},$$

verify that $(AB)^{-1} = B^{-1}A^{-1}$.

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4. Solve the following system of equations using the matrix method:

$$2x + 3y + 3z = 5, \qquad x - 2y + z = -4, \qquad 3x - y - 2z = 3.$$

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5. Find the derivative of $(\sin x)^x + \sin^{-1}(\sqrt{x})$ with respect to x.

6. **Evaluate the integral**

$$\int \frac{x \sin^{-1} x}{\sqrt{1 - x^2}} \, dx.$$

7. **Find the general solution of the differential equation**

$$\frac{dy}{dx} + \frac{y}{x} = x^2.$$