

22103

12425

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

10

- (a) Simplify $\log_2 14 - \log_2 7$
- (b) Using determinant method find the area of triangle whose vertices are (4, 5) (0, 7) & (-1, 1).
- (c) Without using calculator find the value of $\cos (75^\circ)$.
- (d) If the diagonals of a rhombus are 16 cm & 12 cm, find its area.
- (e) A cone and cylinder having the same area of the base and having also the same area of curved surfaces. If the height of the cylinder be 2 m, find the slant height of the cone.
- (f) The coefficient of variance of a certain distribution is 4 and mean is 125. Find standard deviation.
- (g) Find the range and coefficient of range of the following :
80, 40, 120, 90, 50, 200, 180.



2. Attempt any THREE of the following :**12**

- (a) Find Inverse of matrix A, by adjoint method

$$\text{where } A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$$

- (b) Resolve into partial fraction,

$$\frac{x+3}{(x-1)(x+1)(x+5)}$$

- (c) Using Cramer's rule, following equations are obtained as a result of an experiment :

$$P_1 + P_2 + P_3 = 6; P_2 + 3P_3 = 11 \text{ and } P_1 - 2P_2 + P_3 = 0.$$

Find value of P_1, P_2 & P_3 .

- (d) Calculate standard deviation and coefficient of variance from the following table :

Class Mark	7	8	9	10	11	12	13
Frequency	4	6	9	12	9	6	4

3. Attempt any THREE of the following :**12**

- (a) If
- $\tan \frac{\theta}{2} = \frac{2}{3}$
- , find value of '
- $2 \sin \theta + 3 \cos \theta$
- '.

- (b) If
- $2 \cos 60^\circ \cdot \cos 10^\circ = \cos A + \cos B$

then find A and B.

- (c) Simplify
- $\frac{\cos^2(180^\circ - \theta)}{\sin(-\theta)} + \frac{\cos^2(270^\circ - \theta)}{\sin(180^\circ - \theta)}$
- .

- (d) Prove that
- $\frac{\sin 3A - \sin A}{\cos 3A + \cos A} = \tan A$
- .

4. Attempt any THREE of the following :**12**

(a) If $A = \begin{bmatrix} 2 & 4 \\ 1 & 1 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

then prove that $A^2 = 3A + 2I$.

(b) Resolve into partial fraction $\frac{3x-2}{(x+2)(x^2+4)}$.

(c) Prove that $8 \sin 20^\circ \cdot \sin 40^\circ \cos 10^\circ = \sqrt{3}$.

(d) Prove that $\frac{\cos 3A - \cos 7A}{\sin 9A + \sin A} = \cos 2A \tan 4A - \sin 2A$.

(e) If $\tan x = \frac{5}{6}$ and $\tan y = \frac{1}{11}$

show that $x + y = 45^\circ$.

5. Attempt any TWO of the following :**12**

(a) Attempt the following :

(i) Find the equation of the line whose x -intercept is 3 and y intercept is 4.

(ii) Find the equation of line passing through the point (2, 3) and having slope $\frac{1}{2}$.

(b) Attempt the following :

(i) Find the equation of the line passing through (2, -3) and parallel to the line $4x - y + 7 = 0$.

(ii) Show that the point (1, 2) is equidistant from $4x - 3y + 7 = 0$ and $5x + 12y = 16$.

(c) Attempt the following :

Find the length of the longest pole that can be placed in a room 12 m long, 9 m broad and 8 m high.

6. Attempt any TWO of the following :**12**

- (a) Solve the following equation by using matrix inversion method :

$$x + y + z = 6, 3x - y + 3z = 10, 5x + 5y - 4z = 3$$

- (b) Find mean deviation about mean of the following distribution :

C.I.	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	4	6	10	18	9	3

- (c) Attempt the following :

- (i) Find range and co-efficient of range of the following :

C.I.	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79
Frequency	10	15	30	20	15	10

- (ii) The data gives mean weight and S.D. for two groups :

Group	Mean Weight	S.D.
A	80 kg	6.0 kg
B	60 kg	7.0 kg

Which of the two groups has greater variability ?
