

Seat No	
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Regu-F- 408

M.B.A. (Part - I) (Semester – I) Examination, 2010
MATHEMATICS AND STATISTICS FOR MANAGEMENT
(Paper – III)

Day and Date: Monday, 20-12-2010
Time : 10.30a.m. to 1.30 p.m.

Total Marks : 70

- Instructions :** 1) Question No. 1 and Question No. 5 are **Compulsory**
2) Attempt **any two** questions from Question No. 2 to Question **No4.**
3) Figures to the **right** indicate **full** marks.
4) Use of calculator is **allowed**

1.A) i) Evaluate the following :

a) $\lim_{x \rightarrow 2} \frac{X^2 - 5x + 6}{X^2 - 4},$

b) $\lim_{x \rightarrow 1} \left[\frac{1}{X-1} - \frac{1}{X^2 - X} \right],$

c) $\lim_{x \rightarrow 0} \frac{\sqrt{1+3x} - \sqrt{1-3x}}{x}$

ii) At what rate will Rs. 6000 yield a simple interest of Rs. 120 in 6 months?

(6+4)

B) Give merits of arithmetic mean. The mean monthly salary paid to all employees in a certain factory was Rs. 6000. The mean monthly salaries paid to male and female employees were Rs. 6200 and Rs. 5200 respectively. Obtain the ratio of male and female employees in the company.

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P.T.O

2.A) Define transpose of a matrix A. Find the inverse of the matrix

$$A = \begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -5 \\ 2 & 5 & 0 \end{bmatrix} \text{ by adoint method}$$

B) Define coefficient of correlation. Calculate Karl Pearson's coefficient of Correlation for the following data: **(8+7)**

X	28	45	40	38	35	33	40	32	36	33
Y	23	34	33	34	30	26	28	31	36	35

3. A) The Following data give readings for 10 samples of size 5 in the production of certain components.

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean $\bar{X}$	383	508	505	582	557	337	514	614	707	753
Range R	95	128	100	91	68	65	148	28	37	80

Draw the control chart for $\bar{X}$ from the above data.

(Given : For $n = 5$, $A_2 = 0.58$)

B) Solve the following equations by Cramer's rule :

$$2x+y+z=7, 3x-y-z=-2, x+2y-3z=-4.$$

4. A) Define Mean deviation about mean. Compute Mean Deviation and its coefficient for the following data:

Sales (in Rs. Thousand)	40-50	50-60	60-70	70-80	80-90	90-100
No. of shops	10	15	25	30	12	8

B) Find the minimum average cost if the cost function is given by

$$TC = 36x - 10x^2 + 2x^3$$

(8+7)

5. Attempt **any four** of the following:

a) A function $f(x)$ is defined as

$$f(x) = \frac{1}{2} - x, 0 \leq x \leq \frac{1}{2}$$

$$= \frac{3}{2} - x, \frac{1}{2} < x \leq 1$$

$$= x^2 - \frac{x}{2}, x > 1$$

Find $f(2)$, $f\left(\frac{3}{4}\right)$, $f\left(\frac{1}{2}\right)$ and $f\left(\frac{1}{4}\right)$

b) Explain secular trend.

c) Differentiate the following w.r.t. 'x'.

i) $y = 4x^{\frac{5}{4}} + 2x^{\frac{1}{4}}$

ii) $\frac{x^2}{x^2-1}$.

d) From the following information of 10 observations on price X and supply of a commodity the following data were obtained

$$\sum X = 130, \sum X^2 = 2288, \sum Y = 220, \sum XY = 3467.$$

Compute the equation of the line of regression of Y on X.

a) What is index number ? Give base year formula for predicting index number

f) If $A = \begin{bmatrix} 2 & 3 \\ 3 & 5 \end{bmatrix}$, Verify that $A^2 - 7A + I = 0$, Where I is the unit matrix of order 2×2 .
