

Seat No.	
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M.B.A. (Part-I) (Semester-I) (New-Course)**Examination, Dec. - 2013****MATHEMATICS AND STATISTICS FOR MANAGEMENT****(Paper-III)****Sub. Code : 48322****Day and Date : Thursday, 26 - 12 - 2013****Total Marks : 70****Time : 10.00 a.m. to 1.00 p.m.**

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

Q1) a) i) Evaluate

$$1) \lim_{x \rightarrow a} \left[\frac{x^3 - a^3}{x^2 - a^2} \right]$$

$$2) \lim_{x \rightarrow 0} \left[\frac{x}{\sqrt{x+a} - \sqrt{a}} \right]$$

ii) Find out the marginal revenue for the demand function $p = 30 - 2x^2$. [10]

b) Define S.D.. From the prices of shares X and Y given below, state which share is more stable in value. [10]

X	55	54	52	53	56	58	52	50	51	49
Y	108	107	105	105	106	107	104	103	104	101

Q2) a) i) 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 $f(2)$, $f\left(\frac{3}{4}\right)$, $f\left(\frac{1}{2}\right)$, $f\left(\frac{1}{4}\right)$.

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ii) Find $\frac{dy}{dx}$ for the following:

1) $y = (x^2 + 1)(x^3 + 2x + 4)$

2) $y = \frac{x^2 - 1}{x^2 + 1}$ [8]

b) Define regression coefficients. The following table gives the age of cars of certain make and actual maintenance costs. [7]

Age of car	2	4	6	8
Maintenance cost (in Rs.)	10	20	25	30

Obtain regression equation for cost related to age and estimate the maintenance cost for ten year old car.

Q3) a) i) Solve the equations by Cramer's rule.

$$2x + 3y - 7 = 0, 4x - 5y - 3 = 0.$$

ii) Find the simple interest on Rs. 2000 for 8 months at 15% p.a. [8]

b) Define Time series. Compute five yearly moving averages and plot original and trend values on the same graph paper. [7]

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Production	42	45	50	51	41	38	45	28	50

Q4) a) Define Diagonal Matrix. Show that the inverse of matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix} \text{ exists and find its inverse.} [8]$$

b) Define the terms i) correlation ii) correlation coefficient.

Following are the values of import of raw material and export of finished goods in suitable units.

Export	10	11	14	14	20	22	16	12	15	13
Import	12	14	15	16	21	26	21	15	16	14

Calculate the coefficient of correlation between the import and export values. [7]

Q5) Attempt any four:

- a) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, show that the matrix A satisfies the equation $A^2 - 5A - 2I = 0$, where I is unit matrix.
- b) Show that the function $f(x) = 2x^3 - 9x^2 + 12x + 5$ is maximum at $x = 1$. Find this maximum value.
- c) Draw a mean chart to the following data.

Sample No.	1	2	3	4	5	6	7	8
Mean	18	20	22	25	21	30	24	26
Range	2	3	5	6	1	4	4	5

You are given that for $n = 5$, $A_2 = 0.58$.

- d) Define the terms:
- Index number
 - Price index number
 - Value index number
- e) Find the polynomial function of the lowest degree, if $f(0) = 8, f(1) = 11, f(4) = 68, f(5) = 123$.
- f) The service time in minute at the reservation counter of a railway station is given by the following frequency distribution. Calculate the average service time.

Service time (in minutes)	2.1 – 2.7	2.7 – 3.3	3.3 – 3.9	3.9 – 4.5	4.5 – 5.1	5.1 – 5.7
Frequency	2	6	7	5	3	2

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