SF - 432

Seat No.	

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M.B.A. (Part - I) (Semester - I) (Regular) Examination, December - 2016

MATHEMATICS AND STATISTICS FOR MANAGEMENT (Paper - III)

Sub. Code : 48322

Day and Date : Thursday, 08 - 12 - 2016 **Total Marks : 70**

Time : 10.30 a.m. to 01.30 p.m.

Instructions : 1) **Questions numbers 1 and 5 are compulsory.**
2) **Attempt any Two questions from Q.2 to Q.4.**
3) **Figures to the right indicate full marks.**
4) **Use of nonprogrammable calculator is allowed.**

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Q1) a) i) Evaluate $\lim_{x \to 1}\left[\frac{x}{x-1} - \frac{1}{x^2 - x}\right]$

ii) Find the value of x, *if* $\begin{vmatrix} x & 1 & 1 \\ 1 & x & 1 \\ 1 & 1 & 1 \end{vmatrix} = 0$

b) State the relation between correlation coefficient and regression coefficients and verify them by using following data.

x	2	3	4	7	6
y	10	7	3	1	2

[10 + 10 = 20]

Q2) a) i) If $x^2+y^2 = 2xy$ then show that $\frac{dy}{dx} = 1$.

ii) Find the simple interest on Rs. 10,000 for 73 days at 10% p.a.

b) Write note on secular trend in case of time series. Find 3-yearly moving averages from the following data.

Year	1	2	3	4	5	6	7	8	9	10
Sales in lac	4	7	10	12	10	15	20	22	23	22

[8 + 7 = 15]

P.T.O.

Q3) a) i) Define the terms: Index number, price index number, quantity index number, value index number

ii) If $A=\begin{bmatrix}1 & 0\\ -1 & 2\end{bmatrix}$ and $\begin{bmatrix}2 & 1\\ 3 & -2\end{bmatrix}$ then show that $AB \neq BA$

b) Define mean and mean deviation (M.D.) about mean and find the same from the following data.

Class	0-4	4-8	8-12	12-16	16-20
Frequency	4	6	8	5	2

[8 + 7 = 15]

Q4) a) Explain construction of control chart you are given the values of sample means and the ranges for 10 samples of size 5 each. Draw a mean chart and comment on the state of control of the process.

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean	43	49	37	44	45	37	51	46	43	47
Range	5	6	5	7	7	4	8	6	4	6

Given for n = 5, $A_2 = 0.58$

b) State the conditions for minima and maxima of the function $f(x)$:

Show that the function $f(x) = x^3 - 3x^2 - 9x + 12$ is maximum at $x = -1$ and find its maximum value.

[8 + 7 = 15]

Q5) Attempt any four. **[20]**

a) The cost function is given by $C = 2 + 3x + x^2$. Find the average cost and marginal cost at $x = 3$

b) Interpret, if (i) r = + 1, ii) r = –1, iii) r = 0, where r is correlation coeffcient.

c) Prepare the divided difference table for the following data.

x	2	4	9	10
$f(x)$	4	56	711	980

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

$$f(x) = 1 + x, \quad -1 \le x < 0$$

$$= 1 - x, \quad 0 \le x < 1$$

$$= x - 1, \quad 1 \le x \le 2$$

Find $f\left(-\frac{1}{3}\right), f\left(\frac{1}{2}\right), f\left(\frac{6}{5}\right), f(0), f\left(\frac{4}{3}\right)$.

e) If $A = \begin{bmatrix} 1 & 2 \\ 3 & -1 \end{bmatrix}$ then verify A. Adj.A = |A|.I, where I is unit matrix

f) Define standard deviation (S.D.) for a set of 100 observations, the sum is 389 and sum of squares is 2570. Find S.D.

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