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6000 52/6/25/

January 2018

Master of Business Administration (MBA) Examination

First Semester (Full Time)

MATHEMATICS AND STATISTICS FOR MANAGERS

Time 3 Hours] [Max. Marks : 80]

Note : Attempt any five questions with a minimum of two questions from each section. All questions carry equal marks.

Section A

1. **Define the following terms :**
   (a) Singleton Set (b) Proper Subset (c) Power Set
   (d) Constant Function (e) Consumption Function (f) Annuity
   (g) Continuity of a Function (h) Consumer Surplus. 2 each

2. (a) If the supply function of a firm is given as $p = \sqrt{b} + (x/a)$, then calculate the elasticity of supply of the firm at $x = 2a$. 4

   (b) If $y = a^x \cos x + \log(\sin^{-1} x)$, then find $\partial y/\partial x$. 4

   (c) The cost function of a firm producing electrical switches is given by $c(x) = \left(\frac{x^2 + 4x}{x+3}\right) + 20$. Show that increase in output level results in fall of marginal cost. 8

3. (a) $\int \frac{(x-1)^2}{\sqrt{x}}\,dx$

   (b) $\int \frac{\log\sqrt{x+5}}{(x+5)}\,dx$

   (c) $\int \frac{1}{\sqrt{(5-x)^2 + 2^2}}\,dx$

   (d) $\int \frac{\log\log e^x}{e^x}\,dx$. 4 each

4. (a) Solve the following equations using matrices / determinants :

$$4x + 5y + z = 4$$
$$6x + 9y + 3z = 18$$
$$x + y + z = 10.$$

   (b) If $A = \begin{bmatrix} 1 & 3 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix}$ then prove that : $(AB)^t = B^t A^t$.

Section B

5. (a) "Statistics are like proposals of marriage – they should be, but rarely are, studied and considered, very deliberately, upon their all round merits." In the light of this statement, examine the functions and limitations of Statistics.

   (b) Calculate the rank correlation coefficient :

X	:	48	33	40	9	16	16	65	24	46	57
Y	:	13	13	24	6	15	4	20	9	6	19

6. (a) A has 4 shares in a lottery in which there are 4 prizes and 5 blanks. B has 3 shares in another lottery in which there are 3 prizes and 4 blanks. Which has the better chance of winning exactly one prize ? What is the chance of winning two prizes ?

   (b) Explain the distinctive features of Binomial, Normal and Poisson probability distributions.

7. (a) Two varinbles gave the following data :

$\bar{X} = 20$, $\bar{Y} = 15$, $\sigma_x = 4$, $\sigma_y = 3$, $r = +0.7$.

Obtain the two regression equations and find the most likely value of Y when X = 24.

(b) The following are the annual profits in thousands in a certain business :

Year :	2001	2002	2003	2004	2005	2006	2007
Profit :	60	72	75	65	80	85	95

By the method of least squares, fit a straight line, using that estimate the profit for 2011.

8. (a) Explain the following :

(i) Expected Pay Off (ii) EVPI.

(b) Calculate the Coefficient of Correlation : (Karl Pearson's Method)

X :	6	2	10	4	8
Y :	9	11	–	8	7

Arithmetic Mean of X and Y series are 6 and 8 respectively.