January 2017

Master of Business Administration (MBA) Examination

I Semester

Mathematics and Statistics for Managers

Time 3 Hours] [Max. Marks 80, Min Marks : 32

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

Section A

1. (a) In a class of 30 students, 14 has taken mathematics, 10 has taken mathematics but not economics. Find the number of students who had taken mathematics and economics, also find the number of students who had taken economics but not mathematics ?

   (b) If the two functions f (x) and g(x) is defined as $f(x) = \frac{2}{2-x}$ and $g(x) = \frac{x-2}{x}$. then find whether f{g(x)} is equal to g {f(x)} ?

2. (a) Examine the continuity of the function f(x) at x = 1 and x = 2 where :

   $f(x) = 4 - 2x$ if $x < 1$
   $= 2$ if $1 \leq x < 2$
   $= 4x-6$ if $x \geq 2$.

   (b) 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 with increase in output level results in fall of marginal cost.

3. (a) $\int \sqrt{9x^2-16}dx$.

   (b) The cost of a machinery is Rs. 1,00,000 and its effective life is 12 yrs. If the scrap realises only Rs. 5,000, what amount should be retained out of profit at the end of each year to accumulate at compound interest 5% p. a. ?
   (You may use $\log_{10} 1.05 = 0.0212$, $\log_{10} 1.797 = 0.2544$).

   (a) Solve the following linear equations using matrix method :

   $$x - y = 3$$
   $$2x + 3y + 4z = 17$$
   $$y + 2z = 7.$$

   (b) Write a note on Input / Output Analysis.

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Section B

5. (a) The shelf life of as electronic tester is normally distributed with mean life of 200 hrs. and the standard deviation was found to be 50. If there are 500 number of testers, find :
   (i) How many of them have shelf life less then 180 hrs. ?
   (ii) How many of them have shelf life more than 250 hrs ?
   (iii) Number of testers having shelf life ranging between 190 hr. and 220 hr.

   (b) The odds in favour of Manish solving a problem in probability is 7:5 and the odds against Ankur is 5:4. If both of them attempt the problem independently then :
   (i) Find the probability that the problem will be solved.
   (ii) Neither of them could solve the problem.

6. (a) What are the various elements in decision making ?

   (b) "Statistical methods are most dangerous tools in the hands of an inexpert." Elucidate.

7. (a) Find the regression coefficient of y on x from the following regression equations :

   $$5x = 22 + y$$
   $$64x = 24 + 45y.$$

   Is it possible to calculate the standard deviation of y from the given information ? Answer with reason.

   (b) Find Karl Pearson's Coefficient of Correlation from following data :

X :	50	50	55	60	65	65	65	60	60	50
Y :	11	13	14	16	16	15	15	14	13	13

8. (a) Calculate seasonal indices from following data :

Year	Quarter I	Quarter II	Quarter III	Quarter IV
1	68	62	61	63
2	65	58	56	61
3	68	63	63	67
4	70	59	56	62
5	60	55	51	58

   (b) Explain what is meant by Time Series Analysis ? Describe briefly the various characteristic movements of a tune series.

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