PG – 961

I Semester M.B.A. Degree Examination, February 2017
(2007-08 Scheme)
MANAGEMENT
Paper – 1.5 : Business Mathematics and Analytics

Time : 3 Hours Max. Marks : 75

SECTION – A

Answer **any six** questions ; **each** question carries **two** marks : **(6×2=12)**

1. a) Define linear equation.
   b) What do you mean by 'adjoint' of a matrix ?
   c) What is multi-stage sampling ?
   d) What is conditional probability ?
   e) What is null hypothesis ?
   f) What do you mean by cluster sampling ?
   g) What is Poisson distribution ?
   h) What is judgemental sampling ?

SECTION – B

Answer **any three** questions, **each** question carries **eight** marks : **(3×8=24)**

2. a) Explain any five properties of determinants.
   b) Using matrix inversion method, solve the following system of equations

$2x - y + 2z = 6$

$x - 2y + 3z = 6$

$3x - 3y - z = -6.$

P.T.O.

3. a) A firm produces x tonnes of an item at the total cost

$$c(x) = ₹ \left(\frac{1}{10}x^3 - 9x^2 + 85x + 17\right)$$

Find :

i) The average cost.

ii) The average variable cost.

iii) The average fixed cost.

b) What are various methods of collecting statistical data ? Which of these is more reliable and why ?

4. a) Below are given the figures of production (million tonnes) of a sugar factory :

Year	2003	2004	2005	2006	2007	2008	2009
Production (in tonnes)	80	90	92	83	94	99	92

i) Fit a straight line trend to these figures.

ii) Plot these figures on a graph and show the trend line.

b) Calculate Pearson's coefficient of skewness :

x :	12.5	17.5	22.5	27.5	32.5	37.5	42.5	47.5
f :	28	42	54	108	129	61	45	33

5. a) Calculate the coefficient of correlation between x and y from the following data and calculate probable error. Assume 69 and 112 as the mean value for x and y respectively.

x :	78	89	99	60	59	79	68	61
y :	125	137	156	112	107	136	123	108

b) Explain addition and multiplication rule of probability with an example.

6. a) From the following data obtain the two regression equations and calculate the correlation coefficient :

x :	1	2	3	4	5	6	7	8	9
y :	9	8	10	12	11	13	14	16	15

Estimate the value of y which should correspond on an average to x = 6.2.

b) What is chi-square test ? Explain its properties.

SECTION – C

Answer **any two** questions, **each** question carries **twelve** marks : **(2×12=24)**

7. In 1999 for working class people wheat was selling at an average price of ₹ 120 per 20 kg, cloth ₹ 20 per metre, house rent ₹ 300 per house and other items ₹ 100 per unit. By 2009 cost of wheat rose by ₹ 180 per 20 kg, house rent by ₹ 450 and other items double in price. The working class cost of living index for the year 2009 with 1999 as base was 160. By how much the cloth rose in price during the period ?

8. Calculate the cost of living index, Fisher's ideal index and prove the tests of consistency for the following data :

Commodity	Price in 2009	Quantity in 2009	Price in 2010	Quantity in 2010
A	16	8	18	8
B	14	6	15	7
C	12	5	10	6
D	8	9	9	9
E	16	10	20	12

9. What is sampling ? Discuss the various methods of sampling and comment on their appropriateness and usefulness.

SECTION – D

This Section is **compulsory** : **(1×15=15)**

10. A restaurateur has 3 projects in hand. He can only take up one project at a time. The first project is to take up a fast food corner at an investment of ₹ 5,00,000 where the chances of success will be 0.70 with a cash inflow of ₹ 10,00,000. Failure means cash inflow of ₹ 1,00,000 in salvage furniture and utensils.

    The second project is to open an expression coffee shop with an investment of ₹ 7,00,000 where there will be a chances of success will be 0.5 with an inflow of ₹ 4,50,000, failure means an inflow of ₹ 50,000 in salvage material.

    The third project is to start a Apoorva with an investment of ₹ 12,00,000 the chances of success are 0.6 with an inflow of ₹ 14,00,000. Failure means an inflow of ₹ 5,00,000 in salvage material.

    If there is a success, the restaurateur will decide to start a Apoorva with an investment of ₹ 9,00,000, where by he can expect high demand with 0.9 probability and ₹ 11,00,000 inflow, medium demand with 0.2 probability and cashflow of ₹ 10,00,000, low demand with a cash inflow of ₹ 2,00,000.

    All the amounts have been adjusted to current value are expected to draw a decision tree and a pay off table and thereby advise the restaurateur about the best course of action.