COMPUTER ORIENTED NUMERICAL METHODS

Time : Three Hours Maximum Marks : 80

Note : Attempt ***five*** questions in all. Selecft ***one*** question from each section. Question No. 1 is compulsory. All questions carry equal marks.

(COMPULSORY QUESTION)

1. **Compulsory Questions.**

   (a) If μ_r is the moment of a variable about mean and μ'_r is the moment about an arbitrary point, determine relationship between μ_r and u'_r.

   (b) One bag contains 4 white and 2 black balls; and another contains 4 white and 5 black balls. If one

ball is drawn from each bag, find the probability that borth are white.

(c) Show that Co-efficient of correlation r(x, y) is independent of change of scale and shift of origin.

(d) Determine Arithmetic mean and Standard deviation of Poisson distribu6tion.

(e) Define Regression co-efficient and Regression lines.

(f) Explain the significance of Ch-square distribution with degree of freedom and confidence interval.

(3×6=18)

UNIT-I

2. A class interval of weight (in lbs unit) and frequenceis are given below :

Class (Weight)	Frequencies (f)
118-126	3
127-135	5
136-144	9
145-153	12
154-162	5
163-171	5
172-180	2

Find Arithmetic mean, Mode and Median. 6,6,6

3. (a) A frequency distribution is given below :

x :	61	64	67	70	73
f :	5	18	42	27	8

Fidn first four moments about Arithmetic mean.

(b) Write an algorithm to determine Arithmetic mean of a distribution. 9,9

UNIT-II

4. The heights of father (X) and son (Y) are given below :

X :	65	63	67	64	68	62	70	66	68	67	69	71
Y :	68	66	68	65	69	66	68	65	71	67	68	70

(a) Find Co-relation coefficient.

(b) Find Regression coefficient (b_{YX}) of Y on X. 6,9

5. (a) Find 3% of the electric bulbs manufactured by a company.

(i) 0
(ii) 1
(iii) 2
(iv) 4 bulbs are defective.

(b) Write an algorithms to find variance of a frequency distribution x_i and f_i for i = 1, 2, ..., n. 9,9

UNIT-III

6. (a) A sample of 10 measurements of diameter of a sphere given as mean ($\overline{X}$) = 438 cm and standard deviation (y) = 0.06. Find (a) 95% and (b) 99% confidence limits for the actual diameter.

(b) The distribution of digits 0, 1, 2, 3, ..., 9 in a random sample of 250 digits are as follows :

Digits :	0	1	2	3	4	5	6	7	8	9
Observed frequences :	17	31	29	18	14	20	35	30	20	36
Expected frequencies :	25	25	25	25	25	25	25	25	25	25

Does the observed distribution differ significantly from the expected distribution ? 9,9

7. (a) Fit a Least square curve $y = a + bx + cx^2$ for the following distribution :

x :	0	1	2	3	4	5	6
y :	2.4	2.1	3.2	5.6	9.3	14.6	21.9

(b) Write an algorithm to fit the curve $y = a + bx + cx^2$? 9,9

UNIT-IV

8. (a) Explain the terms :
(a) Random experiment
(b) Conditional experiment
(c) Mutually exclusive events.

(b) The contents of two bags of same appearance are as follows :
Bag 1 : 4 red, 3 black and 3 white and
Bag 2 : 3 red, 4 black and 4 white.

Onebag is chosen at random and two balls on drawn. They happen to be red and white. What is the probability that they come from Bag 2 ? 9,9

9. A company wishes to test our different types of tyres : A, B, C and D. The tyre's life-time, as determined from their threads, are given (in thousand miles) in table below, where each type has been tried on six similar automobiles assigned at random to the tyres. Using one-way classification, determine that there is a significant difference between the tyres are (a) 0.05 and (b) 0.01 levels.

A	33	38	36	40	31	35
B	32	40	42	38	30	34
C	31	37	135	33	34	30
D	29	34	32	30	33	31

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