

Total No. of Questions : 6]

[Total No. of Pages : 4

P583

[3775] - 104

M.B.A.

April - 2010

## 104 : STATISTICAL &amp; QUANTITATIVE METHODS

(Sem. - I) (2008 Pattern)

Time : 3 Hours]

[Max. Marks : 70

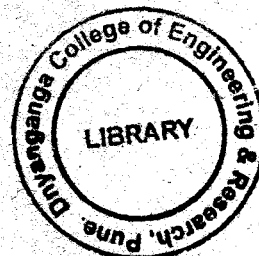
Instructions to the candidates :

- 1) Hand writing should be neat & clear.
- 2) Question No. 1 & Question No. 4 are compulsory.
- 3) Answer any one question from Question No. 2 and 3 and answer any one question from Question No. 5 and 6.
- 4) Use of electronic calculators and statistical tables are allowed.
- 5) Figures to the right indicate full marks.

- Q1) a) State the merits and demerits of Median. [5]
- b) For the data about the heights of boys and girls studying in a college [5]

	Boys	Girls
Number	375	85
Avg. height	67.5	64
Variance	10	6

- i) Which group has more consistent heights?
  - ii) What is combined standard deviation of the heights?
- c) Probability that a man will be alive 5 years hence is 0.35 and probability that his wife will be alive 5 years hence is 0.42. Find the probability that 5 years hence [5]
- i) Only wife is alive.
  - ii) Exactly one of them is alive.
  - iii) None of them is alive.
- d) In a certain factory turning out rator blades there is a small chance  $\frac{1}{400}$  for any blade to be defective. The blades are supplied in a packet of 10. In 100 packets find the expected number of packets containing [5]
- i) No defective.
  - ii) Atleast 2 defectives.



P.T.O.

Q2) a) Estimate  $X_2$  when  $X_1 = 58$  &  $X_3 = 52.2$  for the data given below. [8]

$$\bar{X}_1 = 55.9 \quad \bar{X}_2 = 51.48 \quad \bar{X}_3 = 56.1$$

$$\sigma_1 = 2.25 \quad \sigma_2 = 4.3 \quad \sigma_3 = 4.4$$

$$r_{12} = 0.578 \quad r_{13} = 0.581 \quad r_{23} = 0.974$$

b) Give various measures to find association of attribute and find association between tea drinkers & smokers. 73 are tea drinkers out of 88 people. Out of 43 smokers 3 are non tea drinkers. [7]

Q3) a) A set of examination marks is approximately normally distributed with a mean of 75 marks & standard deviation of 5. If top 5% of the students get grade A and bottom 25% get grade F. What is the marks of lowest A and highest F. [8]

b) Find correlation between husbands age (Y) and wife's age (X) from the following data

X	29	18	22	27	27	28	21
Y	36	23	28	28	31	35	25

[7]

Q4) a) The wholesale company has three warehouses from which supplies are drawn for four retail customers. The company deals in a single product, the supplies of which at each warehouse are [8]

Ware house No	Supply (units)	Customer No.	Demand units
1	20	1	15
2	28	2	19
3	17	3	13
		4	18

Conveniently total supply at the ware houses is equal to total demand from the customer. The following table gives the transportation costs per unit shipment from each ware house to each customer.

Ware house	Customer			
	1	2	3	4
1	3	6	8	5
2	6	1	2	5
3	7	8	3	9

Determine the allocation to minimize overall transportation cost.

b) Solve the following game

[7]

		Player B				
		$b_1$	$b_2$	$b_3$	$b_4$	$b_5$
Player A	$a_1$	3	5	4	9	6
	$a_2$	5	6	3	7	8
	$a_3$	8	7	9	8	7
	$a_4$	4	4	8	5	3

c) Modern Bakery keeps the stock of the popular brand of cake. Previous experience indicates the daily demand as given below.

Daily demand	0	10	20	30	40	50
Probability	0.02	0.19	0.16	0.45	0.13	0.05

Estimate average balance stock, if the owner of the bakery decides to make 30 cakes every day. Use following random numbers

47, 88, 15, 91, 57, 67, 11, 54, 60, 89

[5]

Q5) a) The past experience shows that the number of copies of a book in demand are between 25 and 30 copies. Some agency purchases such unsold copies for Rs. 35. The vendor purchases the copies at Rs. 83 each and sales them at Rs. 110 each.

Find the number of copies to be kept in stock using EMV criteria if probability of demand are known as

Demand	25	26	27	28	29	30
Probability	0.05	0.10	0.30	0.32	0.16	0.07

[8]

b) Find the quantity of each type of chair to be produced to maximize profit

$x \rightarrow$  Quantity of chairs of type A

$y \rightarrow$  Quantity of chairs of type B.

using following constraints

$$6x + 4y \leq 3600, 2x + 4y \leq 2000, 4.6x + 4y \leq 3600, x \leq 500, y \leq 400$$

$$x, y \geq 0.$$

[7]

- Q6) a)** In a railway marshalling yard goods train arrive at a rate of 30 trains per day. Assuming that the inter arrival time follows an exponential distribution and the service time distribution is also exponential with an average 36 minutes calculate the following
- Mean queue size
  - Average time the train spends in yard.
  - Probability that queue size exceeds 10.
  - Probability that system is idle. [8]
- b)** The Head of the department has five jobs A, B, C, D, E & five subordinates V, W, X, Y, Z. The number of hours each man would take to perform each job is as follows.

	V	W	X	Y	Z
A	3	5	10	15	8
B	4	7	15	18	8
C	8	12	20	20	12
D	5	5	8	10	6
E	10	10	15	25	10

Find the optimum allocation of jobs to the subordinates. [7]

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