A-302 Q.P-I

TIME : 2 Hrs **MARKS : 60**

1. **All questions are compulsory.**
2. **Only simple calculators are allowed.**
3. **Figures to the right indicate full marks.**

Q.1 **a.** Define median for raw data. Also give merits and demerits of median. Give application of mode in practice. **(5)**

b. Following is the bivariate data giving height (X in cm) and weight (Y) in kg of some students. **(5)**

(144, 56); (147, 38); (142, 58); (152, 50); (148, 52); (149, 44); (146, 46); (148, 45); (152, 54); (153, 39); (145, 42); (155, 61); (156, 62); (156, 44); (151, 37); (158, 46); (148, 65); (158, 51); (147, 62); (142, 55)

Prepare bivariate frequency distribution with class - intervals for X as 140 - 145, 145 - 150, ... and for Y as 30 - 40, 40 - 50, ... Also write marginal frequency distribution of X and Y.

c. Following data gives distribution of salary of some employees. **(5)**

Salary (in '000 Rs.)	No. of employees
30 - 40	14
40 - 50	20
50 - 60	25
60 - 70	32
70 - 80	28
80 - 90	10

Find mode of the distribution. Also find mode from graph.

OR

Q.1 **p.** Define the concept of correlation between two variables. Explain strong positive & Negative correlation and perfect positive correlation with the help of scatter diagram. **(5)**

q. Find the missing frequencies given that arithmatic mean of the distribution is 4100 hrs. **(5)**

Life (in hours)	No. of batteries
1000 - 2000	100
2000 - 3000	—
3000 - 4000	200
4000 - 5000	300
5000 - 6000	150
6000 - 7000	50
7000 - 8000	50

r. For the following data, Find lower quartile Q_1, upper quartile Q_3 and coefficient of quartile deviation. **(5)**

Marks	No. of Students
50 - 70	7
70 - 90	12
90 - 110	14
110 - 130	10
130 - 150	5
150 - 170	3

Q.2 **a.** Find variance and standard deviation of the following data. **(5)**

Profit (in '000 Rs.)	No. of Shops
7 - 9	4
9 - 11	6
11 - 13	12
13 - 15	12
15 - 17	8
17 - 19	5

b. Find combined mean and combined variance for the following 2 groups taken together. **(4)**

	Group I	Group II
Observations	50	60
Average	200	300
Standard Deviation	10	15

c. Following data gives price of Rice (x) and price of wheat (y). **(6)**

x:	15	18	20	14	16	22
y:	8	10	12	10	7	15

Find correlation coefficient between x and y and comment on the result.

OR

Q.2 **p.** From the following data, Find correlation coefficient r & comment on the result. **(5)**

$\Sigma x = 96$; $\Sigma y = 84$; $\Sigma x^2 = 1128$; $\Sigma y^2 = 1380$; $\Sigma xy = 312$

$n = 10$

q. Mean of 100 items was found to be 40. The mean of 60 items out of them was 32. Find the mean of the remaining items. **(4)**

r. Following is the distribution of salaries of some employees in 2 factories A and B. **(6)**

Salary (in '000 Rs.)	No. of Workers	
	Factory A	Factory B
6 - 8	12	6
8 - 10	10	20
10 - 12	8	5
12 - 14	5	4

.3 **a.** Find the regression line of x on y from the following data. **(5)**

$\bar{x} = 23$, $\bar{y} = 50$, $\delta x = 4$, $\delta y = 5$, $r = 0.75$

Estimate y when x = 42

b. Define: Independent events **(5)**

A bag contains 7 blue and 5 red balls. 3 balls are selected randomly. Find the probability that

i. At least 2 red balls are selected

ii. All blue balls are selected

c. From the following data, for a particulars city find the Crude Death Rate for the entire population and the Age - specific Death Rates for each group. **(5)**

Age Group (Years)	Population	No. of deaths
Under 10	25,000	340
10 - 30	32,000	200
30 - 50	40,000	105
50 - 70	30,000	450
70 and above	10,000	400

OR

Q.3 **p.** From the following data, Find regression line of profit (y) on advertising expenditure (x). **(6)**

Advt. Exp. (x) (in lakh)	12	15	20	18	10
Profit (y) (in lakh)	8	22	25	15	9

Estimate Profit if Advertising Expenditure is 25 lakhs.

q. 3 cards are drawn from a pack of 52 cards, randomly. Find the probability that **(6)**

i. 2 red and 1 black card is selected

ii. One king and 2 jack cards are selected.

r. Fill in the blanks in the following portion from a life table. **(4)**

X	lx	dx	px	qx	Lx	Tx	e^0_x
10	80,000	—	—	—	—	40,54,600	—
11	70,200	600	—	—	—	—	—

Q.4 **a.** Define value Index Number. **(5)**

For the following data, find Laspeyere's Paasche and Fisher's Index Number.

Commodity	Price		Quantity	
	2005	2010	2005	2010
A	4	15	10	20
B	18	20	20	30
C	50	25	45	20
D	14	3	22	4

b. Explain the following terms. **(4)**

1. Insurance and types of insurance
2. Paid up value

c. Calculate the Gross Reproduction Rate (GRR) and the Net Reproduction Rate (NRR) (per women) from the following data. **(6)**

Age Group	No. of children born to 1000 women in the age group	Mortality Rate per 1000
15 - 19	163	128
20 - 24	1613	183
25 - 29	1789	156
30 - 34	802	218
35 - 39	506	211
40 - 44	215	233
45 - 49	110	250

The percentage of women in the population is 54.

OR

Q.4 **p.** Give 2 uses of Index Numbers for the following data, find Marshall - Edgeworth Index Number. **(5)**

Commodity	2008		2012	
	Price	Quantity	Price	Quantity
Rice	28	10	34	15
Wheat	15	20	22	25
Jawar	20	14	24	10
Others	50	5	58	7

q. Explain the following terms. **(4)**

1. Addition theorem of Probability.
2. If $P(A) = 0.8$
   $P(B) = 0.1$
   $P(A \cup B) = 0.5$

   Find 1. $P(A \cap B)$
   2. $P(A')$
   3. $P(B')$

r. **i.** If the two regression lines are given as **(2)**
$3x - 5y - 92 = 0$ and $2x - y - 80 = 0$
Find $\bar{x}$ and $\bar{y}$

ii. Given the following data, find the missing values. **(4)**

	Group I	Group II	Group I & II together
Number	70	—	100