Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instructions : (1) Attempt all questions.

(2) Each question carries equal marks.

1 Answer the following questions : (any **seven**)   14

(1) Degree of freedom for paired t-test is _____.

(2) Define type-II error.

(3) The _____ is applied when sample size is small.

(4) The range of Regression coefficient is _____.

(5) In moderate negative correlation coefficient r lies between _____.

(6) Define correlation.

(7) Define null hypothesis.

(8) Define type-I error.

(9) Write the formula for Spearman's rank correlation coefficient.

2 Answer the following questions :   14

(a) Tuberculin test reaction of 10 patients measured in millimeters as 3, 5, 7, 7, 8, 8, 9, 10, 11 and 12. Find the mean size of reaction.

(b) Discuss the applications of Chi-square test.

OR

2 Answer the following questions : 14
(a) Define following terms :
(1) Mean (2) Median (3) Mode
(b) The following data show monthly advertising expenditure and sales over a period six months. Estimate the regression line of sales on advertising expenditure.

Sales	3	15	6	20	09	25
Advertising Expenditure	1	2	3	4	5	6

3 Answer the following questions : 14
(a) Draw the Histogram of the following data :

Blood Pressure	$70-75$	$75-80$	$80-85$	$85-90$	$90-95$	$95-100$
No. of Patients	4	20	50	16	6	4

(b) Explain the properties of regression coefficient.

OR

3 Answer the following questions : 14
(a) Draw Scatter diagram of the following data :

Temperature $(°C)$	14.3	16.2	19.6	15.2	18.6	22.1	19.4	25.0
Ice Cream Sales ($)	216	325	185	322	4.6	521	410	514

(b) Find the standard deviation of incubation period of small pox when 9 patients it was found to be 14, 13, 11, 15, 10, 7, 9, 12 and 10.

4 Answer the following questions : 14
(a) Find Karl Pearson's correlation coefficient between the sales and expenses of the following ten firms.

Sales	50	50	55	60	65	65	65	60	60	50
Expenses	11	13	14	16	16	15	15	14	13	13

(b) Explain types of correlation.

OR

4 Answer the following questions : 14
(a) An I. Q. test administered to 5 medical representatives before and after they were trained. The results are given below :

I.Q. before training	110	120	123	132	125
I.Q. after training	120	118	125	136	127

(b) Discuss merits and demerits of rank correlation coefficient.

5 Answer the following questions :   **14**

(a) The following data relate to the sales in a time of trend depression of a certain article in a wide demand. Do the data suggest that the sales are significantly affected by depression ?

Sale	Trade depression	
	Not Hit by	Hit By
Satisfactory	140	60
Not Satisfactory	40	60

(b) Define following terms :

(1) Range (2) Standard Deviation (3) Mean Deviation.

OR

5 Answer the following questions :   **14**

(a) In an experiment of pea breeding the following frequencies were obtained.

Round and Yellow	Wrinkled and Yellow	Round and Green	Wrinkled and Green
315	101	108	32

Theory predicts that the frequencies are in proportions 9:3:3:1. Examine the correspondence between the theory and the experiment.

(b) A certain stimulus is administrated to each of 12 patients resulted in the following change in blood pressure : 5, 2, 8, –1, 3, 0, 6, –2, 1, 5, 0, 4. Can it be conclude that the stimulus will increase the blood pressure.