

Duration: 3Hrs.

Total Marks :80

N.B.

- 1) Question **number 1** is compulsory
- 2) Attempt **any three** out of the remaining **five questions**.
- 3) Assume suitable data if **necessary** and justify the assumptions.
- 4) Figures to the **right** indicate full marks

Q1 Answer the Following **20**

- a) Define “Statistics”. Explain Uses and Limitations of Statistics.
- b) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence is 1.96.
- c) What are assumptions of Multiple Linear Regression?
- d) Distinguish between Null and Alternative hypothesis.

Q2 a) Represent the following data by a percentage sub-divided bar diagram. **10**

Item of Expenditure	Family A	Family B
	Income Rs 500	Income Rs 300
Food	150	150
Clothing	125	60
Education	25	50
Miscellaneous	190	70
Saving or Deficits	+10	-30

- b) Distinguish between primary data and secondary. What precautions should be taken in the use of secondary data. **10**

Q3 a) The following Table gives the frequency distribution of the weekly wages(in '00RS.) of 100 workers in factory. Draw the Histogram and frequency polygon of the distribution. **10**

Weekly wages ('00 RS)	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	Total
No. of Workers	4	5	12	23	31	10	8	5	2	100

- b) The equation of two lines of regression obtained in correlation analysis are given below: **10**
 $2X=8-3Y$ and $2Y=5-X$
 Obtain the value of the correlation coefficient

- Q4 a)** From the data given below find: **10**
 a) The **Two** regression coefficients
 b) The **Two** regression equations
 c) The **coefficient of correlation** between the marks in Economics and Statistics
 d) The most likely marks in Statistics if marks in Economics are 30.

Marks in Economics	25	28	35	32	31	36	29	38	34	32
Marks in Statistics	43	46	49	41	36	32	31	30	33	39

- b)** Explain the following point Estimation Properties with Example **10**
 i) Consistency
 ii) Unbiasedness

- Q5 a)** The data with regard to the cost of production of 8 different drugs and cost of ingredients and packaging cost, are as given below: **10**

Sr No	cost of production (Rs.) (Y)	cost of ingredients (in thousands of Rs) (X1)	packaging cost(Rs.) (X2)
1	100	17	19
2	79	50	54
3	100	90	75
4	129	30	36
5	158	15	16
6	106	20	25
7	58	20	24
8	78	50	53

- a) Fit a regression $\hat{y} = a + b_1x_1 + b_2x_2$.
 b) Find the coefficient of multiple determination (R^2).
 c) Also test the significance of regression. (Given $F = 5.786$, for a significance level of $\alpha = 0.05$)
- b)** What is hypothesis testing? **10**
 i) Z-Test for Single Mean
 ii) Z-Test for Difference of Mean

- Q6** Answer the following **20**
 a) Explain the method of maximum likelihood estimation.
 b) Explain the Neyman Pearson Lemma
