

Commodity	Quantity consumed	Unit of Price	Price in 1990 (Rs 00)	Price in 1994 (Rs 00)
Wheat	20 kgs	Rs. per kg	1.25	1.50
Rice	10 kgs	Rs. per kg	3.00	3.75
Pulse	12 kgs	Rs. per kg	2.50	3.00
Sugar	4 kgs	Rs. per kg	2.00	3.25
Ghee	3 kgs	Rs. per kg	3.75	4.00
Milk	30 litres	Rs. per litre	0.50	0.75
Vegetables	35 kgs	Rs. per kg	0.25	0.40
Fuel	200 kgs	Rs. per kg	0.50	0.75
Cloth	22 meters	Rs. per meter	1.50	2.10
House Rent	1 unit	Rs. per unit	30.00	60.00

- c) What is meant by seasonal variation? Explain how seasonal variations are measured and removed from the time series data?

(5+10+5 Marks)

Q No. 5:

- a) A sample of 9 parts produced by certain production process are measured as 5, 7, 2, 4, 8, 9, 8, 6 and 5 inches respectively. Test the hypothesis that the process has the variance equal to 4 (inches)² at the 5% level of significance.
- b) Explain Non-parametric statistics. In what situations non-parametric procedures should be used?
- c) Given the two samples below, test the null hypothesis that the population medians are equal against the alternative that $M_1 < M_2$, at $\alpha = 0.05$ by applying the Wilcoxon rank-sum test.

Sample 1.	26, 25, 38, 33, 42, 40, 44, 26, 25, 43, 35, 48, 37
Sample 2	44, 30, 34, 47, 35, 46, 35, 47, 48, 34, 32, 42, 43, 49, 46, 47

(5+6+9 Marks)

- Q No. 6:**
- a) What are the various statistical organizations in Pakistan? Discuss the main sources of statistical data in Pakistan.
- b) The random variable X , representing the number of cherries in a cherry puff, has the following probability distribution

X	4	5	6	7
$P(X=x)$	0.2	0.4	0.3	0.1

- i) Find the mean μ and standard deviation σ of X
- ii) Find the mean $\mu_{\bar{X}}$ and variance $\sigma^2_{\bar{X}}$ of the mean \bar{X} for random samples of 36 cherry puffs.

(10+10 Marks)

- Q No. 7:**
- a) What are vital statistics? Describe the system for collection of vital statistics in Pakistan. Discuss its strong and weak points and suggest remedies.
- b) The employees in 4 different firms are distributed in three cell frequencies shown in the following table. Test the hypothesis that there is no relation between the firm and the type of labour. Let the level of significance be 5%

Firm	A	B	C	D
Type of labour				
Skilled	29	24	23	49
Semi-skilled	32	60	37	51
Manual	24	56	40	80

- (C) Define power of a test.

(8+10+2 Marks)

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