



Registration Number:

Date & session:

**ST. JOSEPH'S UNIVERSITY, BENGALURU -27  
OPEN ELECTIVE (Statistics) – II SEMESTER  
SEMESTER EXAMINATION: APRIL 2023**

(Examination conducted in May 2023)

**STOE3: APPLIED STATISTICS**

**(For current batch students only)**

**Time: 2 Hours**

**Max Marks: 60**

**This paper contains TWO printed pages and ONE part.**

**Usage of scientific calculator is allowed.**

**PART – A**

**I. Answer any SIX of the following**

**10 X 6 = 60**

1. A) Compute the Fisher's Index number and show that it satisfies Time Reversal and Factor Reversal test.

Item	Base Year		Current Year	
	Price ( $p_0$ )	Quantity ( $q_0$ )	Price ( $p_1$ )	Quantity ( $q_1$ )
A	12	240	15	225
B	14	56	18	90
C	11	110	12	144
D	14	70	20	120

- B) What is consumer price index number and what are its uses? (7+3)

2. A) For the following time series data, fit a straight-line trend by the method of least squares. Estimate the values for the year 2007.

Year	2001	2002	2003	2004	2005
Value	20	60	80	120	160

- B) What are Vital Statistics? What are the sources and uses of the same. (6+4)

3. A) Find Crude death rate and age specific death rate for cities A and B. Compare and contrast the same.

Age	A		B	
	Population	Deaths	Population	Deaths
Under 10	20000	600	12000	372
10 - 20	12000	240	30000	660
20 - 40	50000	1250	62000	1612
40 - 60	30000	1050	15000	525
60 and above	10000	500	3000	180

- B) Calculate the general fertility rate and total fertility rate for the following data. (5+5)

Age of women	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Number of women	212619	198732	212619	145362	128109	106211	86753
Number of births	20837	373705	25755	20307	12631	4546	1466

4. A) Differentiate between population and sample with two examples each.

B) Compare and contrast "Complete Enumeration" and "Sample Survey".

C) Explain lottery method of selecting a sample.

(3+3+4)

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5. A) What are the requisites of a good questionnaire. Explain any Two.  
 B) What is stratified random sampling? Illustrate with an example the need for stratification. (5+5)
6. A) Define the following terms: i) Control Limits, ii) Specification Limits, iii) Tolerance Limits.  
 B) Explain the procedure of systematic random sampling of obtaining a sample? What are the merits and demerits of the same (6+4)
7. A) A machine is set to deliver the packets of a given weight. Ten samples of size five each were examined and the following results were obtained:

Sample no	1	2	3	4	5	6	7	8	9	10
Mean	43	49	37	44	45	37	51	46	43	47
Range	5	6	5	7	7	4	8	6	4	6

Calculate the values for the central line and the control limits for the mean chart and range chart. Comment on the state of control. (Given  $n = 5$ ,  $d_2 = 2.326$ ,  $d_1 = 0.864$ )

- B) What is Statistical Quality Control. How is it used? (7+3)
8. A) What are the various criteria for detecting lack of control in  $\bar{x}$  and R chart. List any five.  
 B) Write a short note on double sampling plan. (6+4)

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