



OEST211

Reg. No. 

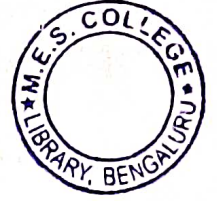
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II Semester B.Sc. Degree Examination, July/August - 2024

STATISTICS

Applied Statistics (O.E)

(NEP Scheme)



Time : 2½ Hours

Maximum Marks : 60

**Instructions to Candidates:**

- 1) Answer any **Eight** sub-divisions questions from Section A and **Three** questions from Section B.
- 2) Scientific **calculators** are allowed.

**SECTION - A**

**Answer any Eight sub-divisions from the following.**

**(8×3=24)**

1. What are Index numbers? Discuss the importance and limitations of index numbers.
2. What are Vital Statistics? Give their uses.
3. Define Crude Death Rate (CDR). Give its merits and demerits.
4. In a particular city 3000 live births occurred in particular year. The number of infant deaths was 200. Find infant mortality rate (IMR).
5. Define sampling and non-sampling error.
6. What is meant by
  - i) Simple Random Sampling (SRS)
  - ii) Simple Random Sampling With Replacement (SRSWR).
7. Explain Systematic sampling.
8. Distinguish between chance and assignable causes of variation in quality control.
9. What are control charts? State the utility of control chart.
10. Describe the criteria for detecting lack of control in a control chart.

[P.T.O.]



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## SECTION - B

Answer any THREE questions from the following.

(3×12=36)

11. Calculate Laspeyre's, Paasche's, Marshall - Edgeworth's and Fisher's ideal price and quantity index numbers for the following data.

| Commodities | Prices |      | Quantities |      |
|-------------|--------|------|------------|------|
|             | 2021   | 2023 | 2021       | 2023 |
| A           | 10     | 12   | 5          | 6    |
| B           | 15     | 30   | 8          | 10   |
| C           | 50     | 80   | 6          | 8    |
| D           | 80     | 100  | 4          | 4    |
| E           | 10     | 10   | 7          | 8    |

(12)

12. a) Calculate the trend values by finding 3 - yearly moving averages for the following time series. Plot the trend values on the graph sheet.

| Year                | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------------------|------|------|------|------|------|------|------|------|
| Production in tones | 10   | 12   | 8    | 10   | 16   | 12   | 14   | 10   |

- b) The prices of a commodity during 2011-17 are given below. Fit a straight line  $Y = a + bx$  to these data. Estimate the price of the commodity for the year 2019.

| Year  | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|------|------|------|------|
| Price | 100  | 107  | 128  | 135  | 120  | 115  | 110  |

(5+7)

13. a) The following data Pertaining to the population in a small city.

| Age group  | Mid year population of 2020 | N.of deaths |
|------------|-----------------------------|-------------|
| 0-1        | 3020                        | 280         |
| 2-10       | 28,700                      | 432         |
| 10-19      | 29,800                      | 220         |
| 20-29      | 25,300                      | 295         |
| 30-39      | 13,700                      | 156         |
| 40-49      | 10,600                      | 243         |
| 50 & above | 19,050                      | 720         |

Compute

- i) C.D.R.  
ii) A.S.D.R.



- b) Calculate CBR, ASFR, GFR and TFR from the following data.

| Population |        |        |        |
|------------|--------|--------|--------|
| Age        | Male   | Female | Births |
| 15-19      | 308269 | 314056 | 6921   |
| 20-24      | 257852 | 269340 | 13983  |
| 25-29      | 230629 | 236187 | 13136  |
| 30-34      | 204168 | 203477 | 8420   |
| 35-39      | 182270 | 176534 | 5684   |
| 40-44      | 162509 | 145037 | 1318   |
| 45-49      | 128184 | 122446 | 257    |

(4+8)

14. a) Describe the advantages of sample survey over Census enumeration.  
b) Discuss the need for stratified random sampling. (7+5)

15. a) Sample subgroups of size 4 of polyester yarns are drawn at regular intervals of one hour each from a production process. The tensile strength in grams of these yarns are measured. The sample means and sample ranges are given below.

| Subgroup No. | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|--------------|------|------|------|------|------|------|------|------|------|------|
| Sample mean  | 1842 | 1853 | 1876 | 1867 | 1840 | 1874 | 1810 | 1843 | 1870 | 1830 |
| Sample Range | 14   | 21   | 18   | 18   | 32   | 53   | 47   | 42   | 41   | 52   |

Analyse the data using  $\bar{X}$  and R charts.

- b) Explain single sampling plan. (8+4)
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