

(8 pages)

Reg. No. : .....

**Code No. : 10434 E      Sub. Code : CAST 21**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2024.

Second/Fourth Semester

Mathematics — Allied

**STATISTICS – II**

(For those who joined in July 2021-2022)

Time : Three hours

Maximum : 75 marks

**PART A — (10 × 1 = 10 marks)**

Answer ALL questions.

Choose the correct answer :

1. Arithmetic mean of Paasche and Laspeyre Index numbers is
  - (a) Bowley
  - (b) Fisher
  - (c) Marshall Edgeworth
  - (d) Kelley

2. Aggregate expenditure method of cost of living index following

- (a) Marshall Edgeworth index
- (b) Laspeyres Index
- (c) Fishers Index
- (d) Bowley Index

3. Type II error is known as

- (a) Rejection error    (b) Acceptance error
- (c) Probable error    (d) Standard error

4. Sample is a part of

- (a) Sampling            (b) Population
- (c) Probability        (d) None of these

5. In which one of the following sampling design, proportional allocation is used?

- (a) SPS
- (b) Stratified random sample
- (c) Systematic sample
- (d) None





6. Test for independence of attributes is based on
- $\chi^2$  - distribution
  - $t$  - distribution
  - Normal distribution
  - $F$  - distribution.
7. Randomized Block design involves
- Randomization throughout the experimental area
  - Randomization within each block
  - Randomization within each column
  - Randomization within each row
8. The basic principles of design of experimental are
- Local control
  - Randomization
  - Replication
  - All of these
9. 'P' - chart is suitable for
- number of defective pieces
  - measurable values
  - number of defects in a unit
  - none of the above

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10. In SQC, the important tool in
- Control charts
  - Sampling plans
  - (a) and (b)
  - None of these

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

11. (a) Construct the index number taking 1990 as base.

Years	1987	1988	1989	1990	1991	1992
Price of rice per kg	5	6	6.5	7	7.5	8

Or

- (b) Explain :
- Factor Reversal Test
  - Time Reversal Test.

12. (a) Define :
- Critical region
  - Level of significance.

Or

- (b) A coin is tossed 144 times and a person gets 80 heads. Can we say that the coin is unbiased one?

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[P.T.O.]





13. (a) Explain the test of independence of two attributes in a  $m \times n$  contingency table.

Or

- (b) Explain the test procedure for testing the difference between the means of two samples.
14. (a) Explain RBD.

Or

- (b) Define one – way classification and two – way classification.
15. (a) Write seven quality control tools.

Or

- (b) Explain about control charts.

PART C — ( $5 \times 8 = 40$  marks)

Answer ALL questions choosing either (a) or (b).

16. (a) Prove that Fishers index number is an ideal index number.

Or

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- (b) From the following data, find Fishers index number and show that it satisfies both factor and time reversal test.

Commodity	A	B	C	D
Base year price in rupees	5	6	4	3
Base year quantity in quintals	50	40	120	30
Current year price in rupees	7	8	5	4
Current year quantity in quintals	60	50	110	35

17. (a) Two populations have their means equal but the standard deviation  $\sigma$  of one is twice the other

- (i) Show that in the sample of size 2000 from each drawn under simple sampling condition the difference of means will in all probability not exceed  $0.15 \sigma$ , where  $\sigma$  is the smaller SD.

- (ii) Find the probability that the difference will exceed half this amount.

Or

- (b) A machine put out 16 imperfect articles in a sample of 500 articles. After the machine is overhauled it puts out 3 defective articles in a sample of 100. Has the machine improved?

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18. (a) The height of 10 males of a given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 inches. Is it reasonable to believe that the average height is greater than 64 inches. Test at 5% significance level assuming that for 9 degrees of freedom  $p(t > 1.83) = 0.05$ .

Or

- (b) From the details of the following two random variables, test whether the two samples are drawn from the same normal population.

Sample	Size	Sample mean	Sum of squares of deviation from the mean
I	10	15	90
II	12	14	108

19. (a) Explain the analysis of Latin square Design (LSD).

Or

- (b) Analyse the one-way ANOVA.

Batches	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	S <sub>7</sub>	S <sub>8</sub>
A	1600	1610	1650	1680	1700	1720	1800	-
B	1580	1640	1640	1700	1750	-	-	-
C	1460	1550	1600	1620	1640	1660	1740	1820
D	1510	1520	1530	1570	1600	1680	-	-

20. (a) What are the ways sampling Inspection can be carried out? Explain.

Or

- (b) Describe the construction of P-chart for fixed and variable sample sizes.

