SECTION–IV

7. (a) Estimate the trend line for the following time series data :

Year	1983	1984	1985	1986	1987	1988	1989
Sales (tonnes)	77	88	94	85	91	98	90

20

(b) Discuss the methods of Ratio to moving averages and link relative methods for measuring seasonal variations of a Time Series Data. 20

(c) Write about Cost of Living Index Number and its importance in measuring the standard of life. 20

8. (a) Define various Weighted Index Numbers along with their merits and limitations. 30

(b) Explain the terms demand function and supply function. Derive their elasticities with respect to price. 15

(c) Explain the first order Logistic curve and its properties. What are the methods to estimate the curve ? 15

SECTION–V

9. (a) Explain the terms FGR, SFR and TFR along with their expressions. 15

(b) What is NRR ? How is it measured ? What is its relationship with GRR ? 20

(c) Define various columns of a life table. Obtain expressions for e_x^0 and e_x. 25

10. (a) Explain at least two scales of measuring Psychometric data. 30

(b) Describe difference between Stationary Population and Stable Population. 20

(c) How do you test the reliability of a research tool like a questionnaire ? 10

Total No. of Printed Pages : 4 **Roll No. .....**

1[CCE.M]1

Statistics–II

(23)

Time : Three Hours Maximum Marks : 300

INSTRUCTIONS

(i) Answers must be written in English.

(ii) The number of marks carried by each question is indicated at the end of the question.

(iii) The answer to each question or part thereof should begin on a fresh page.

(iv) Your answers should be precise and coherent.

(v) The part/parts of the same question must be answered together and should not be interposed between answers to other questions.

(vi) Candidates should select any **three** sections. Attempt any **five** questions from the selected sections, choosing at most **two** questions from each selected section.

(vii) If you encounter any typographical error, please read it as it appears in the text book.

(viii) Candidates are in their own interest advised to go through the General Instructions on the back side of the title page of the Answer Script for strict adherence.

(ix) No continuation sheets shall be provided to any candidates under any circumstances.

(x) Candidates shall put a cross (X) on blank pages of Answer Script.

(xi) No blank page be left in between answer to various questions.

SECTION–I

1. (a) Justify how sample survey is better than complete enumeration. 10

(b) Justify how Stratified Random sampling is better than Simple Random and Systematic sampling methods. 20

(c) Compare the procedure, merits and limitations of simple random sampling with Replacement (SRSWR) and simple random sampling without Replacement (SRSWOR) methods. 20

(d) Show that Sample Mean is an unbiased estimator of population mean in SRSWOR. 10

2. (a) Discuss various types of Sampling and Non-sampling errors in survey. 20

(b) Give the procedure, layout plan, merits and limitations of Randomized Block Design. 30

(c) Explain Confounding in Factorial Designs. 10

SECTION–II

3. (a) Explain the construction and operation of p-chart with variable sample size. 20

(b) Write about the Producer's Risk and Consumer's Risk. 20

(c) Explain the role of AQL, AOQL and LTPD in acceptance sampling plans. 20

4. (a) Define Reliability and Hazard functions and explain their importance in Life Testing Problems. 20

(b) Explain the system reliability when the subsystems are in series and in parallel. 20

(c) Explain the concepts of Censoring and Truncation of distributions and mention their importance in reliability testing. 20

SECTION–III

5. (a) Define Discrete Time Markov Chain and explain various types of relations among states. 15

(b) Discuss the conditions in construction of Transition Probability Matrix and construct a TPM for random walk when there are stages from 0 to 4, P[transition form (n–1) to n^{th} step] = p; P[transition form (n+1) to n^{th} step] = q; 0, 4 are absorbing barriers. 15

(c) Give the objectives of observing the queuing theory. 10

(d) Give the salient features of M/M/1:N/FIFO and how the measures like average waiting time of a customer and average idle time of the server can be calculated ? 20

6. (a) What are the important features of inventory management ? Explain deterministic and probabilistic inventory models. 20

(b) Define Linear Programming problem in its canonical and standard forms. Convert the following LPP into standard form.

Max $Z = x_1 + 2x_2 + 4x_3$,

Subject to $x_1 + 2x_2 + x_3 \leq 8$,

$3x_1 + 4x_2 \geq 7$, x_1 unrestricted in sign, $x_2, x_3 \geq 0$. 30

(c) How an Unbalanced Assignment Problem can be solved by Hungarian Method ? 10