PG (CBCS) Even Semester Examination, May 2025

STATISTICS

4th Semester

Course No. : STSCC - 402

(Applied Statistics-II)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

(Answer five questions taking one from each unit)

Unit - I

1. (a) Define time series with example. 2+2=4

(b) (i) $P[X_n = 1, -1] = {}^1\!/_2$; if n is even

(ii) $P[X_n = a^{1/2}] = \dfrac{1}{1+a}$; if n is odd

$P[X_n = -a^{1/2}] = \dfrac{a}{a+1}$

verify the nature of the process. 3+3=6

(c) Explain Holt Winter's trend and scasonality method. 4

2. (a) Explain stationarity of a time series. 4

(Turn Over)

(b) Define auto correlation function. Prove the properties of autocorrelation function. 2+6=8

(c) Define auto covariance. 2

Unit - II

3. (a) Write a note on Moving Average (MA) process of order q. 7

(b) Describe the iterative application of steps involved in Box-Jenkins methodology. 7

4. (a) State the difference between an ARMA and ARIMA model. 6

(b) Write a note on Auto Regressive Integrated Moving Average (ARIMA) model. 8

Unit - III

5. (a) Write a note on quantitative and qualitative method of forecasting. 4+4=8

(b) Explain the difference between a point forecast and an interval forecast. 6

6. (a) Discuss the basic steps required in modelling and forecasting a time series? 7

(b) Describe the activities of the forecasting process. 7

Unit - IV

7. Derive the variance of Kaplan-Meier estimate using Geen Wood's method. 14

8. Define the following $3^1/_2$x4=14

a) Hazard function

b) Survival function

c) Mean residual life function

d) Cumulative hazard function

Unit - V

9. Define the terms based on Bivariate random variables for competing situations $3^1/_2$x4=14

a) Sub distribution

b) Sub survivor function

c) Sub density function

d) Cumulative sub hazard function

10. Based on latent failure times, define the following: $3^1/_2$x4=14

(a) Survivor function

(b) Sub density function

(c) Marginal survivor function

(d) Sub hazard function.

★★★