



**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU -27**

**M.Sc. STATISTICS– IV SEMESTER**

**SEMESTER EXAMINATION: APRIL 2023**

(Examination conducted in May 2023)

**STDE 0520: TIME SERIES ANALYSIS**

**(For current batch students of only)**

**Time: 2 ½ Hours**

**Max Marks: 70**

**This paper contains TWO printed pages and TWO parts**

**PART-A**

**Answer any SIX of the following**

1. Define time series with example. Mention the various components of time series.
2. Explain the estimation of trend component by moving average method.
3. Define auto covariance function. With usual notation show that  $|\gamma(h)| \leq \gamma(0)$  for all integer  $h$ .
4. Define covariance stationary process. Check whether white noise process is covariance stationary or not.
5. Explain non stationary time series.
6. What do you mean by minimum mean square error forecast? Explain.
7. Explain the importance of financial time series models.
8. Explain AIC and BIC criteria.

**PART-B**

**II Answer any FOUR of the following:**

**4 x 13 = 52**

9. A) Explain the Mann-Kendall test for testing trend component.  
B) Define MA (1) process. Obtain mean, variance and autocorrelation function of the same.  
(5+8)
10. A) Define partial auto correlation function (PACF). Obtain the PACF of AR (2) process.  
B) Define AR (p) process. Obtain its variance. Verify whether AR process is always invertible.  
(6+7)
11. A) Define general linear process.  
B) Explain the terms (i) Unit root test in AR (1) (ii) Determination of (p,d,q) in ARIMA modes.  
C) Explain seasonal Arima models. (3+6+4)



12. A) Derive a formula for computing h-step ahead forecast of
- (i) Deterministic trend
  - (ii) ARMA (1,1) process
  - (iii) IMA (1,1) process
- B) Explain forecasting through exponential smoothing. (7+6)
13. A) Explain ARCH and GARCH models.
- B) Write a note on Box Pierce and Bjung box test. (7+6)
14. A) Explain the estimation of Moving average process using least square estimation and method of moments.
- B) Explain the residual analysis in time series modelling. (7+6)