



Register Number:

Date:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE –560 027

**M.Sc. STATISTICS – IV SEMESTER
SEMESTER EXAMINATION – July 2022
STDE 0520: Time Series Analysis**

Time: 2 ½ hrs

Max: 70 Marks

This question paper has **TWO** printed pages and **TWO** sections

SECTION – A

I Answer any SIX of the following:

6x3= 18

1. Explain various components of the additive model in time series analysis.
2. Explain a test for detecting seasonality.
3. Define following terms:
(i) Strict stationarity (ii) White noise process
4. Explain partial autocorrelation (PACF) function.
5. Define ARMA (p, q) processes. Obtain its difference equation form.
6. Write a note on minimum mean square error forecast.
7. Describe Ljung-Box test for testing significance of autocorrelations. Give the distribution of the statistics under the null hypothesis.
8. Explain the role of AIC and BIC in time series modelling.

SECTION – B

II Answer any FOUR of the following:

4 x 13 = 52

9. A) Define exponential smoothing technique.
B) Explain the estimation of trend by moving average method.
C) Define auto covariance and auto-correlation (ACF) function. State and prove any two properties of auto covariance function. (2+4+7)
10. A) Obtain auto-covariance of MA (1) model.
B) Show that auto regressive of order p is a covariance stationary. (7+6)
11. A) Explain the estimation and elimination of trend and seasonal component in the presence of both trend and seasonal component.
B) Find mean, variance and Auto-Correlation Function (ACF) of AR (1) process. (5+8)
12. A). Write a note on fitting AR (p) process.
B) Define SARIMA model with usual notations. Explain forecasting in SARIMA Processes. (4+9)

13. A) Explain ARIMA (p,d,q) process.

B) Explain Holt-Winter's method of forecasting time in the presence of trend and seasonality. (6+7)

14. A) Define Unit root test. Obtain its asymptotic distribution.

B) Define ARCH and GARCH models. Find the expected value and variance of ARCH (1). (6+7)