

**22P363**

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Name: .....

Reg. No: .....

**THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2023**

(CBCSS-PG)

(Regular/Supplementary/Improvement)

**CC19P ST3 E02 / CC22P MST3 E02 - TIME SERIES ANALYSIS**

(Statistics)

(2019 Admission onwards)

Time: Three Hours

Maximum: 30 Weightage

**PART A**

Answer any *four* questions. Each question carries 2 weightage.

1. What is seasonal component of a time series? How it can be removed from time series?
2. How stochastic process and time series are related?
3. Explain simple exponential smoothing.
4. Define *ARIMA* ( $p, d, q$ ) model.
5. What do you mean by stationary time series?
6. Write the general formula for the spectral density of a time series model.
7. Define periodogram.

**(4 × 2 = 8 Weightage)**

**PART B**

Answer any *four* questions. Each question carries 3 weightage.

8. What are the properties of an autocorrelation function?
9. Explain briefly about the different models that we use in Box Jenkins methodology.
10. Explain the concept of invertible stochastic process. Is *AR*( $p$ ) invertible?
11. Derive the autocorrelation function of a *MA*( $q$ ) process.
12. Discuss unit root test for stationarity.
13. Explain different forecasting methods of a time series data.
14. Explain Portmanteau test.

**(4 × 3 = 12 Weightage)**

**PART C**

Answer any *two* questions. Each question carries 5 weightage.

15. Explain different methods of estimation of parameters of time series analysis.
16. Derive spectral density of *ARMA* ( $p, q$ ) process. Identify the stationary and invertible

process  $X_t$  having spectral density  $S(f) = \frac{17-8 \cos 2\pi f}{13-12 \cos 2\pi f}$

17. Explain in detail various methods for determining trend in a time series.

18. State and prove Herglotz theorem.

**(2 × 5 = 10 Weightage)**

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