

TIME SERIES AND FORECASTING

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Question No.	Question	K Level	CO
1	What are the main components of a time series? a) Trend, Seasonality, Cyclic, and Irregular b) Mean, Variance, Standard Deviation, and Mode c) Linear, Exponential, Logarithmic, and Quadratic d) Independent, Dependent, Correlated, and Uncorrelated	K1	CO1
2	Which of the following best describes an additive model in time series? a) $Y_t = T_t + S_t + R_t + Y_t$ b) $Y_t = T_t \times S_t \times R_t \times Y_t$ c) $Y_t = T_t - S_t - R_t - Y_t$ d) $Y_t = T_t + S_t + R_t + Y_t$	K2	CO1
3	A simple moving average is best suited for which type of time series data? a) Data with a linear trend b) Data with seasonality c) Data with irregular fluctuations d) Data with an exponential trend	K1	CO2
4	In Exponential Smoothing, what does the smoothing constant (α) represent? a) The weight given to the most recent observation b) The number of past observations considered c) The length of the moving average window d) The seasonal adjustment factor	K1	CO2
5	What is the difference between an AR(1) and an AR(2) model? a) AR(1) has one lag term, while AR(2) has two lag terms b) AR(2) is a non-stationary model, while AR(1) is always stationary c) AR(1) includes moving averages, while AR(2) does not d) AR(2) has no auto regressive component	K2	CO3
6	The Partial Auto Correlation Function (PACF) helps in identifying: a) The number of lagged values in an AR model b) The seasonality in a time series c) The presence of a trend component d) The moving average order	K1	CO3
7	What is the purpose of the Augmented Dickey-Fuller (ADF) test? a) To test for stationarity in a time series b) To calculate the auto correlation of a time series c) To determine the best lag order for an AR model d) To detect seasonal components in a time series	K1	CO4
8	How does an ARIMA model differ from an ARMA model? a) ARIMA includes a differencing step to handle non-stationarity b) ARIMA can only model seasonal data c) ARMA is a special case of ARIMA with an integrated order of 1 d) ARIMA requires a larger dataset compared to ARMA	K1	CO4
9	Which of the following is a qualitative forecasting method? a) Delphi Method b) ARIMA Model c) Moving Averages d) Exponential Smoothing	K1	CO5
10	Identify the main purpose of Akaike Information Criterion (AIC) a) To compare different time series models and select the best one b) To measure the stationarity of a dataset c) To find the optimal smoothing parameter for Exponential Smoothing d) To calculate the auto correlation coefficient	K1	CO5

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SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks

(5 × 7 = 35)

Question No.	Question	K Level	CO
11.a.	Explain the components of time series with suitable examples.	K3	CO1
	(OR)		
11.b.	Compare Additive and Multiplicative Models in time series analysis.		
12.a.	What is Moving Average Smoothing? Explain different types of moving averages.	K3	CO2
	(OR)		
12.b.	Describe Holt and Winter's Models for time series smoothing.		
13.a.	Define Auto-Regressive (AR) and Moving Average (MA) models with examples.	K3	CO3
	(OR)		
13.b.	Explain the importance of ACF and PACF in time series analysis.		
14.a.	Describe the concept of Non-Stationary and the methods to test it.	K3	CO4
	(OR)		
14.b.	Discuss the Dickey-Fuller Test and its role in time series analysis.		
15.a.	Describe the steps involved in stochastic model building.	K4	CO5
	(OR)		
15.b.	Compare AIC, BIC, and Schwartz's Bayesian Criterion in model selection.	K3	

SECTION - C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks

(3 × 10 = 30)

Question No.	Question	K Level	CO
16	Explain Auto-covariance and Auto correlation Functions in time series analysis.	K4	CO1
17	Discuss in detail Single and Double Exponential Smoothing with examples.	K4	CO2
18	Elaborate ARMA and ARIMA models along with their statistical properties.	K4	CO3
19	What is Random Walk? Explain Random Walk with Drift with a real-world example.	K4	CO4
20	Bring out the nature and uses of forecasting and compare qualitative vs quantitative forecasting methods.	K4	CO5

Z-Z-Z

END