MID TERM EXAMINATION-September 2022

Subject Name: Time Series Analysis for AI

Time: 01Hr

Maximum marks: 30

SECTION-A (Attempt any two questions, Each of 05 Marks)

Q.1. When a time series is called as Stationary Time series? Describe the common ways to convert a time series data to stationary.

Q.2. Explain the following

a). Self correlation vs Spurious correlations b) Linear Interpolation vs Polynomial Interpolation

Q.3. What is Auto-correlation function (ACF) and Partial Auto correlation function (PACF)?. How ACF and PACF can help to identify the order of Auto-Regressive model?.

SECTION-B (Attempt any One question, Each of 10 Marks)

Q.1. a) Why Linear Regression is not always considered as the best choice for time series forecasting?

b) Derive and explain how can an MA(q) process be converted to an AR(∞) process?

c) Derive and explain how can an AR(p) process be converted to an MA(∞) process?

Q.2. What is Exponential Smoothing?. If the smoothing constant value is 0.10 and exponential smoothing forecast for week 8 has demand forecast value of 786.3 , then using the below table of demand of the product for the respective week, calculate the exponential smoothing forecast for week 10?

Week	Demand
1	820
2	775
3	680
4	655
5	750
6	802
7	798
8	689
9	775

SECTION-C (Compulsory, 10 Marks)

Q. In the below State diagram, the Hidden states $S=\{S_{Sunny}, S_{Rainy}, S_{Cloudy}\}$ and Observable state $O = \{O_{summer\ dress}, O_{coat}, O_{umbrella}\}$ are given along with their transition and emission probabilities respectively.

Calculate the likelihood of getting the sequence of Sunny, Rainy and Cloudy given the observed state sequence of O_{coat}, O_{coat}, and $O_{umbrella}$ i.e., P ($O_{coat}, O_{coat}, O_{umbrella}, S_{Sunny}, S_{Rainy}, S_{Cloudy}$). Given the Initial probabilities as π = [Sunny: 0.75, Rainy:0.2, Cloudy:0.05],