LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **STATISTICS**

SECOND SEMESTER – **APRIL 2023**

PST2ME01 – TIME SERIES MODELLING

Date: 10-05-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A – K1 (CO1)

Answer ALL the questions **(5 x 1 = 5)**

1. **Answer the following:**

a) Write the additive decomposition model.

b) Define White noise.

c) Write holt winter's multiplicative forecasting model.

d) Define differencing.

e) Write ARIMA notation.

SECTION A – K2 (CO1)

Answer ALL the questions **(5 x 1 = 5)**

2. **Match the following:**

a)	Test for autocorrelation	-	Box-Jenkins
b)	Averaging method	-	Durbin Watson test
c)	Test for stationarity	-	Moving Averages
d)	Weighted Method	-	Dickey fuller test
e)	ARIMA	-	Exponential smoothing method

SECTION B – K3 (CO2)

Answer any THREE of the following **(3 x 10 = 30)**

3. Explain the test procedure for Durbin Watson test.

4. Demonstrate the different stages involved in smoothing methods of forecasting.

5. Justify that backshift operator is convenient for describing the process of differencing.

6. Write a note on Box-Jenkins time series modelling.

7. Calculate the autocorrelation for the following data:

Year'20	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sales	280	240	270	300	280	290	210	200	230	200	230	210

SECTION C – K4 (CO3)

Answer any TWO of the following **(2 x 12.5 = 25)**

8. Elaborate the method for deseasonalizing a time series under the multiplicative model.

9. Describe the seasonal exponential smoothing method in detail.

10. Test the time series for stationarity in mean and variance using time plot.

t	1	2	3	4	5	6	7	8	9	10
Y_t	31	37	39	41	41	45	49	48	50	52

11. Explain the Autoregressive model of order p.

SECTION D – K5 (CO4)

	Answer any ONE of the following **(1 x 15 = 15)**
12.	Construct the various moving averages for the following time series data:
13.	Explain the dynamic Regression model.

Time	1	2	3	4	5	6	7	8	9	10	11
Shipments	100	115	132	141	154	171	180	204	228	247	291

SECTION E – K6 (CO5)

Answer any ONE of the following **(1 x 20 = 20)**

14. Using the single non-random series 2, 4,6,8,10,12,14,16,18 and 20, compute the forecast for period 11 using:
    a) Single exponential smoothing
    b) Holt's Linear exponential smoothing

    Find the optimal parameters in both cases and which of the two methods is more appropriate. Why?

15. Explain the general ARIMA Model and describe how to identify the model using a time plot.

############