UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program : Seventh Semester – Fall 2021

Roll No. ……………

Paper: Time Series Analysis-I **Course Code: STAT-411** **Time: 3 Hrs. Marks: 60**

Q.1. Answer the following short questions: (6x5=30)

a) Discuss the duality between moving average and auto-regressive process.
b) Write a short note on stationarity of time series.
c) Define stochastic process.
d) Discuss about the invertibility of MA(q) process.
e) Write down the objectives of time series analysis.
f) Define Autocorrelation and Correlogram.

Answer the following questions. (3x10=30)

Q.2. Given the following time series, compute the first two partial autocorrelations.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
X_t	13	8	15	4	4	12	11	7	14	12

Q.3. Derive the properties of AR(p) process.

Q.4. Given the following MA(1) processes

Model-1 : $X_t = Z_t + \beta Z_{t-1}$

Model-2 : $X_t = Z_t + \frac{1}{\beta} Z_{t-1}$

Where $\{Z_t\}$ is a purely random process with zero mean and finite variance σ^2

Find the autocorrelation functions of Model-1 and Model-2. Also comment on the invertibility condition of MA process by discussing the autocorrelation functions of both models.