



QP CODE: 25803010

25803010

Reg No :

Name :

INTEGRATED MSC DEGREE EXAMINATION, JUNE 2025

Eight Semester

INTEGRATED MSC BASIC SCIENCE-STATISTICS

CORE - IST8CR02 - STOCHASTIC PROCESSES

2020 Admission Onwards

36653EFF

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Define limiting distribution of a markov chain.
2. What is null recurrent?
3. State Random walk in the plane.
4. Prove that an ergodic state communicates only with an ergodic state.
5. What is continuous time markov chain?
6. Write an example for pure birth process.
7. Define birth-death process.
8. State Elementary Renewal Theorem.
9. What you meant by ARMA in time series modeling?
10. What is the Box-Jenkins model?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Describe Galton -Watson branching process.
12. Define Probability generating function and hence evaluate mean and variance.
13. Examine whether the population is extinct or not.If $P(S) = \frac{c}{(c+1)} e (1 - \frac{S}{c+1})^{-e}$
14. Write down the postulates of poisson process.





15. Derive the generating function of Yule-Furry process.
16. Briefly explain about the excess life distribution.
17. Distinguish between ACF and PACF
18. Explain Correlogram in time series.

(6×2=12 weightage)

Part C (Essay Type Questions)

Answer any **two** questions.

Weight **5** each.

19. Find the stationary distributions of the following matrix

$$1. P = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ \frac{1}{3} & 0 & \frac{2}{3} & 0 \end{bmatrix}$$

$$2. P = \begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$$

20. Explain kolmogrov forward and backward differential equation.
21. Explain delayed renewal process.
22. Explain moving average process.

(2×5=10 weightage)

