B.Sc. DEGREE EXAMINATION, APRIL 2018.

III YEAR VI SEMESTER

Core Major - Paper XVI - STOCHASTIC PROCESSES

Time : 3 Hours Max. Marks : 60

SECTION A – (10 × 1 = 10 marks)

(Q. No. 1-12)Answer any *TEN* questions

1. Give any one example for a continuous state space with continuous time parameter stochastic

Process.

1. Define wide sense stationary process.
2. Define states of a Markov chain.
3. Give an example of a Markov chain.
4. Define ergodic state.
5. Define Poisson Process.
6. Write the relation between Poisson process and exponential distribution.
7. What is pure death process?
8. Define Emigration process.
9. What are waiting lines?
10. Define Balking in queuing theory.
11. What is (M/M/∞ ):(C/SIRO)?

SECTION B – (5 × 4 = 20 marks)

(Q. No. 13-19)Answer any *FIVE* questions

1. Give a brief note about covariance stationary.
2. Check whether the given process is stationary whose probability distribution under certain condition

is given by P{X(t)=n}= (at)n-1/(1+at)n+1 , n=1,2,...

at/(1+at), n=0

1. Prove that if state j is persistent then for every state k that can be reached from state j is Fkj=1.
2. State and prove the difference of two Poisson process.
3. Explain Yule’s Fury process.
4. Explain the arrival pattern and service mechanism of queuing system.
5. Describe steady state and transient state of a queuing system.

SECTION C – (3 × 10 = 30 marks)

(Q. No. 20-24)Answer any *THREE* questions

1. Define evolutionary process. Prove that the process X(t)=A1+A2t where A1and A2 are independent

random variables with E(Ai)=ai and V(Ai)=σi2, i=1,2 is evolutionary.

1. State and prove Chapmann-Kolmogrov equations of a Markov chain.
2. Derive pure Birth process.
3. State and prove the decomposition property of Poisson process.
4. Discuss the steady state probability for a (M/M/1):(N/FIFO ).