



**HDZ-003-1173004**

Seat No. \_\_\_\_\_

**M. Sc. (Statistics) (Sem. III) (CBCS) Examination**

**November / December – 2017**

**MS-304 : Stochastic Process**

**Faculty Code : 003**

**Subject Code : 1173004**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : 70

- Instructions :** (i) Attempt all questions.  
(ii) Each question carries equal marks.

**1 Answer the following : (any seven) 14**

- (1) A pure Birth process follows which distribution?
- (2) Mean of Pure Birth Process is \_\_\_\_\_.
- (3) What is the probability when state k is said to be transient or non - recurrent?
- (4) Conditional probability of Poisson process gives which distribution?
- (5) Which one is postulates of Poisson process from given below?
- (6) The difference of two Poisson process gives which distribution?
- (7) Explain Ergodic chain.
- (8) Define Periodic state.
- (9) Total probability of pure birth process is \_\_\_\_\_
- (10) Yule - Fury Process is also known as \_\_\_\_\_

**2 Answer the following : (any two) 14**

- (1) Define following terms :
  - (a) Stochastic process
  - (b) State -Space
  - (c) Non -Recurrent
- (2) Explain Gambler's ruin problem.
- (3) Explain One - Dimensional Random Walk.

**3** Answer the following : **14**

- (1) Explain Postulates of Poisson Process
- (2) Derive Probability Mass Function of Poisson Process

**OR**

**3** Answer the following : **14**

- (1) Explain Decomposition theorem of a Poisson Process
- (2) Prove that conditional probability of Poisson Process gives Binomial Distribution.

**4** Answer the following : (any **two**) **14**

- (1) Discuss Chapman Kolmogorov equation.
- (2) Classified the all chain and states. Explain any one chain and one state.
- (3) Prove that  $P_n(S) = P_{n-1}(PS)$

**5** Answer the following : (any **two**) **14**

- (1) Prove that if  $i \leftrightarrow j$  that is  $i$  and  $j$  are communicative. If  $i$  is recurrent (Persistent) then  $j$  is also recurrent(Persistent).
- (2) What is meant by probability transition matrix? Explain Markov's chain.
- (3) Find mean and variance of branching process.
- (4) Show that total probability of pure birth process is 1.

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