+1/1/60+

Name: ..... Reg. No.: CIIT/.....–BSE–...../ATK

Quiz 1: CSC456: Stochastic Processes: BS(SE)-VIII (Fall 2025)

Instructions:

- Please choose the most correct option by filling or ticking or crossing the box.
- Spoiled or overwritten selection has no credit.
- Please don't use whitener or any other eraser.
- **Correct:** 3 Marks, **Incorrect:** Zero Mark, **Not Attempt:** 1 Mark

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Q. 1. If $P(X_{n+1} = 0|X_n = 0) = 0.70$, then

- ☐ $P(X_n = 1|X_n = 0) = 0.70$
- ☐ $P(X_n = 1|X_{n+1} = 0) = 0.30$
- ☐ $P(X_{n+1} = 1|X_n = 0) = 0.30$
- ☐ $P(X_{n+1} = 0|X_n = 1) = 0.50$

Q. 2. Let $P(E)$ represent probability of event E. Then

- ☐ $0 \leq P(E) \leq 1$
- ☐ $P(E) > 1$
- ☐ $P(E) > 0$
- ☐ $0 < P(E) < 1$

Q. 3. Which of the following best describes a stochastic process?

- ☐ A sample space of an experiment over time
- ☐ A random variable
- ☐ A sequence of random variables over time
- ☐ none of these

Q. 4. If a Markov chain has the transition matrix

$$P = \begin{bmatrix} 0.2 & 0.6 & 0.1 \\ 0.6 & 0.1 & 0.4 \\ 0.5 & 0.2 & 0.3 \end{bmatrix},$$

what is P_{22}?

- ☐ 0.1
- ☐ 0.3
- ☐ 0.6
- ☐ 0.2

Q. 5. For two events E and F in a sample space S, if

$$P(E|F) = P(E),$$

then E and F are:

- ☐ Independent
- ☐ Mutually exclusive
- ☐ Complementary
- ☐ Exhaustive

Q. 6. In the context of Markov chains, what does the Markov property state?

- ☐ The future depends only on the present state
- ☐ The future is independent of the past and present
- ☐ The future depends on the entire past history

Q. 7. On any given day, the weather can either be Rainy or Not Rainy. If today is Rainy, then tomorrow will also be Rainy with probability 0.7. If today is Not Rainy, then tomorrow will be Rainy with probability 0.4. Then draw the State Transition Diagram and directly write Transition Probability Matrix.