



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS) (Grant-in-Aid)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Bachelor of Science (Semester 5) Internal Examination - 2025
US05MISTA01 : Elements of Probability Theory

Date: 24/09/2025

Day: Wednesday

Time: 10:45am TO 11:45am

Total marks : 20

Q-1 Answer the following by selecting correct choice from the options. [6]

1. The probability of the sure (certain) event is:
(a) 0 (b) 0.5 (c) 1 (d) Undefined
2. If two events A and B are independent, then $P(A/B)=$
(a) 0 (b) $P(A)$ (c) $P(B)$ (d) 1
3. If $P(A) = 0.3$, $P(B) = 0.4$ and A and B are mutually exclusive, what is $P(A \cup B)$?
(a) 0.7 (b) 0.12 (c) 0.6 (d) 0.3
4. Which of the following is an example of a continuous random variable?
(a) Number of heads in 10 coin tosses (b) Number of students in a classroom
(c) Amount of rain in a day (d) Number of apples in a basket
5. If $f(x) = 3x^2$, $0 < x < 1$ and Zero otherwise, is the pdf of X then P_{75} is....
(a) $(\frac{1}{4})^{\frac{3}{4}}$ (b) $(\frac{1}{4})^{\frac{1}{3}}$ (c) $(\frac{3}{4})^{\frac{3}{4}}$ (d) $(\frac{3}{4})^{\frac{1}{3}}$
6. For a continuous random variable X, what is $P(X=a)$?
(a) 1 (b) Depends on pdf (c) 0 (d) $F(a)$



- Q-2**
1. A Pair of dice is rolled. Find $P(A/B)$ if A: 2 appears on at least one dice and B: Sum of numbers appearing on dice is six.
 2. Draw a random card from a pack of cards. What is the probability that the card drawn is a face card?

OR

[7]

- Q-2** 1. A bag I contains 4 white and 6 black balls while another Bag II contains 4 white and 3 black balls. One ball is drawn at random from one of the bags, and it is found to be black. Find the probability that it was drawn from Bag I.
2. A man is known to speak the truth 2 out of 3 times. He throws a die and reports that the number obtained is a four. Find the probability that the number obtained is actually a four. [7]
- Q-3** A r.v. X has the following probability mass function: [7]

x	1	2	3	4	5	6	7	8
$P(X=x)$	k	k	$3k$	$2k$	k^2+k	$2k^2$	$4k^2+k$	$3k^2$

- (i) Find k (ii) the c.d.f. of X (iii) find the minimum value of k so that $P(X \leq k) = 1/2$
 (iv) $P(3 < X \leq 7)$.

OR

- Q-3** Find $F(X)$ if $f(x) = \frac{3}{10}(3x - x^2)$, $0 < x < 2$, Zero otherwise. Also find Median, Q_1 , D_7 , P_{50} .



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BSC (Semester 5) Quiz - 2025
 US05MISTA01 : Elements of Probability Theory

Date: 24/09/25

Day: Wednesday

Total marks : 05

Time: Maximum 10 minutes

Obtained marks :

Q-1 Fill in the blanks with appropriate answer given in the bracket. OR Answer with either true or false.

- (i) What is the probability of drawing a red card from a standard deck of 52 cards?
 $\{ 1/2, 1/4, 1/26 \}$
- (ii) Two events A and B are called mutually exclusive if.....
 A) They can happen at the same time B) One affects the other
 C) They have no outcomes in common D) Their probabilities add to 1
- (iii) If $P(A) = 0.7$, $P(B) = 0.5$ and A, B are independent, then what is $P(A | B)$?.....
 $\{ 0.2, 0.5, 0.7, 1.2 \}$
- (iv) If $f(x)$ is the p.d.f. of a continuous r.v. X and if $P(X \leq a) = P(X \geq a)$ then a is mean.
 True..... False
- (v) Let a random variable X denote the waiting time of a passenger at a railway station then X is Discrete random variable.
 True..... False.....



Signature of Examiner:.....