

# CUET (UG) – MATHEMATICS

Chapter Test - Unit VI: Probability

## General Instructions

1. Total Questions: **20**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

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- If  $P(A) = 0.4$ ,  $P(B) = 0.8$  and  $P(B|A) = 0.6$ , then  $P(A \cup B)$  is:
  - 0.24
  - 0.96
  - 0.48
  - 0.16
- Let  $A$  and  $B$  be two events such that  $P(A) = 1/2$ ,  $P(B) = 1/3$  and  $P(A \cap B) = 1/4$ . The probability  $P(A'|B')$  is:
  - $1/4$
  - $1/3$
  - $5/8$
  - $3/8$
- If  $A$  and  $B$  are independent events such that  $P(A) = p$ ,  $P(B) = 2p$  and  $P(\text{exactly one of } A, B) = 5/9$ , then the value of  $p$  is:
  - $1/3$
  - $5/12$
  - $1/6$
  - $2/9$
- A bag contains 5 red and 3 blue balls. If 3 balls are drawn at random without replacement, the probability that exactly two of them are red is:
  - $15/28$
  - $5/14$
  - $15/56$
  - $5/28$
- In a factory, machines  $M_1$  and  $M_2$  produce 60% and 40% of the total output respectively. 2% of  $M_1$  and 1% of  $M_2$  output is defective. If an item is chosen at random and found to be defective, the probability it was produced by  $M_1$  is:
  - $3/4$
  - $2/3$
  - $4/5$
  - $3/5$
- The probability distribution of a random variable  $X$  is given by  $P(X = x) = kx$  for  $x = 1, 2, 3, 4, 5$ . The value of  $P(X < 3)$  is:
  - $1/15$
  - $3/15$
  - $1/5$
  - $2/15$
- If  $A$  and  $B$  are two events such that  $P(A) > 0$  and  $P(B) \neq 1$ , then  $P(A'|B')$  is equal to:
  - $1 - P(A|B)$
  - $1 - P(A \cup B)/P(B')$
  - $\frac{1 - P(A \cup B)}{P(B')}$
  - $\frac{P(A')}{P(B')}$
- Three persons  $A$ ,  $B$ , and  $C$  fire at a target in turn. Their probabilities of hitting are 0.4, 0.3, and 0.2. The probability that at least two of them hit the target is:
  - 0.188
  - 0.456
  - 0.224
  - 0.024

9. A random variable  $X$  has the following probability distribution:

$X$	0	1	2	3
$P(X)$	$k$	$2k$	$3k$	$4k$

The variance of  $X$  is:

- (A) 1.0  
(B) 2.0  
(C) 1.5  
(D) 0.5
10. If  $P(A) = 0.3$ ,  $P(B) = 0.6$  and  $A$  and  $B$  are independent, then  $P(A \cap B')$  is:  
(A) 0.12  
(B) 0.18  
(C) 0.28  
(D) 0.42
11. Two dice are thrown. If it is known that the sum of numbers is less than 6, the probability of getting a sum of 3 is:  
(A)  $1/5$   
(B)  $2/5$   
(C)  $1/10$   
(D)  $1/18$
12. A box contains 10 coins, out of which 2 are double-headed and the rest are fair. A coin is selected at random and tossed. If it shows a head, the probability that it is a double-headed coin is:  
(A)  $1/3$   
(B)  $2/5$   
(C)  $1/2$   
(D)  $2/3$
13. If  $E$  and  $F$  are two events such that  $P(E) = 0.6$  and  $P(F) = 0.3$ , then the minimum value of  $P(E \cap F)$  is:  
(A) 0  
(B) 0.1  
(C) 0.2  
(D) 0.3
14. A random variable  $X$  takes values 0, 1, 2 with probabilities  $P(X = 0) = 3k^3$ ,  $P(X = 1) = 4k - 10k^2$ , and  $P(X = 2) = 5k - 1$ . Then the value of  $k$  is:  
(A)  $1/3$   
(B)  $2/3$   
(C)  $1/2$   
(D)  $1/4$
15. A girl throws a die. If she gets 5 or 6, she tosses a coin 3 times. If she gets 1, 2, 3 or 4, she tosses it once. If she obtained exactly one head, the probability that she threw 1, 2, 3 or 4 is:  
(A)  $4/7$   
(B)  $8/11$   
(C)  $3/11$   
(D)  $5/7$

16. The multiplication theorem of probability for two events  $A$  and  $B$  states that  $P(A \cap B)$  is:
- (A)  $P(A) + P(B|A)$
  - (B)  $P(A) \cdot P(B|A)$
  - (C)  $P(A) \cdot P(A|B)$
  - (D)  $P(B) \cdot P(B|A)$
17. If  $X$  is a random variable such that  $E(X^2) = 15$  and  $E(X) = 3$ , then  $Var(2X + 3)$  is:
- (A) 6
  - (B) 12
  - (C) 24
  - (D) 27
18. Ten cards numbered 1 to 10 are in a box. Two cards are drawn without replacement. The probability that both cards show odd numbers is:
- (A)  $5/18$
  - (B)  $2/9$
  - (C)  $1/4$
  - (D)  $1/3$
19. Let  $A$  and  $B$  be two events such that  $P(A) = 0.8$ ,  $P(B) = 0.5$  and  $P(B|A) = 0.4$ . Then  $P(A|B)$  is:
- (A) 0.32
  - (B) 0.64
  - (C) 0.16
  - (D) 0.25
20. The mean of a discrete random variable  $X$  is also known as:
- (A) Variance
  - (B) Standard Deviation
  - (C) Mathematical Expectation
  - (D) Cumulative Distribution

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