

MODEL QUESTION PAPER

TOPIC – PROBABILITY

UNIT- XIV

TYPES OF QUESTION

A- V.S.A each of carrying one marks

B- V.S.A each of carrying four marks

C- V.S.A each of carrying six marks

UNIT-XIV

(Probability)

1 marks questions

1. Write the conditional probability of the event E given that F has occurred. 1
2. If $P(A) = 7/3$, $P(B) = 9/13$ and $P(A \cap B) = 4/13$. Find value of $P(A/B)$. 1
3. If A and B are events such that $P(A/B) = P(B/A)$ then ----- 1
4. If $P(A) = 0.8$, $P(B) = 0.5$ and $P(B/A) = 0.4$. Find $P(A \cap B)$. 1
5. Let E and F be two independent events associated with the same random experiment then $P(E \cap F) = ?$ 1
6. What is the probability of obtaining an even prime number on each die when a pair of dice is rolled? 1
7. When will be two events A and B are said to be independent? 1
8. If the events E and F are independent then E and F are independent. Is this statement true? 1
9. Write the condition when two events E and F are dependent. 1
10. If $P(A) = 3/5$ and $P(B) = 1/5$, find $P(A \cap B)$ if A and B are independent events. 1
11. Let E and F be events with $P(E) = 3/5$, $P(F) = 3/10$ and $P(E \cap F) = 1/5$. are E and F independent? 1
12. If E, F and G are three events of a sample space then $P(E \cap F \cap G) = ?$ 1
13. A set of pair wise disjoint and exhaustive events E_1, E_2, \dots, E_n present a portion of the sample space S then 1
14. Given two independent events A and B such that $P(A) = 0.3$, $P(B) = 0.6$. Find $P(A \cup B)$. 1
15. Let X be a random variable whose possible values $x_1, x_2, x_3, \dots, x_n$ occur with probabilities P_1, P_2, \dots, P_n respectively. Find the mean of a random variable X. 1
16. Let X be a random variable such that $E(x) = 21/6$, $E(x^2) = 91/6$. find the variance of X. 1
17. Let X be a random variable such that $P(x_1), P(x_2), \dots, P(x_n)$ are probabilities of x_1, x_2, \dots, x_n . Then find variance of X. 1
18. If $P(A) = 1/2$, $P(B) = 0$ find the conditional probability of A given that B has already occurred. 1
19. What is the probability of x successes i.e $P(x = x)$ in n – Bernoulli trials. 1
20. Let E and F be events of a sample space S of an experiment, then find $P(S/F)$. 1

Short answer question on the topic probability (Independent Event) 4 marks

1. A coin tossed thrice. Let the event E be “the first throw result is a head and the event F be “the last throw result is a tail” find whether the event E and F are independent. 4
2. A can solve 90% of the problems given in a book and B can solve 70%. What is the probability that at least one of them will solve a problem selected at random from the books? 4
3. A die is thrown three times. Events A and B are defined as below 4
 A:4 on the third throw
 B:6 on the first and 5 on the second throw
 Find the probability of A given that B has already occurred
4. Bag I contains 3 red and 4 black balls while Bag II contains 5 red and 6 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that it was drawn from bag II. 4
5. A random variable X has the following probability distribution 1+1+1+1

X	0	1	2	3	4	5	6	7	
P(X)	0	K	2K	2K	3K	4K	K^2	$2K^2$	

 Determine
 - i K
 - ii $P(X < 3)$
 - iii $P(X > 6)$
 - iv $P(0 < X < 3)$
6. If a fair coin is tossed 10 times. Find the probability of exactly six heads. 4
7. A die is thrown twice and the sum of the numbers appearing is observed to be 6. What is the conditional probability that the number 4 has appeared at least once. 4
8. Given that the events A and B are such that $P(A) = \frac{1}{2}$, $P(A \cup B) = \frac{3}{5}$ and $P(B) = P$. Find P if they are 4
 - i Mutually exclusive.
 - ii Independent.
9. Find the probability distribution of the number of sixes in three tosses of a die. 4
10. Two cards are drawn successively with replacement from a well shuffled deck of 52 cards. Find the probability of the numbers of aces. 4

11. Given 4
- $$P(x = x) = \begin{cases} 0.1 & \text{if } x = 0 \\ Kx & \text{if } x = 1 \text{ or } 2 \\ k(5 - x) & \text{if } x = 3 \text{ or } 4 \end{cases}$$
- O otherwise. Where X denote the numbers of hours you study during a randomly selected school day.
- a. Find the value of K.
 - b. What is the probability that you study at least three hours? Exactly two hours? At most two hours?
12. Find the variance of the number obtained on a throw of an unbiased die. 4
13. Ten eggs are drawn successively with replacement from a lot containing 10% defective eggs. Find the probability that there is at least one defective eggs.
14. A fair die is rolled. Consider events $E = \{1, 3, 5\}$, $F = \{2, 3\}$, $G = \{2, 3, 4, 5\}$ 4
Find
- a. $P(E/F)$
 - b. $P(E/G)$
 - c. $P((E \cup F)/G)$
15. A family has two children. What is the probability that both the children are boys given that at least one of them is a boy?

Chapter 14 6 marks question

1. A coin is tossed. If the coin shows head, toss it again but if it shows tail then throw a die. Find the conditional probability of the event that the die shows a number greater than 4 given that there is at least one tail.
2. Three coins are tossed simultaneously. Consider the event E three heads or three tails F at least two heads and G at most two heads of the pairs (E, F), (E, G) and (F, G) which are independent? Which are dependent?
3. Given three identical boxes I, II and III, each containing two coins. In box I, both coins are gold coins, in box II both are silver coins and in the box III there is one gold and one silver coin. A person choose a box at random and take out a coin. If the coin is of gold, what is the probability that the other coin in the box is also of gold?
4. Find the probability distribution of doublets in three throws of a pair of dice.
5. Two cards are drawn simultaneously (or successively without replacement) from a well shuffled pack of 52 cards. Find the mean, variance and standard deviation of the number of kings.

6. In a hostel 60% of the students read Hindi news paper, 40% read English news paper and 20% read both Hindi and English news papers. A student is selected at random
- Find the probability that he reads neither Hindi nor English news papers.
 - If he reads Hindi news paper, find the probability that he reads English news paper.
 - If he reads English news paper. Find the probability that he reads Hindi news paper. $1\frac{1}{2}+1\frac{1}{2}+1\frac{1}{2}+1\frac{1}{2}$
7. Suppose that the probability of a HIV test is specified as following -
- Of people having HIV, 90% of the test detect the disease but 10% go undetected. 6
- Of people free of HIV, 99% of the test are judged HIV-Ve but 1% are diagnosed as showing HIV+Ve. From a large population of wick only 0.1% have HIV, one person is selected at random. Given the HIV test and the pathologist reports him/her as HIV+Ve what is the probability that the person actully has HIV?
8. A man known to speak truth 3 out of 4 times. He throws a die and reports that is a six. Find the probability that it is actually a six? 6
9. Find mean of the Binomial distribution B $(4, \frac{1}{3})$. 6
10. If a fair coin is tossed 10 times, find the probability of - 6
- Exactly six heads.
 - At least six heads.
 - At most six heads.