MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

PROBABILITY

One Marks Questions With Answers

1. Given that E and F are events such that P(E)=0.6, P(F)=0.3 and $P(E \cap F) = 0.2$, find $P(E/F)$ and $P(F/E)$.

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2. Find $P(A/B), \quad \text{if} \quad P(B) = 0.5 \text{ and } P(A \cap B) = 0.32$

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3. If P(A) = 0 . 8 , P(B) = 0 . 5 and $P(B/A) = 0.4$, find

$P(A/B)$

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4. If P(A) = 0 . 8 , P(B) = 0 . 5 and $P(B/A) = 0.4$, find

$P(A/B)$

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5. If P(A) = 0 . 8 , P(B) = 0 . 5 and $P(B/A) = 0.4$, find $P(A \cup B)$.

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6. Evaluate $P(A \cup B)$, if 2 P (A) $= P(B) = \frac{5}{13}$ and $P(A/B) = \frac{2}{5}$.

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7. If $P(A) = \frac{6}{11}, P(B) = \frac{5}{11}$ and $P(A \cup B) = \frac{7}{11}$, find $P(A \cap B)$

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8. If $P(A) = \frac{6}{11}, P(B) = \frac{5}{11}$ and $P(A \cup B) = \frac{7}{11}$, find $P(A/B)$

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9. If $P(A) = \frac{6}{11}, P(B) = \frac{5}{11}$ and $P(A \cup B) = \frac{7}{11}$, find $P(B/A)$

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10. If $P(A) = \frac{3}{5}$ and $P(B) = \frac{1}{5}$ find $P(A \cap B)$, where A and B are independent events.

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11. Two cards drawn at random and without replacement from a pack of 52 playing cards. Find the probability that both the cards are black .

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Two Marks Questions With Answers

1. A coin is tossed three times

E : head on third toss F : head on first two tosses .

Find $P(E/F)$

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2. Determine P(E/F) . A coin is tossed three times

E : atieast two heads F : atmost two heads

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3. A coin is tossed three times

E : atmost two tails F : atleast one tail Find $P(E/F)$

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4. Two coins are tossed once, where

E : tail appears on one coin F : one coin shows head

Find $P(E/F)$

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5. Two coins are tossed once, where

E : no tail appears $\quad$ F : no head appears

Find $P(E/F)$

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6. A die is thrown three times,

E : 4 appears on the third toss

F : 6 and 5 appears, respectively on first two tosses.

Find $P(E/F)$

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7. Mother father and son line up at random for a family picture

E : son on one end $\quad$ F : father in middle

Find $P(E/F)$

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8. A black and a red die are rolled.

Find the conditional probability of obtaining a sum greater than 9, given that the black die resulted in a 5 .

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9. A black and a red die are rolled.

Find the conditional probability of obtaining the sum 8, given that the red dieresulted in a number less than 4 .

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10. A box of oranges is inspected by examining three randomly selected oranges drawn without replacement. If all the three oranges are good, the box is approved for sale otherwise it is rejected. Find the probability that a box containing 15 oranges out of which 12 are good and 3 are bad one will be approved for sale .

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11. A fair coin and an unbiased die are tossed. Let A be the event 'head appears on the coin' and B be the event '3 on the die' . Check whether A and B are independent events or not.

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12. A Die marked 1, 2, 3 in red and 4. 5, 6 in green is tossed. Let A be the event, 'number is even's and B be the event, 'number is red'. Are A and B independent ?

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13. Let E and F events with $P(E) = \frac{3}{5}, P(F) = \frac{3}{10}$ and $P(E \cap F) = \frac{1}{5}$. Are E and F independent ?

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14. Given that the event A and B are such that $P(A) = 1/2, P(A \cup B) = 3/5$ and $P(B) = P$. Find p, if

they are

mutually exclusive

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15. Given that the events A and B are such that $P(A) = \frac{1}{2}$, and $P(A \cup B) = \frac{3}{5}P(B) = P$. Find P if they are independent.

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16. Let A and B be independent events with P(A) = 0 . 3 and P(B) = 0 . 4, . Find

$P(A \cap B)$

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17. Let A and B be independent events with P(A) = 0 . 3 and P(B) = 0 . 4, . Find

$P(A \cup B)$

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18. Let A and B be independent events with P(A) = 0 . 3 and P(B) = 0 . 4, . Find

$P(A/B)$

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19. Let A and B be independent events with P(A) = 0 . 3 and P(B) = 0 . 4, . Find

$P(B/A)$

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20. If E and F are two evetns such that $P(E) = \frac{1}{4}, P(F) = \frac{1}{2}$ and $P(E \text{ and } F) = \frac{1}{8}$. Find P(not E and not F)

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21. Events A and B are such that$P(A) = \frac{1}{2}, P(B) = \frac{7}{12}$ P (not A or not B) $= \frac{1}{5}$. State whether A and B are independent ?

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22. Given two independent events A and B such that P(A) = 0 . 3,

P (B) = 0 . 6 . Find

P(A and B)

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23. Given two independent events A and B such that P(A) = 0 . 3,

P (B) = 0 . 6 . Find

P(A and not B)

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24. Given two independent events A and B such that P(A) = 0 . 3,

P (B) = 0 . 6 . Find

P(A or B)

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25. Given two independent events A and B such that P(A) = 0 . 3, P (B) = 0 . 6 . Find

P(neither A nor B)

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26. A die is tossed thrice. Find the probability of getting an odd number tieast once.

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27. An urncontains 5 red and 2 black balls. Two balls are randomly selected. Let x represent the number of black balls.

What are the possible valuesof X ? Is X a random variable ?

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28. A coin is biased so that the head is 3 times as likely to occuras tail. If the coin is tossed twice, find the probability distribution of number of tails .

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29. Two cards are drawn successfully with replacement from a well- shuffled pack of 52 cards. Find the probability distribution of number of aces.

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30. 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 ?

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31. A fair die is rolled . Consider events E = {1, 3, 5} F = {2, 3} and G = {2, 3, 4, 5} . Find

$P(E/F)$ and $P(F/E)$

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32. A fair die is rolled . Consider events E = {1, 3, 5} F = {2, 3} and G = {2, 3, 4, 5} . Find

$P(E/G)$ and $P(G/E)$

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33. A fair die is rolled . Consider events E = {1, 3, 5} F = {2, 3} and G = {2, 3, 4, 5} . Find

$P(E \cup F/G)$ and $(E \cup F/G)$

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34. Assume that each child born is equally likely to be boy or a girl . If a family has two children, what is the conditional probability that both are girls given that

the youngest is a girl?

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35. Assume that each child born is equally likely to be boy or a girl . If a family has two children, what is the conditional

probability that both are girls given that

atleast one is a girls ?

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36. An instructor has a question bank consisting of 300 easy true /false questions, 200 difficult true/ false question, 500 easy multiply choice questions and 400 difficult multiple choice questions. If a question is selected at random from the test bank , what is the probability that it will be an easy question given that it is a multiple choice question ?

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37. Given that the two numbers appearing on throwing two dice are different . Find the probability of the events 'the sum

of numbers on the dice is 4' .

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38. Consider the experiment of throwing a die, if a multiple of 3 comes up thrown tha die again and if any other number comes, toss a coin . Find the conditional probability of the event the coin shows a tail, given that atleast one die shows a 3 .

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39. An urn contains 5 red and 5 black balls. A ball is drawn at random, its colour is noted and is returned to the urn. Moreover, 2 additional balls of the colour drawn are put in the

urn and then a balls is drawn at random. What is the probability that the second ball is red ?

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40. A beg contains 4 red and 4 black , another bag contains 2 red and 6 black balls. One of the two bags is selected at random and a ball is drawn from the bag which is found to be red. Find the probability that the ball is drawn from the first bag.

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41. Let x, represents the difference between number of heads and the number of tails obtained when a coin is tossed 6 times. What are posible values of x?

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42. Find the probability distribution of

number of heads in two tosses of a coin .

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43. Find the probability distribution of

number of tails in the simultaneous tosses of three coins .

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44. Find the probability distribution of

number of heads in four tosses of a coin .

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45. A coin is biased so that the head is 3 times as likely to occuras tail. If the coin is tossed twice, find the probability distribution of number of tails .

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Three Marks Questions With Answers

1. Of the students in a college, it is known that 60% reside in hostel and 40% are day scholars (not residing in hostel) . Previous years results report that 30% of all students who reside in hostel attain A grade and 20% of day scholrs attain A grade in their annual examination . At the end of the year, one

student is chosen at random from the college and he has an A grade, what is the probability that the student is a hostler ?

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2. In answering a question on a multiple choice test a student either knows the answer or gueses . Let 3 /4 be the probability that he knows the answer and 1/4 be the probability that he guesses . Assuming that a student who guesses at the answer will be correct with probability 1/4 what is the probability that a student knows the answer given that he answered it correctly ?

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3. A laboratory blood test is 99% effective in detecting a certain disease when it is in fact present. However, the test also yields a false positive result for 0.5% of the healthy person tested (i.e., if a healthy person is tested, then with probability 0.005, the test will imply he has the disease). If 0.1% of the population actually has the disease, what is the probahility that a person has disease given that his test result is positive ?

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4. There are three coins. One is a two headed coin (having head on both faces,) another is a biased coin that comes up heads 75% of the time and third is an unbiased coin. One of

the three coins is chosen at random and tossed, it shows head what is the probability that it is was the two headed coin

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5. An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probability of an accident is 0.01, 0.03 and 0.15 respectively. One of the insured person meets with an accident. What is the probability that he is a cooter driver?

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6. A factory has two machines A and B . Past record shows that machine A produced 60% of the item of output and machine b produced 40% of the items. Further, 2% of the items produce

by machine A and 1% produced by machine B wer efective. All the items are put into one stockpile and then one item is chosen at random from this and is found to be defective .What is the provability that it was produced by machine B ?

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7. Two groups are competing for the position on the board of directors of a corporation. The probability that the first and the second groups will win are 0 . 6 and 0 . 4 , respectively. Further, if the first group wins the probability of introducing anew product is 0 . 7 and the corresponding probability is 0 . 3 if the second group wins. Find the probability the the new product introduce was by the second group .

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8. Suppose, a girl throws a die. If she gets a 5 or 6 she tosses a coin three and notes the number of heads. If she gets 1 , 2, 3 or 4 she tosses a coin once an notes whether a head or tail is obtained. If she obtained exactly one head, what is the probability that she threw 1, 2, 3 or with the die ?

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9. A manufacturer has three maching operators A , B and C . The first op erator a produces 1% defective items , where as the other two operators B and C produce 5% and 7% defective items, respectively. A is on the jop for 50% of the time, B on the job for 30% of the time and C on the job for 20% of the time.A defective item is produced , what is the probability that it was produced by A ?

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10. A card from a pack of 52 cards is lost . From the remaining cards of the pack , two cards are drawn are are found to be diamonds. Find the probability of the lost card being a diamond ?

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Five Marks Questions With Answers

1. From a lot of 30 bulbs which include 6 detective, a sample of 4 balls is drawn at random with replacement. Find the probability distribution of the number of defective bulbs.

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2. A die is thrown 6 times. If getting an odd number is success,

What is the probability

(a) 5 successes

(b) at least 5 successes

(c) at most 5 successes

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3. A die is thrown 6 times. If getting an odd number is success,

What is the probability

(a) 5 successes

(b) at least 5 successes

(c) at most 5 successes

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4. A die is thrown 6 times. If getting an odd number is success,

What is the probability

(a) 5 successes

(b) at least 5 successes

(c) at most 5 successes

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5. If a fair coin is tossed 10 times, find the probability of.

(i) exactly six heads and (ii) atleast six heads.

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6. If a fair coin is tossed 10 times, find the probability of.

(i) exactly six heads and (ii) atleast six heads.

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7. A fair coin is tossed 10 times. Find the probability of

at most 6 heads .

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8. A pair of dice is thrown 4 times. If getting a doublet is considered a success find the probability of 2 success.

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9. There are 5% defective items in a large bulk of items. What is the probability that a sample of 10 items will include not more than 1 defective item.

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10. Five cards are drawn successively with replacement from a well shuffled deck of 52 cards. What is the probability that

(i) all the five cards are spades?

only five three cards are spaces?

(iii) none of spades?

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11. Five cards are drawn successively with replacement from a well shuffled deck of 52 cards. What is the probability that

(i) all the five cards are spades?

only five three cards are spaces?

(iii) none of spades?

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12. Five cards are drawn successively with replacemet from a well-shuffied pack of 52 cards. What is the probability that one is a spade

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13. A person buys a lottery ticket in 50 lotteries, in each of which his chance of winning and prize is $\frac{1}{100}$. What is the probability that he will win a prize.

(a) at least once

(b) exactly once

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14. Find the probability of getting 5 exactly twice in 7 throws of a die

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15. On a multiple choice questions with three possible answers for each of the five questions, what is the probability that a candidate would get 4 or more correct answers just by guessing ?

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Try Yourself One Marks Questions

1. An urncontains 5 red and 2 black balls. Two balls are randomly selected. Let x represent the number of black balls. What are the possible valuesof X ? Is X a random variable ?

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2. Find $P(A/B), \quad \text{if} \quad P(B) = 0.5 \text{ and } P(A \cap B) = 0.32$

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3. A fair die is rolled. Consider events E = E {2,4,6}and F{1,2} . Find P(E/F)

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Try Yourself Two Marks Questions

1. A die is thrown. If E is the event 'the number appearing is a multiple of 3' and F is the event 'the number appearing is even', then find whether E and F are independent?

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2. Probability distribution of x is

x	0	1	2	3	4
$p(X_1)$	0.1	k	$2k$	$2k$	k

Find k .

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3. Two cards drawn at random and without replacement from a pack of 52 playing cards. Find the probability that both the cards are black .

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Try Yourself Three Marks Questions

1. Consider the experiment of tossing two fair coins simultaneously, find the probability that both are head given that at least one of them is a head.

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2. A man is known to speak truth 4 out 5 times. He tossed a coin and reports that is head. Find the probability that it is actually head.

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3. 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.

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Try Yourself Five Marks Questions

1. If a fair coin is tossed 8 times. Find the probability of at least five heads.

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2. Find the probability of getting at most two sixes in six throws of a single die .

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3. A person buys a lottery ticket in 50 lotteries, in each of which his chance of winning and prize is $\frac{1}{100}$. What is the probability that he will win a prize.

(a) at least once

(b) exactly once

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