MATHS

BOOKS - NCERT MATHS (ENGLISH)

PROBABILITY

Short Answer Type Questions

1. If the letters of the word 'ALGORITHM' are arranged at random in a row,what is the probability that the letter GOR must remain together as a unit.

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2. Six new employees, two of whom are married to each other, are to be assigned six desks that are lined up in a row. If the assignment of employees to desks is made randomly, what is the probability that the married couple will have nonadjacent desks?

3. Suppose an integer from 1 through 1000 is chosen at random, find the probability that the integer is a multiple of 2 or a multiple of 9.

4. An experiment consists of rolling die until a 2 appears. How many elements of the sample space correspond to the event that 2 appears on the kth roll of the die? How many element of the sample space correspond to the event that 2 appears not later than the kth roll of the die?

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5. A die is loaded in such a way that a way that each odd number is twice as likely to occur as each even number. Find P(G), where G is the event that a number greater than 3 occurs on a single roll of the die.

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6. In a large metropolitan area, the probabilities are 0.87,0.36,0.30 that a family (randomly chosen for a sample survey) owns a colour televise set, a black and white television set, or both kinds of sets. What is the probability that a family owns either any one or both kinds of sets?

7. If A and B are mutually exclusive events, P(A)=0.35 amd P(B)=0.45, then find

(i) P(A')

(ii) P(B')

(iii) $P(A \cup B)$

(iv) $P(A \cap B)$

(v) $P(A \cap B')$

(vi) $P(A' \cup B')$

8. A team of medical students doing internship have to assist during surgeries at a city hospital The probabilitiies of surgeries rated as very complex, complex, routine simple or very simple are 0.15, 0.20, 0.31, 0.26, 0.08. Find the probabilities that a particular surgery will be rated a) complex or very comples b)neither very complex nor very simple c)routine or complex d) routine or simple

9. Four candidates A, B, C, D have applied for the assignment ot coach a school cricket team. If A is twice as likely to be selected as B, and B and C are given about the same chance of being selected, while C is twice as likely to be selected as D, what are the probability that (i) C will be selected ? (ii) A will not be selected?

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10. Once of the four persons John, Rita, Aslam or Gurpreet will be promoted next month. Consequently the sample space consists of four elementary outocomes S={John promoted, Rita promoted, Aslam promoted, Gurpreet promoted}. You are told that the chances of John's promotion is same as that of Gurpreet Rita's chances of

promotion are twice as likely as John's Aslam's chances are four times that of John.

(i) Determine

P (John promoted),

P (Rita promoted),

P (Aslam promoted),

P (Gurpreet promoted).

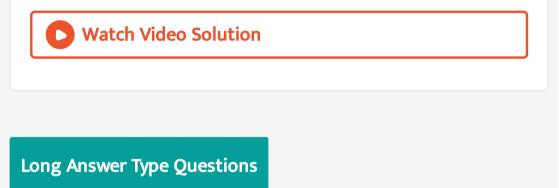If A= {John promoted or Gurpreet promoted}, find P (A)

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11. The accompanying Venn diagram shows three events, A, B and C and also the probabilities of the various intersections [for instance, $P(A \cup B) = 0.7$]. Determine

(i) P (A)

(ii) $P\left(B \cap \bar{C}\right)$

(iii) $P(A \cup B)$

(iv) $P\left(A \cap \bar{B}\right)$

(v) $P(B \cap C)$

(vi) Probability of exactly one of the three occurs.

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Long Answer Type Questions

1. One urn contains two black balls (labelled B1 and B2) and one white ball. A second urn contains one black ball and two white balls (labelled W1 and W2). Suppose the following experiment is performed. One of the two urns is chosen at random. Next a ball is randomly chosen from the urn. Then

a second ball is chosen at random from the same urn without replacing the first ball. Write the sample space showing aol possible outcomes. What is the probability that two black balls are chosen? What is the probability that two balls of opposite colour are chosen?

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2. A bag contain 8 red and 5 white balls. Three balls are drawn at random. Find the probability that: All the three balls are white. All the three balls are red. One ball is red and two balls are white.

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3. If the letters of the word ASSASSINTION are arranged at random. Find the probability that Four Ss come consecutively in the word. Two Is and two Ns come together. All As are not coming together. No two As are coming together.

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4. A card is drawn from a deck of 52 cards. Find the probability of getting a king or a heart or a red card.

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5. A sample space consists of 9 elementary outcomes $E_1, E_2, \ldots, E_9$ whose probabilities are

$$P(E_1) = P(E_2) = 0.08, \ P(E_3) = P(E_4) = P(E_5) = 0.1$$

$$P(E_6) = P(E_1) = 0.2, \ P(E_8) = P(E_9) = 0.07$$

Suppose $\quad A = \{E_1, E_5, E_8\}, \ B = \{E_2, E_5, E_8, E_9\}$

(i) Calculate P(A), P(B) and $P(A \cap B)$.

(ii) Using the addition law of probability, calculate $P(A \cup B)$.

(iii) List the composition of the event $A \cup B$ and calculate $P(A \cup B)$ by adding the probabilities of the elementary outcomes.

Calculate $P\left(\overline{B}\right)$ from P(B), also calculate $P\left(\overline{B}\right)$ directly from the elementary outcomes of $\overline{B}$,

6. Determine the probability p, for each of the following events.

(i) An odd number appears in a single toss of a fair die.

(ii) Atleast one head apperas in two tosses of a fair coin.

(iii) A king, 9 of hearts or 3 of spades appears in drawing a single card from a well shuffled ordinary deck of 52 cards.

(iv) The sum of 6 appears in a single toss of a pair of fair dice.

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Objective Type Questions

1. In a non-leap year, the probability of having 53 Tuesday or 53 Wednesday is

A. $\dfrac{1}{7}$

B. $\dfrac{2}{7}$

C. $\dfrac{3}{7}$

D. None of these

Answer: B

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2. Three numbers are chosen from 1 to 20. Find the probability that they are consecutive.

A. $\dfrac{186}{190}$

B. $\dfrac{187}{190}$

C. $\dfrac{188}{190}$

D. $\dfrac{18}{.^{20}C_3}$

Answer: B

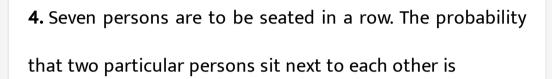**3.** While shuffling a pack of 52 playing cards, 2 are accidentally dropped. Find the probability that the missing cards to be of different colours.

A. $\dfrac{29}{52}$

B. $\dfrac{1}{2}$

C. $\dfrac{26}{51}$

D. $\dfrac{27}{51}$

Answer: C

4. Seven persons are to be seated in a row. The probability

that two particular persons sit next to each other is

A. $\dfrac{1}{3}$

B. $\dfrac{1}{6}$

C. $\dfrac{2}{7}$

D. $\dfrac{1}{2}$

Answer: C

5. If without repetition of the numbers, four-dight numbers are formed with the numbers 0, 2, 3 and 5, then the probability of such a number divisible by 5 is

A. $\dfrac{1}{5}$

B. $\dfrac{4}{5}$

C. $\dfrac{1}{30}$

D. $\dfrac{5}{9}$

Answer: D

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6. If A and B are mutually exclusive events, then

A. $P(A) \leq P(\bar{B})$

B. $P(A) \geq P(\bar{B})$

C. $P(A) < P(\bar{B})$

D. None of these

Answer: A

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7. "If " $P(A \cup B) = P(A \cap B)$" for any two events A and B, then"`

A. $P(A) = P(B)$

B. $P(A) > P(B)$

C. $P(A) < P(B)$

D. None of these

Answer: A

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8. 6 boys and 6 girls sit in a row at random. Find the probability that all the girls sit together.

A. $\dfrac{1}{432}$

B. $\dfrac{12}{431}$

C. $\dfrac{1}{132}$

D. None of these

Answer: C

9. If a single letter is selected at random from the word "PROBABILITY", then the probability that it is a vowel is

A. $\dfrac{1}{3}$

B. $\dfrac{4}{11}$

C. $\dfrac{2}{11}$

D. $\dfrac{3}{11}$

Answer: B

10. If the probabilities for A to fail in an examination is 0.2 and that for B is 0.3, then the probability that either A or B fails is

    A. > 0.5

    B. 0.5

    C. ≤ 0.5

    D. 0

Answer: C

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11. The probability that atleast one of the events A and B occurs is 0.6 If A and B occur simulataneously with

probability 0.2, then $P(\bar{A}) + P(\bar{B})$ is equal to

A. 0.4

B. 0.8

C. 1.2

D. 1.6

Answer: C

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12. If M and N are any two events, then the probability that

exactly one of them occurs is

A. $P(M) + P(N) - 2P(M \cap N)$

B. $P(M) + P(N) - P(M \cap N)$

C. $P(M) + P(N) + P(M \cap N)$

D. $P(M) + P(N) + 2P(M \cap N)$

Answer: B

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True False

1. The probability that a person visiting a zoo will see the girafee is 0.72, the probability that he will see the bears is 0.84 and the probability that he will see both is 0.52.

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2. The probability that a student will pass his examination is 0.73, the probability of the student getting a compartment is 0.13 and the probability that the student will either pass or get compartment is 0.96.

3. The probabilities that a typist will make 0, 1, 2, 3, 4 and 5 or more mistakes in typing a report are respectively, 0.12, 0.25, 0.36, 0.14, 0.08 and 0.11.

4. If A and B are two candidates seeking admission in an engineering college. The probability that A is selected is 0.5 and the probability that both A and B are selected is at most 0.3. Is it possible that the probability of B getting selected is 0.7 ?

5. The probability of intersection of two events A and B is always less than or equal to those favourable to the event A.

6. The probability of an occurrence of event A is 0.7 and that of the occurrence of event B is 0.3 and the probability of occurrence of both is 0.4.

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7. The sum of probabilities of two students getting distinction in their final examinations is 1.2.

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Fillers

1. The probability that the home team will win an upcoming football game is 0.77, the probability that it will tie the game is 0.08 and the probability that is will lose the game is .....
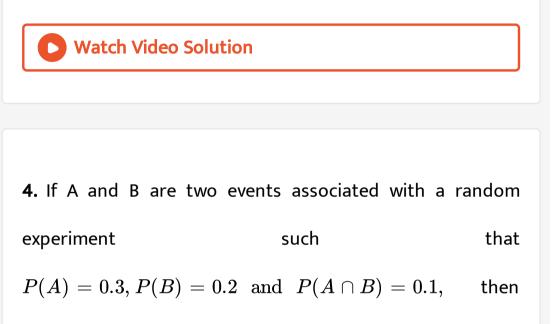
2. If e_1, e_2, e_3 and e_4 are the four elementary outcomes in a sample space and $P(e_1) = 0.1, P(e_2) = 0.5,$ and $P(e_3) = 0.1,$ then the probability of e_4 is ......

3.

If $S = \{1, 2, 3, 4, 5, 6\}$ and $E = \{1, 3, 5\}$, then $\bar{E}$ is..... .

4. If A and B are two events associated with a random experiment such that $P(A) = 0.3, P(B) = 0.2$ and $P(A \cap B) = 0.1$, then the value of $P(A \cup B)$ is ....

5. The probability of happening of an event A is 0.5 and that of B is 0.3. If A and B are mutually exclusive events, then the

probability of neither A nor B is.....

Matching The Columns

1. Match the following.

Column I			Column II
(i)	0.95	(a)	An incorrect assignment
(ii)	0.02	(b)	No chance of happening
(iii)	− 0.3	(c)	As much chance of happening as not
(iv)	0.5	(d)	Very likely to happen
(v)	0	(e)	Very little chance of happening

2. Match the following.

	Column I		Column II
(i)	If E_1 and E_2 are the two mutually exclusive events	(a)	$E_1 \cap E_2 = E_1$
(ii)	If E_1 and E_2 are the mutually exclusive and exhaustive events	(b)	$(E_1 - E_2) \cup (E_1 \cap E_2) = E_1$
(iii)	If E_1 and E_2 have common outcomes, then	(c)	$E_1 \cap E_2 = \phi, E_1 \cup E_2 = S$
(iv)	If E_1 and E_2 are two events such that $E_1 \subset E_2$	(d)	$E_1 \cap E_2 = \phi$

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