

MATHEMATICS
WORKSHEET_150426
CHAPTER 14 - PROBABILITY

SUBJECT: MATHEMATICS

MAX. MARKS : 40

CLASS : XI

DURATION : 1½ hrs

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. In a non-leap year, the probability of having 53 tuesday or 53 wednesday is
(a) $1/7$ (b) $2/7$ (c) $3/7$ (d) none of these
2. While shuffling a pack of 52 playing cards, 2 are accidentally dropped. The probability that the missing cards are to be of different colours is
(a) $29/52$ (b) $1/2$ (c) $26/51$ (d) $27/51$
3. 6 boys and 6 girls sit in a row at random. The probability that all the girls sit together is
(a) $1/432$ (b) $12/431$ (c) $1/132$ (d) none of these
4. A single letter is selected at random from the word 'PROBABILITY'. The probability that it is a vowel is
(a) $1/3$ (b) $4/11$ (c) $2/11$ (d) $3/11$
5. The probability that in a random arrangements of the letters of the word 'FAVOURABLE', 'A' do not come together is
(a) $1/5$ (b) $1/10$ (c) $9/10$ (d) $4/5$
6. 3 mangoes and 3 apples are in a box. If 2 fruits are choosen at random. The probability that one is a mango and other is an apple is
(a) $2/5$ (b) $5/6$ (c) $3/36$ (d) $3/5$
7. A fair coin with 1 marked on one face and 6 on the other and a fair die are both tossed. Find the probability that the sum of numbers that turn up is 3.
(a) $1/6$ (b) $1/12$ (c) $2/3$ (d) $1/4$
8. A coin is tossed repeatedly until a head comes up for the first time. Then, the sample space for this experiment is:
(a) {H, TH, TTH}
(b) {HH, HHH, TTH, HTT}
(c) {H, TH, TTH, TTTH, TTTTH,}
(d) None of these

For Q9 and Q10, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
- (c) (A) is true but (R) is false.
- (d) (A) is false but (R) is true.

9. Assertion (A): The probability of drawing either an ace or a king from a pack of cards in a single draw is $\frac{2}{13}$.

Reason (R): For two events A and B which are not mutually exclusive,
 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

10. Consider the experiment of rolling a die. Then, sample space is $S = \{1, 2, 3, 4, 5, 6\}$.

Assertion (A): The event E : " the number appears on the die is a multiple of 7", is an impossible event.

Reason (R): The event F : " the number turns up is odd or even", is a sure event.

SECTION – B

Questions 11 to 14 carry 2 marks each.

- 11.** In an entrance test that is graded on the basis of two examination, the probability of a randomly chosen student passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing at least one of them is 0.95. What is the probability of passing both?
- 12.** A fair coin with 1 marked on one face and 6 on the other and a fair die are both tossed. Find the probability that the sum of numbers that turn up is (i) 3 (ii) 12
- 13.** A letter is chosen at random from the word ASSASSINATION. Find the probability that letter is (i) a vowel (ii) a consonant.
- 14.** In class XI of a school 40% of the students study Mathematics and 30% study Biology, 10% of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology.

OR

Three balls are drawn from a bag containing 5 red, 4 white, and 3 black balls. Find the number of ways in which this can be done if atleast 2 balls are red.

SECTION – C

Questions 15 to 17 carry 3 marks each.

- 15.** Three coins are tossed once. Find the probability of getting (i) 3 heads (ii) no head (iii) at most two tails
- 16.** A bag contains 8 red and 5 white balls. Three balls are drawn at random. Find the probability that (a) all the three balls are white. (b) all the three balls are red. (c) one ball is red and two balls are white.
- 17.** Three dice are thrown together. Find the probability of getting a total of at least 6.

SECTION – D

Questions 18 carry 5 marks.

- 18.** If 4 digit numbers greater than 5000 are randomly formed from the digits 0, 1, 3, 5 and 7 then what is the probability of forming a number divisible by 5 when
- (i) the digits are repeated?
 - (ii) the repetition of digits is not allowed?

OR

In a class of 60 students, 30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS. If one of these students is selected at random, find the probability that

- (i) the student opted for NCC or NSS.
- (ii) the student has opted neither NCC nor NSS.
- (iii) the student has opted NSS but not NCC.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Two students, Anil and Vijay, appeared in a highly competitive examination. Anil has been preparing part-time while managing a job, which has left him with limited preparation time. On the other hand, Vijay, though dedicated, has struggled with certain key concepts. Based on their preparation and past performance, the probability that Anil will qualify the examination is estimated to be 0.05, and the probability that Vijay will qualify is estimated at 0.10. Additionally, the probability that both students will qualify together, due to their independent preparation and individual strengths, is calculated as 0.02.



- (a) Find the probability that at least one of them will qualify the exam.
 - (b) Find the probability that at least one of them will not qualify the exam.
 - (c) Find the probability that both Anil and Vijay will not qualify the exam.
 - (d) Find the probability that only one of them will qualify the exam.
20. One of the four persons John, Rita, Aslam or Gurpreet will be promoted next month. Consequently, the sample space consists of four elementary outcomes $S = \{\text{John promoted, Rita promoted, Aslam promoted, Gurpreet promoted}\}$. 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.
- (a) What is the probability that John got promotion?
 - (b) What is the probability that Rita got promotion?
 - (c) What is the probability that Aslam got promotion?
 - (d) What is the probability that Gurpreet got promotion?

