UNIQUE STUDY POINT

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PRACTICE PAPER 04 (2025-26)

CHAPTER 14: PROBABILITY

SUBJECT: MATHEMATICS STANDARD	**MAX. MARKS: 40**
CLASS: X	**DURATION: 1½ hrs**

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five Sections A, B, C, D and E.
3. 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 and Section E comprises of 2 Case Study Based Questions of 4 marks each.
4. There is no overall choice.
5. Use of Calculators is not permitted.

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. In a bag containing 12 balls, 7 are white. What is the probability of drawing a ball which is not white?

(a) 5/12
(b) 7/12
(c) 1/2
(d) 2/3

2. A coin is tossed 3 times. What is the probability of getting exactly 1 head?

(a) 1/8
(b) 3/8
(c) 1/2
(d) 5/8

3. The probability of an event E is 0.05. What is the probability of 'not E'?

(a) 0.05
(b) 0.5
(c) 0.95
(d) 1.05

4. A number is selected from numbers 1 to 20. The probability that it is a multiple of 3 is:

(a) 1/5
(b) 3/10
(c) 2/5

(d) 1/2

5. If a card is selected at random from 52 cards, what is the probability that it is a heart or a club?

(a) 1/4
(b) 1/2
(c) 3/4
(d) 1

6. Which of the following cannot be the probability of an event?

(a) 0.3
(b) 3/5
(c) 15%
(d) 17/16

7. A letter is selected from the letters of the word 'TRIGONOMETRY'. What is the probability that it is 'T'?

(a) 1/12
(b) 1/6
(c) 1/4
(d) 1/3

8. Two dice are thrown. What is the probability of getting a sum of 6?

(a) 1/9
(b) 5/36
(c) 1/6
(d) 7/36

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

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

9. Assertion (A): The probability of getting a prime number when a die is thrown is 1/2.

Reason (R): Prime numbers on a die are 2, 3 and 5.

10. Assertion (A): If a bag contains 3 red and 2 blue balls, the probability of drawing a red ball is 3/5.

Reason (R): Probability = (Favorable outcomes)/(Total outcomes)

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. A bag contains tickets numbered 11 to 40. A ticket is drawn at random. Find the probability that the number on the ticket is:

(i) a multiple of 5
(ii) a prime number greater than 20

12. All red face cards are removed from a pack of 52 cards. A card is drawn at random from the remaining cards. Find the probability of getting:

(i) a black card
(ii) a non-face card

13. Two different dice are thrown together. Find the probability that:

(i) both show the same number
(ii) the product of numbers is 12

14. A number x is selected at random from the numbers 1, 2, 3 and 4. Another number y is randomly selected from the numbers 1, 4, 9 and 16. Find the probability that the product of x and y is less than 16.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. From a pack of 52 cards, two cards are drawn at random one after the other without replacement. Find the probability that both cards are kings.

16. A box contains 20 cards numbered 1 to 20. A card is drawn at random from the box. Find the probability that the number on the card is:

(a) a prime number
(b) divisible by 2 or 3
(c) a perfect square

17. In a Family of 2 children, find the probability that:

(a) both are boys
(b) at least one is a girl
(c) both are girls given that at least one is a girl

SECTION – D

Question 18 carries 5 marks.

18. A survey of 500 families was conducted to find out their monthly savings. The results are shown below:

Monthly Savings (₹)	Less than 5000	5000-10000	10000-15000	More than 15000
Number of Families	150	200	100	50

If a family is selected at random, find the probability that the family:

(a) saves less than ₹5000 per month
(b) saves at least ₹10000 per month
(c) saves between ₹5000 and ₹15000
(d) does not save more than ₹15000
(e) saves more than ₹5000

SECTION – E (CASE STUDY BASED QUESTIONS)

Questions 19 to 20 carry 4 marks each.

19. Cricket Tournament

In a school cricket tournament, the performance analysis of bowlers is done based on wickets taken. The data for 50 matches is given below:

Wickets Taken	0-2	3-4	5 or more
Number of Matches	20	18	12

Based on the above information, answer the following questions:

(i) What is the probability that in a randomly selected match, 5 or more wickets were taken? (1)

(ii) What is the probability that less than 3 wickets were taken in a match? (1)

(iii) (a) Find the probability that at least 3 wickets were taken. (1)

OR

(b) Find the probability that at most 4 wickets were taken. (1)

(iv) In which category do maximum matches fall? What is the probability for this category? (1)

20. Color Preference Survey

A survey was conducted among 120 students to find their favorite color among Red, Blue, Green, and Yellow. The results showed:

- 30 students like Red
- 45 students like Blue
- 25 students like Green
- 20 students like Yellow

Based on the above information, answer the following questions:

(i) (a) If a student is selected at random, what is the probability that the student likes Blue? (1)

OR

(b) What is the probability that a randomly selected student likes Red or Yellow? (1)

(ii) What is the probability that a student does not like Green? (1)

(iii) If two students are selected at random, what is the probability that both like the same color? (Note: Assume with replacement) (2)

DETAILED ANSWER KEY

SECTION A - ANSWERS

1. Answer: (a) 5/12

Total balls = 12, White balls = 7

Non-white balls = 12 - 7 = 5

P(not white) = 5/12

2. Answer: (b) 3/8

Total outcomes = $2^3 = 8$

Exactly 1 head: HTT, THT, TTH = 3 outcomes

P = 3/8

3. Answer: (c) 0.95

P(not E) = 1 - P(E) = 1 - 0.05 = 0.95

4. Answer: (b) 3/10

Multiples of 3 from 1-20: 3, 6, 9, 12, 15, 18 = 6 numbers

P = 6/20 = 3/10

5. Answer: (b) 1/2

Hearts = 13, Clubs = 13

Total = 26 cards

P = 26/52 = 1/2

6. Answer: (d) 17/16

Probability must be between 0 and 1

17/16 > 1, so it cannot be a probability

7. Answer: (b) 1/6

TRIGONOMETRY has 12 letters

Letter T appears 2 times

P(T) = 2/12 = 1/6

8. Answer: (b) 5/36

Sum = 6: (1,5), (2,4), (3,3), (4,2), (5,1) = 5 outcomes

P = 5/36

9. Answer: (a) Both true and R explains A

Prime numbers on die: 2, 3, 5 = 3 numbers

P = 3/6 = 1/2

Both A and R are true, and R explains A

10. Answer: (a) Both true and R explains A

Total balls = 5, Red = 3

P(red) = 3/5

R correctly explains how to find probability

SECTION B - ANSWERS

11. Solution:

Tickets: 11 to 40 = 30 tickets

(i) Multiple of 5:

15, 20, 25, 30, 35, 40 = 6 tickets

P = 6/30 = 1/5

(ii) Prime > 20:

23, 29, 31, 37 = 4 primes

P = 4/30 = 2/15

12. Solution:

Red face cards removed = 6 (3 hearts + 3 diamonds)

Remaining = 52 - 6 = 46 cards

(i) P(black):

Black cards = 26 (all remain)

P = 26/46 = 13/23

(ii) P(non-face):

Total face cards originally = 12

Face cards removed = 6

Face cards remaining = 6

Non-face cards = 46 - 6 = 40

P = 40/46 = 20/23

13. Solution:

Total outcomes = 36

(i) Same number (doublet):

(1,1), (2,2), (3,3), (4,4), (5,5), (6,6) = 6

P = 6/36 = 1/6

(ii) Product = 12:

(2,6), (3,4), (4,3), (6,2) = 4 outcomes

P = 4/36 = 1/9

14. Solution:

$x \in \{1,2,3,4\}$, $y \in \{1,4,9,16\}$

Total outcomes = $4 \times 4 = 16$

Product < 16:

x=1: 1×1=1, 1×4=4, 1×9=9 (3 cases)

x=2: 2×1=2, 2×4=8 (2 cases)

x=3: 3×1=3, 3×4=12 (2 cases)

x=4: 4×1=4 (1 case)

Total favorable = 8

P = 8/16 = 1/2

SECTION C - ANSWERS

15. Solution:

Total cards = 52, Kings = 4

P(first king) = 4/52

After one king, remaining cards = 51, remaining kings = 3

P(second king | first king) = 3/51

P(both kings) = (4/52) × (3/51) = 12/2652 = 1/221

16. Solution:

Cards 1 to 20 = 20 cards

(a) Prime numbers:

2, 3, 5, 7, 11, 13, 17, 19 = 8 primes

P = 8/20 = 2/5

(b) Divisible by 2 or 3:

By 2: 2,4,6,8,10,12,14,16,18,20 = 10

By 3: 3,6,9,12,15,18 = 6

By both: 6,12,18 = 3

Total = 10 + 6 - 3 = 13

P = 13/20

(c) Perfect square:

1, 4, 9, 16 = 4 numbers

P = 4/20 = 1/5

17. Solution:

Sample space: {BB, BG, GB, GG}

Total outcomes = 4

(a) Both boys:

BB = 1 outcome

P = 1/4

(b) At least one girl:

BG, GB, GG = 3 outcomes

P = 3/4

(c) Both girls given at least one girl:

Given at least one girl: {BG, GB, GG}

Both girls: {GG} = 1 outcome

P(both girls | at least one girl) = 1/3

SECTION D - ANSWERS

18. Solution:

Total families = 500

(a) P(< ₹5000):

P = 150/500 = 3/10

(b) P(≥ ₹10000):

Families = 100 + 50 = 150

P = 150/500 = 3/10

(c) P(between ₹5000-₹15000):

Families = 200 + 100 = 300

P = 300/500 = 3/5

(d) P(not > ₹15000):

Families = 500 - 50 = 450

P = 450/500 = 9/10

(e) P(> ₹5000):

Families = 200 + 100 + 50 = 350

P = 350/500 = 7/10

SECTION E - ANSWERS

19. Cricket Tournament - Solutions:

Total matches = 50

(i) P(5 or more wickets):

P = 12/50 = 6/25

(ii) P(< 3 wickets):

Matches with 0-2 wickets = 20

P = 20/50 = 2/5

(iii)(a) P(at least 3 wickets):

Matches = 18 + 12 = 30

P = 30/50 = 3/5

OR (iii)(b) P(at most 4 wickets):

Matches = 20 + 18 = 38

P = 38/50 = 19/25

(iv) Maximum category:

0-2 wickets (20 matches)

P = 20/50 = 2/5

20. Color Preference - Solutions:

Total students = 120

Red=30, Blue=45, Green=25, Yellow=20

(i)(a) P(Blue):

P = 45/120 = 3/8

OR (i)(b) P(Red or Yellow):

P = (30+20)/120 = 50/120 = 5/12

(ii) P(not Green):

P = (120-25)/120 = 95/120 = 19/24

(iii) P(both like same color):

P(both Red) = $(30/120)^2$ = 1/16

P(both Blue) = $(45/120)^2$ = 9/64

P(both Green) = $(25/120)^2$ = 25/576

P(both Yellow) = $(20/120)^2$ = 1/36

Total P = 1/16 + 9/64 + 25/576 + 1/36

= 36/576 + 81/576 + 25/576 + 16/576

= 158/576 = 79/288