UNIQUE STUDY POINT

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PRACTICE PAPER 03 (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. If two events A and B are such that P(A) = 0.4, P(B) = 0.3 and P(A and B) = 0.2, then P(A or B) is:

(a) 0.1
(b) 0.5
(c) 0.7
(d) 0.9

2. A bag contains 10 red balls and 15 green balls. If one ball is removed, what is the probability that it is green?

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

3. Three fair coins are tossed. What is the probability of getting all tails?

(a) 1/2
(b) 1/4
(c) 1/8
(d) 1/16

4. A number is chosen at random from 1 to 25. What is the probability that it is divisible by 3 or 5?

(a) 11/25
(b) 12/25
(c) 13/25

(d) 14/25

5. A card is drawn from a deck of 52 cards. What is the probability of drawing a card which is neither a king nor a queen?

(a) 11/13
(b) 12/13
(c) 10/13
(d) 9/13

6. If P(E) denotes the probability of an event E, then what is the range of P(E)?

(a) $0 < P(E) < 1$
(b) $0 \leq P(E) \leq 1$
(c) $-1 \leq P(E) \leq 1$
(d) $P(E) \geq 0$

7. A letter is chosen at random from the word 'ASSESSMENT'. What is the probability that it is the letter 'S'?

(a) 1/5
(b) 2/5
(c) 3/10
(d) 4/10

8. Two dice are rolled. What is the probability that the sum of numbers is 7?

(a) 1/12
(b) 1/6
(c) 1/9
(d) 1/4

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 an even number on rolling a die is 1/2.

Reason (R): On a die, even numbers are 2, 4, 6.

10. Assertion (A): If a card is drawn from a pack of 52 cards, then the probability of getting a diamond is 1/4.

Reason (R): There are 13 cards of each suit in a pack of 52 cards.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. A bag contains cards numbered 1 to 49. A card is drawn at random. Find the probability that the number on the card is:

(i) divisible by 7
(ii) a perfect cube

12. In a single throw of two dice, find the probability of getting:

(i) a total of 11
(ii) a total greater than 10

13. A bag contains 8 red and 7 black balls. Two balls are drawn at random (without replacement). Find the

probability that both balls are of the same colour.

14. Find the probability that a randomly chosen month has exactly 30 days.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. A lot consists of 144 ball pens of which 20 are defective. A customer will buy a pen if it is good, but will not buy it if it is defective. The shopkeeper draws one pen at random and gives it to the customer. What is the probability that:

(i) the customer will buy it?
(ii) the customer will not buy it?
(iii) If 12 more good pens are added to the lot, what is the new probability that the customer will buy a randomly selected pen?

16. A die is thrown twice. Find the probability that:

(a) 5 will not come up either time
(b) 5 will come up exactly once
(c) 5 will come up at least once

17. Cards bearing numbers 2, 3, 4, ..., 11 are kept in a bag. A card is drawn at random from the bag. Find the probability of getting a card with:

(a) a prime number
(b) an odd number
(c) a number less than 5

SECTION – D

Question 18 carries 5 marks.

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

(a) the student opted for Mathematics or Biology
(b) the student opted for only Mathematics
(c) the student opted for only Biology
(d) the student opted for neither Mathematics nor Biology
(e) the student opted for Mathematics given that they opted for Biology

SECTION – E (CASE STUDY BASED QUESTIONS)

Questions 19 to 20 carry 4 marks each.

19. Traffic Signal Study

A traffic study was conducted at a busy intersection. The data collected over one week showed the following duration of different signal lights:

Signal Color	Red	Yellow	Green
Time (seconds)	45	5	40

Based on the above information, answer the following questions:

(i) What is the probability that when you reach the signal, it is red? (1)

(ii) What is the probability that the signal is not green? (1)

(iii) (a) What is the probability that the signal is yellow? (1)

OR

(b) What is the probability that the signal is either red or yellow? (1)

(iv) Which signal light has the maximum duration? What is the probability of seeing this signal? (1)

20. Lottery System

A school organized a lottery to raise funds for charity. There are 500 tickets numbered 001 to 500. The prize distribution is as follows:

- Tickets ending with digit 0 win ₹1000
- Tickets ending with digit 5 win ₹500
- Tickets with all three digits same win ₹2000

Based on the above information, answer the following questions:

(i) (a) What is the probability of winning ₹1000? (1)

OR

(b) What is the probability of winning ₹500? (1)

(ii) What is the probability of winning ₹2000? (1)

(iii) What is the probability that a ticket wins some prize? (Note: A ticket can only win one prize - the highest it qualifies for) (2)

DETAILED ANSWER KEY

SECTION A - ANSWERS

1. Answer: (b) 0.5

P(A or B) = P(A) + P(B) - P(A and B)

= 0.4 + 0.3 - 0.2 = 0.5

2. Answer: (b) 3/5

Total balls = 10 red + 15 green = 25

P(green) = 15/25 = 3/5

3. Answer: (c) 1/8

Total outcomes = $2^3 = 8$

All tails (TTT) = 1 outcome

P(all tails) = 1/8

4. Answer: (c) 13/25

Divisible by 3: 3, 6, 9, 12, 15, 18, 21, 24 = 8 numbers

Divisible by 5: 5, 10, 15, 20, 25 = 5 numbers

Divisible by both (15) = 1 number

Total = 8 + 5 - 1 = 12... wait let me recount

Divisible by 3 or 5: {3,5,6,9,10,12,15,18,20,21,24,25} = 12 numbers

Actually 13: {3,5,6,9,10,12,15,18,20,21,24,25} = 12, but I need to verify

Let me list: 3,5,6,9,10,12,15,18,20,21,24,25 = 12 numbers

Hmm, rechecking: divisible by 3 (1-25): 3,6,9,12,15,18,21,24 = 8

Divisible by 5 (1-25): 5,10,15,20,25 = 5

Common (15) = 1

By inclusion-exclusion: 8 + 5 - 1 = 12

Wait, the answer says 13/25, let me check again...

Actually, I need to include 1 to 25 properly

Numbers divisible by 3 or 5 from 1-25:

{3,5,6,9,10,12,15,18,20,21,24,25} = 12 numbers

So P = 12/25

The correct answer should be (b) 12/25

5. Answer: (a) 11/13

Kings and Queens = 4 + 4 = 8 cards

Cards that are neither = 52 - 8 = 44

P = 44/52 = 11/13

6. Answer: (b) 0 ≤ P(E) ≤ 1

Probability always lies between 0 and 1, inclusive.

7. Answer: (d) 4/10

ASSESSMENT has 10 letters

Letter 'S' appears: A-S-S-E-S-S-M-E-N-T = 4 times

P(S) = 4/10 = 2/5

8. Answer: (b) 1/6

Sum = 7: (1,6), (2,5), (3,4), (4,3), (5,2), (6,1) = 6 outcomes

Total outcomes = 36

P(sum = 7) = 6/36 = 1/6

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

A is TRUE: P(even) = 3/6 = 1/2

R is TRUE and explains A: The even numbers 2,4,6 give us 3 favorable outcomes

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

A is TRUE: P(diamond) = 13/52 = 1/4

R is TRUE and explains A: Each suit has 13 cards

SECTION B - ANSWERS

11. Solution:

Cards numbered 1 to 49 = 49 cards

(i) Divisible by 7:

7, 14, 21, 28, 35, 42, 49 = 7 numbers

P = 7/49 = 1/7

(ii) Perfect cube:

1, 8, 27 = 3 numbers

P = 3/49

12. Solution:

Total outcomes = 36

(i) Total of 11:

(5,6), (6,5) = 2 outcomes

P = 2/36 = 1/18

(ii) Total > 10:

Sum 11: (5,6), (6,5) = 2

Sum 12: (6,6) = 1

Total = 3 outcomes

P = 3/36 = 1/12

13. Solution:

Total balls = 8 red + 7 black = 15

P(both same color):

P(both red) = (8/15) × (7/14) = 56/210 = 4/15

P(both black) = (7/15) × (6/14) = 42/210 = 1/5

P(both same) = 4/15 + 1/5 = 4/15 + 3/15 = 7/15

14. Solution:

Months with 30 days: April, June, September, November = 4 months

Total months = 12

P(30 days) = 4/12 = 1/3

SECTION C - ANSWERS

15. Solution:

Total pens = 144, Defective = 20, Good = 124

(i) P(customer will buy):

P(good pen) = 124/144 = 31/36

(ii) P(customer will not buy):

P(defective) = 20/144 = 5/36

(iii) After adding 12 good pens:

Total = 156, Good = 136, Defective = 20

New P(good) = 136/156 = 34/39

16. Solution:

Total outcomes = 36

(a) 5 not coming either time:

First die not 5: 5 outcomes, Second die not 5: 5 outcomes

Favorable = 5 × 5 = 25

P = 25/36

(b) 5 exactly once:

(5,not 5) + (not 5, 5) = 5 + 5 = 10 outcomes

P = 10/36 = 5/18

(c) 5 at least once:

P = 1 - P(5 never) = 1 - 25/36 = 11/36

17. Solution:

Cards: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 = 10 cards

(a) Prime numbers:

2, 3, 5, 7, 11 = 5 numbers

P = 5/10 = 1/2

(b) Odd numbers:

3, 5, 7, 9, 11 = 5 numbers

P = 5/10 = 1/2

(c) Less than 5:

2, 3, 4 = 3 numbers

P = 3/10

SECTION D - ANSWERS

18. Solution:

Total students = 60

Math = 30, Biology = 32, Both = 24

(a) P(Math or Biology):

Students = 30 + 32 - 24 = 38

P = 38/60 = 19/30

(b) P(only Math):

Only Math = 30 - 24 = 6

P = 6/60 = 1/10

(c) P(only Biology):

Only Biology = 32 - 24 = 8

P = 8/60 = 2/15

(d) P(neither):

Neither = 60 - 38 = 22

P = 22/60 = 11/30

(e) P(Math | Biology):

P(Math given Biology) = 24/32 = 3/4

SECTION E - ANSWERS

19. Traffic Signal - Solutions:

Total time = 45 + 5 + 40 = 90 seconds

(i) P(red):

P = 45/90 = 1/2

(ii) P(not green):

P = (45 + 5)/90 = 50/90 = 5/9

(iii)(a) P(yellow):

P = 5/90 = 1/18

OR (iii)(b) P(red or yellow):

P = 50/90 = 5/9

(iv) Maximum duration:

Red signal (45 sec), P = 45/90 = 1/2

20. Lottery - Solutions:

Total tickets = 500

(i)(a) P(₹1000 - ending in 0):

010, 020, ..., 500 = 50 tickets

P = 50/500 = 1/10

OR (i)(b) P(₹500 - ending in 5):

005, 015, ..., 495 = 50 tickets

P = 50/500 = 1/10

(ii) P(₹2000 - all same digits):

111, 222, 333, 444 = 4 tickets

P = 4/500 = 1/125

(iii) P(some prize):

Ending in 0: 50 tickets

Ending in 5: 50 tickets

All same (already counted in above): 0 additional

Total winning tickets = 50 + 50 = 100

P = 100/500 = 1/5