

Quantitative Aptitude

Probability

Level-1

- Q1** A card is drawn from a well shuffled pack of 52 cards. What is the probability of getting queen or club card?
 (A) $17/52$ (B) $15/52$
 (C) $4/13$ (D) $3/13$
 (E) None of these
- Q2** A bag contains 2 red, 3 green and 2 yellow balls. Two balls are drawn at random. What is the probability that none of the balls drawn is yellow?
 (A) $10/21$ (B) $13/21$
 (C) $17/19$ (D) $13/15$
 (E) none of these
- Q3** Two cards are drawn from pack of 52 cards. What is the probability that both are kings, when first drawn card is replaced?
 (A) $1/169$ (B) $3/13$
 (C) $3/676$ (D) $4/676$
 (E) None of these
- Q4** 2 dice are thrown simultaneously. What is the probability that the sum of the numbers on the faces is divisible by either 2 or 7?
 (A) $\frac{1}{3}$
 (B) $\frac{5}{36}$
 (C) $\frac{2}{3}$
 (D) $\frac{11}{36}$
 (E) None of these
- Q5** Rahul tells the truth 8 times out of 12 times while Manoj tells the truth 12 out of 15 times. If they say a statement, then what is the probability that the given statement is true?
 (A) $\frac{13}{30}$
 (B) $\frac{14}{15}$
 (C) $\frac{1}{10}$
 (D) $\frac{1}{15}$
 (E) None of these
- Q6** A number is randomly chosen from 1 to 100(both inclusive). What is the probability that it is divisible by 4 or 9?
 (A) $\frac{3}{50}$
 (B) $\frac{7}{25}$
 (C) $\frac{37}{100}$
 (D) $\frac{17}{25}$
 (E) 825
- Q7** When two dice are thrown, what is the probability that the sum of numbers appears ≤ 7 ?
 (A) $\frac{1}{2}$ (B) $\frac{7}{9}$
 (C) $\frac{7}{12}$ (D) $\frac{8}{11}$
 (E) None of these
- Q8** A single card is chosen at random from a standard deck of 52 playing cards. What is the probability of a queen or a club?
 (A) $\frac{4}{13}$ (B) $\frac{5}{13}$
 (C) $\frac{3}{13}$ (D) $\frac{7}{13}$
 (E) none of these
- Q9** A bag contains 3 red balls, 5 white balls and 2 blue balls. In how many ways can 7 balls be selected from the bag, so that there are at least 2 balls of each color?
 (A) 80 (B) 30
 (C) 50 (D) 90
 (E) 40
- Q10** A bag contains 4 black balls, 3 red balls and 3 white balls. In how many ways can 3 balls be selected such that there are at least 2 colored balls with the majority of black balls?
 (A) 30 (B) 60



- (C) 36 (D) 48
(E) None of these
- Q11** A bag contains 4 red balls and three green balls. If two balls are selected, in how many different ways the balls selected such that at least one red ball should be there?
(A) 18 (B) 20
(C) 36 (D) 48
(E) 54
- Q12** A bag contains 51 balls numbered 1 to 51. A ball is drawn and then another ball is drawn without replacement. What is the probability that both balls are even numbered?
(A) $\frac{1}{50}$
(B) $\frac{4}{17}$
(C) $\frac{1}{2}$
(D) $\frac{2}{51}$
(E) None of these
- Q13** A bag contains 4 red, 5 blue and 6 black colors sarees. 2 sarees are drawn at random after one another without replacement then what is the probability that at least one saree is blue.
(A) $\frac{2}{7}$
(B) $\frac{3}{7}$
(C) $\frac{4}{7}$
(D) $\frac{1}{7}$
(E) None of these
- Q14** A bag contains 31 cards numbered 1, 2, 3,, 31. Two cards are picked at random (one after another and without replacement). Find the probability that the sum of numbers of both cards is odd.
(A) $\frac{15}{31}$
(B) $\frac{13}{31}$
(C) $\frac{16}{31}$
(D) $\frac{19}{31}$
(E) None of these
- Q15** A bag contains 'n' yellow balls and '2n + 3' black balls and probability of drawing one

black ball from the bag is $\frac{3}{5}$, then find the total number of black balls in the bag.

- (A) 6 (B) 9
(C) 12 (D) 15
(E) 3
- Q16** A bag contains 'x' number of balls out of which there are 5 blue balls in it. If probability of drawing two blue balls from the bag is $\frac{2}{21}$, find the value of 'x'.
(A) 10 (B) 12
(C) 18 (D) 15
(E) None of these
- Q17** A bag contains 8 red balls, 5 blue balls, and 2 green balls. Four balls are drawn from the bag without replacement. If the probability of drawing exactly two blue balls, one green ball, and one red ball is $\frac{x}{819}$, then find the value of 'x'.
(A) 16 (B) 20
(C) 10 (D) 18
(E) 12
- Q18** A bag contains 12 red balls and 8 green balls while a box contains 8 red balls, 10 green balls and 7 white balls. A ball from bag is transferred in the box then three balls are randomly drawn from box. What will be the probability that exactly 2 balls are red in colour?
(A) $\frac{734}{3289}$
(B) $\frac{719}{3244}$
(C) $\frac{701}{3258}$
(D) $\frac{711}{3250}$
(E) None of these
- Q19** A box contains 5 red stones, 3 blue stones and 4 green stones. If 2 stones are drawn at random, what is the probability that both the stones are of the same color?
(A) $\frac{17}{66}$
(B) $\frac{15}{66}$
(C) $\frac{19}{66}$
(D) $\frac{21}{66}$
(E) None of these



Q20 A box contains 4 blue pens, and 5 green pens, and 6 red pens. Two pens are drawn at random from the box. What is the probability that the ball drawn is either red or green?

(A) $\frac{5}{9}$
(C) $\frac{4}{9}$
(E) $\frac{7}{11}$

(B) $\frac{3}{11}$
(D) $\frac{5}{21}$



Level-2

- Q1** Bag A contains 3 green and 7 blue balls. While bag B contains 10 green and 5 blue balls. If one ball is drawn from each bag, what is the probability that both are green?
 (A) $\frac{29}{30}$ (B) $\frac{1}{5}$
 (C) $\frac{1}{3}$ (D) $\frac{1}{30}$
 (E) None of these
- Q2** In a box containing ten toys, two are defective. What is the probability that among 5 toys chosen at random none is defective?
 (A) $\frac{1}{3}$ (B) $\frac{2}{9}$
 (C) $\frac{2}{3}$ (D) $\frac{5}{84}$
 (E) None of these
- Q3** An integer is chosen at random from the first fifty integers. What is the probability that the integer chosen is a prime or multiple of 4?
 (A) $\frac{14}{25}$ (B) $\frac{3}{5}$
 (C) $\frac{7}{50}$ (D) $\frac{27}{50}$
 (E) None of these
- Q4** A bag contains 30 balls out of which 6 are white balls and rests are black and red balls. If two balls are withdrawn one after another without substitution, then the probability of being the first ball is black and the second ball being white is $\frac{3}{29}$. Find the difference between the number of red balls and black balls
 (A) 5 (B) 3
 (C) 6 (D) 4
 (E) 12
- Q5** A bag contains 7 red balls, some blue balls and 3 black balls. Probability of picking two balls from the bag is $\frac{1}{3}$ such that one is exactly red and one is exactly blue. The probability of picking two blue balls from the bag is _____.
 I. $\frac{2}{21}$
 II. $\frac{17}{42}$
 III. $\frac{2}{7}$
 (A) I only
- (B) III only
 (C) II and III only
 (D) I and II only
 (E) I, II, and III
- Q6** There are 18 males and 12 females and the number of the children is 50% of the average number of males, females and children in a party. If two persons selected at randomly with any repetition then find the probability that 1 male and 1 child selected.
 (A) $\frac{6}{35}$ (B) $\frac{6}{31}$
 (C) $\frac{8}{35}$ (D) $\frac{9}{35}$
 (E) None of these
- Q7** A bag has balls of three colours. It has 16 blue balls, m green balls and n red balls. If the probability of picking one green ball and that of picking one red ball out of the bag is equal, then find the number of red balls. Probability of picking one blue ball is 0.5.
 (A) 9 balls (B) 8 balls
 (C) 12 balls (D) 13 balls
 (E) 16 balls
- Q8** A cricket team has 15 members, of whom only 5 bowlers. What is the probability that a select of 11 members with at least 3 bowlers selected?
 (A) $\frac{12}{13}$ (B) $\frac{13}{15}$
 (C) $\frac{7}{15}$ (D) $\frac{9}{17}$
 (E) $\frac{7}{19}$
- Q9** The probability that a bullet fired from a point will strike the target is $\frac{1}{4}$. 2 such bullets are fired simultaneously toward the target from that very point. What is the probability that the target will be hit?
 (A) $\frac{7}{19}$ (B) $\frac{5}{19}$
 (C) $\frac{4}{13}$ (D) $\frac{5}{16}$
 (E) $\frac{9}{20}$
- Q10**



Two friends A and B appear in an interview for two vacancies in the same post. The probability of A's selection is $\frac{1}{6}$ and that of B's selection is $\frac{1}{5}$. What is the probability that both of them will be selected and one of them will be selected?

- (A) $\frac{11}{30}$, $\frac{3}{10}$ (B) $\frac{11}{30}$, $\frac{2}{3}$
 (C) $\frac{1}{30}$, $\frac{3}{10}$ (D) $\frac{1}{30}$, $\frac{2}{3}$
 (E) None of these

Q11 A pot contains 5 white and 3 red balls while another pot contains 4 white and 6 red balls. One pot is chosen at random and a ball is drawn from it. If the ball is white, what is the probability that it is from the first pot?

- (A) $\frac{5}{16}$
 (B) $\frac{41}{80}$
 (C) $\frac{25}{41}$
 (D) $\frac{1}{5}$
 (E) None of the above

Q12 A committee has 15 members, of whom only 5 woman. What is the probability that a committee of 11 members with at least 3 women is selected?

- (A) $\frac{11}{13}$ (B) $\frac{14}{13}$
 (C) $\frac{12}{13}$ (D) $\frac{6}{13}$
 (E) None of these

Q13 Directions: A Bag contains 3 blue marbles, 2 green marbles & 5 red marbles.

If four Marbles are picked at random, what would be the probability that two of them are green marbles and two are blue marbles?

- (A) $\frac{3}{5}$
 (B) $\frac{1}{2}$
 (C) $\frac{1}{18}$
 (D) $\frac{1}{70}$
 (E) $\frac{11}{12}$

Q14 Directions: A Bag contains 3 blue marbles, 2 green marbles & 5 red marbles.

If three Marbles are picked at random, what would be the probability that at least one of them is red marble?

- (A) $\frac{1}{5}$
 (B) $\frac{7}{12}$
 (C) $\frac{1}{2}$
 (D) $\frac{11}{12}$
 (E) None of these

Q15 The Noida office of Physics Wallah has 1200 executives. Out of these, 880 subscribe to The Hindu and 650 subscribe to the Hindustan Times. Each executive may subscribe to either The Hindu or the Hindustan time or both. If an executive is picked at random, find the probability that he has subscribed to Hindustan times

- (A) $\frac{7}{15}$
 (B) $\frac{1}{15}$
 (C) $\frac{13}{24}$
 (D) $\frac{11}{15}$
 (E) None of these

Q16 A box contains 'y' blue, 8 pink and 10 yellow colour balls. One ball is taken randomly and the probability of getting a yellow colour ball is $\frac{1}{3}$, then finds the number of balls in the box

- (A) 30 (B) 12
 (C) 18 (D) 3
 (E) None of these

Q17 40 balls numbered 1 to 40 are mixed up and then a ball is drawn at random. What is the probability that the ball drawn has a number which is a multiple of 5 or 7?

- (A) $\frac{3}{10}$ (B) $\frac{2}{5}$
 (C) $\frac{7}{10}$ (D) $\frac{3}{5}$
 (E) None of these

Q18 A box contains 3 red, 8 blue and 5 green pens. If 2 pens are drawn at random from the pack, not replaced and then another pen is drawn. What is the probability of drawing 2 blue pens and 1 red pen

- (A) $\frac{1}{18}$
 (B) $\frac{1}{19}$
 (C) $\frac{1}{20}$
 (D)



$$\frac{1}{28}$$

(E) $\frac{1}{25}$

Q19 Directions: Study the following question carefully and choose the right answer given beside.

12 marbles are selected at random from a large collection of black, yellow, white and orange marbles. The number of marbles of each colour is unlimited. Find the probability that the selection contains atleast one marble of each colour?

- (A) $\frac{33}{91}$
(B) $\frac{23}{91}$
(C) $\frac{34}{91}$
(D) $\frac{36}{91}$

(E) None of these

Q20 A bag contained some green stones, some blue stones, and seven red stones. The probability of picking one green stone is $\frac{1}{7}$ more than that of picking one red stone from the bag and the probability of picking one blue stone is $\frac{9}{35}$ more than that of picking one red stone from the bag. Find the total number of stones in the bag.

- (A) 12
(B) 14
(C) 16
(D) 18
(E) None of these



Level-3

Q1 In a bag, there are some red and a total of 9 black and yellow balls. The probability of selecting two red balls from that bag is $\frac{1}{7}$ which is 250% of the probability of selecting two black balls. Find the number of yellow balls in that bag if the number of black balls is even.

- (A) 3 (B) 5
(C) 6 (D) 4
(E) None of these

Q2 In Abhishek's wardrobe there are four different color i.e. blue, red, green and yellow flags. He selects one flag out of them. The probability of this flag being blue is $33\frac{1}{3}\%$, the probability of selecting one red flag by him out of the total flags is $28\frac{4}{7}\%$ and the probability of selecting one yellow flag out of the total flag is 25% The number of green flags in the wardrobe is 33.

If all the flag are numbered as 1,2,3,...and so on and Abhishek picked up one flag at random then find the probability that the picked flag has a number which is the multiple of 19 or 15.

- (A) $\frac{61}{252}$
(B) $\frac{31}{252}$
(C) $\frac{29}{252}$
(D) $\frac{101}{252}$
(E) $\frac{21}{252}$

Q3 **Directions: Study the following data carefully and answer the questions accordingly.**

there are three sections X,Y and Z in a class. Every section has some boy and some girl students in it . Probability of a girl being selected when one student is selected randomly from section X is $\frac{2}{5}$, that from section Y is $\frac{4}{9}$ and that from section Z is $\frac{5}{9}$.

If the number of girls in sections X is same as the number of boys in section Z, then what is the ratio of number of boys in section X to number of

Boys in section Z?

- (A) None of these (B) 4:3
(C) 3:2 (D) 3:4
(E) 5 : 7

Q4 **Directions: Study the following data carefully and answer the questions accordingly.**

there are three sections X,Y and Z in a class. Every section has some boy and some girl students in it . Probability of a girl being selected when one student is selected randomly from section X is $\frac{2}{5}$, that from section Y is $\frac{4}{9}$ and that from section Z is $\frac{5}{9}$.

If the ratio of total number of students in sections X,Y and Z is 10:12:9, then what is the probability of a girl being selected when one student is selected randomly from the students from all the three sections together?

- (A) Can't be determined
(B) $\frac{43}{93}$
(C) $\frac{13}{31}$
(D) $\frac{11}{23}$
(E) $\frac{27}{41}$

Q5 A bag contains $(X+3)$ red balls, X white balls and five silver balls. If one ball taken out from the bag the probability of taken out white balls is $\frac{3}{10}$. Pipe P can fill the tank in $(X+3)$ minutes and pipe Q can fill the same tank in $(X+6)$ minutes. Efficiency of pipe R is 25% more than that of pipe P.

If pipe R and Q opened together for three min and pipe Q closed. After two more min pipe P also opened, then in how many mins the whole tank be filled.

- (A) $3\frac{2}{9}$ min
(B) $4\frac{2}{9}$ min
(C) $5\frac{2}{9}$ min
(D) $6\frac{2}{9}$ min
(E) None of these

Q6 A bag contains $(X+3)$ red balls, X white balls and five silver balls. If one ball taken out from the



bag the probability of taken out white balls is $\frac{3}{10}$. Pipe P can fill the tank in $(X+3)$ minutes and pipe Q can fill the same tank in $(X+6)$ minutes. The efficiency of pipe R is 25% more than that of pipe P.

If two balls are taken from the bag, then find the probability of taken at most one ball is silver color.

- (A) $\frac{18}{19}$
- (B) $\frac{11}{19}$
- (C) $\frac{7}{19}$
- (D) $\frac{9}{19}$
- (E) None of these

Q7 A bag contains $(x + 1)$ red balls, $(2x - 1)$ blue balls and 'z' green balls. The probability of drawing a blue ball from the bag is $\frac{3}{10}$. The probability of drawing a red ball from the bag is $\frac{1}{5}$.

5 balls are to be drawn from the bag. In how many ways the balls are drawn so that at least 3 red balls are drawn?

- (A) 5364
- (B) 5520
- (C) 5698
- (D) 5886
- (E) None of these

Q8 A bag contains three colours Red, green, and blue of balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?

Statement I: The total number of all balls (Red, green, and blue) in the bag is 7.

Statement II: The sum of red balls and blue balls is 4.

Statement III: The number of green balls is 3.

- (A) Only I
- (B) Only I and II
- (C) Only II and III
- (D) All together
- (E) None of these

Q9 Following question consists of two statements numbered (1) and (2). You have to decide

whether the data provided in the statements is sufficient to answer the question.

A box contains Red, Black and Blue marbles. What is the percentage of Blue marbles in the box?

Statement 1: Percentage of Red marbles is 60% of the total marbles.

Statement 2: Black marbles are 300% of the Blue marbles.

- (A) Both I and II together are sufficient
- (B) Either I or II alone are sufficient
- (C) Only I is sufficient
- (D) Only II is sufficient
- (E) Neither I nor II is sufficient.

Q10 In a bag, there are 4 types of coins i.e. Rs. 1, Rs. 2, Rs. 5, and Rs. 10. The ratio of the number of Rs. 5 to the number of Rs. 10 coins in the bag is 2:3 and the ratio of the number of Rs. 2 to number of Rs. 5 coin is 4:3. Total number of coin in the bag is 30 and number of Rs. 1 coin is 7. A man randomly draws 4 coins from the bag. What is the probability that out of four, two are Rs. 5 coin and one is Rs. 2 coin?

- (A) $\frac{12}{87}$
- (B) $\frac{128}{1827}$
- (C) $\frac{45}{683}$
- (D) $\frac{200}{1913}$
- (E) None of these



Answer Key

Level-1

Q1 (C)
Q2 (A)
Q3 (A)
Q4 (C)
Q5 (B)
Q6 (C)
Q7 (C)
Q8 (A)
Q9 (E)
Q10 (C)

Q11 (A)
Q12 (B)
Q13 (C)
Q14 (C)
Q15 (B)
Q16 (D)
Q17 (E)
Q18 (D)
Q19 (C)
Q20 (D)



Level-2

Q1 (B)
Q2 (B)
Q3 (D)
Q4 (C)
Q5 (D)
Q6 (A)
Q7 (B)
Q8 (A)
Q9 (E)
Q10 (C)

Q11 (C)
Q12 (C)
Q13 (D)
Q14 (D)
Q15 (C)
Q16 (A)
Q17 (A)
Q18 (C)
Q19 (A)
Q20 (C)



Level-3

Q1 (B)

Q2 (C)

Q3 (C)

Q4 (B)

Q5 (C)

Q6 (A)

Q7 (D)

Q8 (E)

Q9 (A)

Q10 (B)



Hints & Solutions

Level-1

Q1 Text Solution:

The probability of getting queen card = $4/52$
 The probability of getting club card = $13/52$
 The club card contains already a queen card,
 therefore required probability
 is, $4/52 + 13/52 - 1/52 = 16/52 = 4/13$

Q2 Text Solution:

Total number of balls = $(2 + 3 + 2) = 7$.
 Let S be the sample space.
 $n(S)$ = Number of ways of drawing 2 balls out of 7
 $= {}^7C_2$
 $= 21$

Let E = Event of drawing 2 balls, none of which is yellow.

$n(E)$ = Number of ways of drawing 2 balls out of $(2 + 3)$ balls
 $= {}^5C_2$
 $= 10$

$$P(E) = \frac{n(E)}{n(S)} = \frac{10}{21}$$

Q3 Text Solution:

The probability of getting king card = $4/52$
 The first card is replaced so that, it doesn't affect the second drawn card.
 Hence, probability of getting 2nd king card = $4/52$
 \therefore Required Probability = $4/52 \times 4/52 = 1/169$

Q4 Text Solution:

Clearly, Total number of outcomes $n(S) = 6 \times 6 = 36$
 Let E be the event that the sum of the numbers on the 2 faces are divisible by either 2 or 7. Then
 $E = \{(1,1), (1,3), (1,5), (1,6), (2,2), (2,4), (2,5), (2,6), (3,1), (3,3), (3,4), (3,5), (4,2), (4,3), (4,4), (4,6), (5,1), (5,2), (5,3), (5,5), (6,1), (6,2), (6,4), (6,6)\}$
 So, number of favorable events $n(E) = 24$
 $[\text{Probability} = \frac{\text{Total number of favorable outcomes}}{\text{Total number of outcomes}}]$
 Hence $P(E) = \frac{n(E)}{n(S)} = \frac{24}{36} = \frac{2}{3}$

Q5 Text Solution:

Probability of Rahul speaking truth = $\frac{8}{12} = \frac{2}{3}$
 Probability of Manoj speaking truth = $\frac{12}{15} = \frac{4}{5}$
 Probability that the truth is said = Rahul speaks the truth and Manoj tells a lie or Rahul tells a lie and Manoj speaks the truth or both Rahul and Manoj speak the truth
 $= \frac{2}{3} \times \left(1 - \frac{4}{5}\right) + \left(1 - \frac{2}{3}\right) \times \frac{4}{5} + \frac{2}{3} \times \frac{4}{5}$
 $= \frac{2}{3} \times \frac{1}{5} + \frac{1}{3} \times \frac{4}{5} + \frac{8}{15}$
 $= \frac{2}{15} + \frac{4}{15} + \frac{8}{15}$
 $= \frac{14}{15}$

Q6 Text Solution:

We have 25 multiples of 4 between 1 to 100
 We have 14 multiples of 9 between 1 to 100
 We now need to subtract multiples of 36 as they would have been counted twice (once as multiple of 4, and once as multiple of 9)
 We have 2 multiples of 36 below 100.
 So total numbers divisible by 4 or 9 = $25 + 14 - 2 = 37$
 Required Probability = $\frac{37}{100}$

Q7 Text Solution:

The desired sum of the numbers is 2, 3, 4, 5, 6, 7
 The possibility of sum 2 is (1, 1)
 Possibility of sum 3 is (1, 2), (2, 1)
 Possibility of sum 4 is (1, 3), (3, 1), (2, 2)
 Possibility of sum 5 is (1, 4), (4, 1), (3, 2), (2, 3)
 Possibility of sum 6 is (1, 5), (5, 1), (2, 4), (4, 2), (3, 3)
 Possibility of sum 7 is (1, 6), (6, 1), (2, 5), (5, 2), (3, 4), (4, 3)
 $N(E) = 1 + 2 + 3 + 4 + 5 + 6 = 21$
 Required probability = $\frac{21}{36} = \frac{7}{12}$

Q8 Text Solution:

There are 4 queens in the deck and 13 club cards.
 favourable outcomes = 16 (13 club card which include one queen and remaining 3 queen cards)
 total number of outcomes = 52



probability of choosing a queen or a club =
 $\frac{16}{52} = \frac{4}{13}$

Q9 Text Solution:

Number of ways to select 3 red balls, 2 white balls and 2 blue balls:

$$C_3^3 \times C_2^5 \times C_2^2 = 1 \times 10 \times 1 = 10$$

Number of ways to select 2 red balls, 3 white balls and 2 blue balls:

$$C_2^3 \times C_3^5 \times C_2^2 = 3 \times 10 \times 1 = 30$$

Required number of ways = $10 + 30 = 40$

Q10 Text Solution:

Since, there should be at least 2 colored balls with the majority of black balls.

So, number of ways to select 2 black balls and 1 red ball = $C_2^4 \times C_1^3 = 6 \times 3 = 18$

And number of ways to select 2 black balls and 1 white ball = $C_2^4 \times C_1^3 = 6 \times 3 = 18$

Required number of ways = $18 + 18 = 36$

Q11 Text Solution:

Total number of balls = $4 + 3 = 7$

Total number of ways to select 2 balls = $C(7,2)$
 $= 7! / (5! \times 2!) = 21$

Number of ways to select 2 green balls = $C(3,2) = 3! / (2!1!) = 3$

Number of ways to select 2 balls with at least 1 red ball = Total number of ways to select 2 balls
 - Number of ways to select 2 green balls = $21 - 3 = 18$

Therefore, there are 18 different ways to select 2 balls from the bag such that at least one red ball is selected.

Q12 Text Solution:

There are 25 even numbers in the group 1 - 51.

So, Total number of balls = 51

As, Probability = $\frac{\text{Possible Outcomes}}{\text{Total Sample-space}}$

\therefore The probability that the first ball is even numbered = $\frac{25}{51}$

Since the ball is not replaced there are now 50 balls left, of which 24 are even-numbered

\therefore The probability that the second ball is even numbered = $\frac{24}{50}$

\therefore Required probability = $\frac{25}{51} \times \frac{24}{50} = \frac{4}{17}$

Q13 Text Solution:

Total sarees = 15

Probability that no saree is blue = $\frac{10C1 \times 9C1}{15 \times 14} = \frac{90}{15 \times 14} = \frac{3}{7}$

Required probability = $1 - \frac{3}{7} = \frac{4}{7}$

Q14 Text Solution:

Conditions for odd sum

1. First card is odd numbered and the second one is even numbered $\Rightarrow \frac{16}{31} \times \frac{15}{30} = \frac{8}{31}$

2. First card is even numbered and second is odd numbered $\Rightarrow \frac{15}{31} \times \frac{16}{30} = \frac{8}{31}$

Hence required probability = $\frac{8}{31} + \frac{8}{31} = \frac{16}{31}$

Q15 Text Solution:

Yellow balls = 'n'

Total balls = $2n + 3$

Black balls = $(2n + 3) - n = (n + 3)$

Probability of drawing one black ball =

$$\frac{C_1^{n+3}}{C_1^{2n+3}} = \frac{3}{5}$$

$$\frac{n+3}{2n+3} = \frac{3}{5}$$

$$5n + 15 = 6n + 9$$

$$n = 6$$

Hence, black balls in the bag = $n + 3 = 9$

Q16 Text Solution:

Total balls = 'x'

Total blue balls = 5

Probability of drawing two blue balls from the

$$\text{bag} = \frac{C_5^2}{C_x^2} = \frac{2}{21}$$

$$\frac{5 \times 2}{x(x-1)} = \frac{2}{21}$$

$$x(x-1) = 210$$

$$x(x-1) = 15(15-1)$$

After comparing:

$$x = 15$$

Q17 Text Solution:

Total balls in the bag = $8 + 5 + 2 = 20$

Required probability = $\frac{C_8^1 + C_5^2 + C_1^2}{C_{20}^4} = \frac{x}{819}$

$$\frac{8 + 10 + 2}{15 \times 14 \times 13 \times 12} = \frac{x}{819}$$



$$\frac{20}{1365} = \frac{x}{819}$$

$$x = \frac{16380}{1365}$$

$$x = 12$$

Hence, value of 'x' = 12

Q18 Text Solution:

Case I: A red ball is transferred from bag to box.

$$\text{Probability} = {}^{12}C_1 \div {}^{20}C_1 \times ({}^9C_2 \times {}^{17}C_1) \div {}^{26}C_3 = \frac{12}{120} \times (36 \times 17) \div 2600 = \frac{459}{3250}$$

Case II: A green ball is transferred from bag to box.

$$\text{Probability} = {}^8C_1 \div {}^{20}C_1 \times ({}^8C_2 \times {}^{18}C_1) \div {}^{26}C_3 = \frac{8}{20} \times (28 \times 18) \div 2600 = \frac{252}{3250}$$

$$\text{Required probability} = \frac{459}{3250} + \frac{252}{3250} = \frac{711}{3250}$$

Hence, option D.

Q19 Text Solution:

$$\text{Total number of stones} = 5+3+4 = 12$$

$$\text{Exhaustive number of cases} = {}^{12}C_2 = \frac{12 \times 11}{2 \times 1} = 66$$

$$\text{Favorable number of ways} = {}^5C_2 + {}^3C_2 + {}^4C_2 = 10 + 3 + 6 = 19$$

$$\text{Required Probability} = \frac{19}{66}$$

Q20 Text Solution:

Required

$$\frac{{}^5C_2 \times {}^6C_2}{{}^{15}C_2} = \frac{10 \times 15}{105} = \frac{25}{105} = \frac{5}{21}$$

probability



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Level-2

Q1 Text Solution:

The required probability = $\frac{3C_1}{10C_1} \times \frac{10C_1}{15C_1}$
 $= \frac{3}{10} \times \frac{10}{15} = \frac{1}{5}$

Q2 Text Solution:

The required probability = $\frac{8C_5}{10C_5} = \frac{8C_3}{10C_5} = \frac{2}{9}$

Q3 Text Solution:

There are 15 prime numbers in the first 50 integers i.e. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43 and 47.

There are 12 integers are multiples of 4 i.e. 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44 and 48

\therefore required probability = $\frac{15}{50} + \frac{12}{50} = \frac{27}{50}$

Q4 Text Solution:

Number of black balls + red balls = $30 - 6 = 24$

Let the number of black balls be x , then the number of red balls = $24 - x$.

$$\text{Required probability} = \frac{{}^x C_1}{{}^{30} C_1} \times \frac{{}^{6} C_1}{{}^{29} C_1}$$

$$= \frac{6x}{30 \times 29} = \frac{x}{145}$$

According to the question,

$$\frac{x}{145} = \frac{3}{29}$$

$x = 15$

Number of red balls = $24 - 15 = 9$

Required difference = $15 - 9 = 6$

'6' is the correct answer.

Q5 Text Solution:

Let number of blue balls in bag = a

Now,

$${}^7 C_1 \times {}^a C_1 / (7 + a + 3) {}^C_2 = \frac{1}{3}$$

$$\frac{2 \times 7 \times a}{(10 + a)(9 + a)} = \frac{1}{3}$$

$$42a = 90 + 19a + a^2$$

$$a^2 - 23a + 90 = 0$$

Value of $a = 18, 5$

So, total balls in bag = $(7 + 5 + 3)$ OR $(7 + 18 + 3) = 15$ OR 28

$$\text{Required probability} = \frac{\text{Value of } a \times 4}{\text{total balls in bag} \times 14} \text{ OR}$$

$$\frac{\text{Value of } a \times 17}{\text{total balls in bag} \times 27}$$

$$\text{Required probability} = \frac{5 \times 4}{15 \times 14} \text{ OR } \frac{18 \times 17}{28 \times 27}$$

$$= \frac{2}{21} \text{ OR } \frac{17}{42}$$

Only I and II follows

Q6 Text Solution:

Let the number of children be x .

According to the question,

$$x = 0.5 \times \frac{18+12+x}{3}$$

$$6x = 30 + x$$

$$x = 6$$

Total person = $16 + 12 + 6 = 36$

$$\text{Required probability} = \frac{{}^{18} C_1 \times {}^6 C_1}{{}^{36} C_2} = \frac{18 \times 6}{630} = \frac{6}{35}$$

Q7 Text Solution:

$$\text{Probability of picking one blue ball} = \frac{16}{16+m+n} = 0.5$$

$$\frac{16}{16+m+n} = \frac{5}{10}$$

$$160 = 80 + 5m + 5n$$

$$32 = 16 + m + n$$

$$16 = m + n \dots\dots\dots(1)$$

Probability of picking one green ball = probability of picking one red ball

$$\frac{m}{16+m+n} = \frac{n}{16+m+n}$$

$$m = n$$

From equation (1);

$$m + n = 16$$

$$2m = 16$$

$$m = 8$$

$$n = n$$

So, number of blue balls = 8

Q8 Text Solution:

Total number of ways of forming the team = ${}^{15} C_1 = {}^{15} C_4$

Of these, number of ways of forming a team

(i) with one bowler =

$${}^5 C_1 \times {}^{10} C_{10} = \frac{5!}{4! \times 1!} \times \frac{10!}{9! \times 1!} = 5 \times 1 = 5$$

(ii) with two bowlers =

$${}^5 C_2 \times {}^{10} C_9 = \frac{5!}{3! \times 2!} \times \frac{10!}{9! \times 1!} = \frac{5 \times 4 \times 3!}{3! \times 2} \times \frac{10 \times 9!}{9!}$$

$$= 5 \times 2 \times 10 = 100$$



The probability that at least 3 bowlers are in the team =

$$1 - \frac{105}{15C_4} = 1 - \frac{105}{15!} = 1 - \frac{1}{13} = \frac{13-1}{13} = \frac{12}{13}$$

Q9 Text Solution:

$P(A) = 3/5$, $P(B) = 2/5$ and $P(C) = 3/4$

That means $P(A') = 2/5$, $P(B') = 3/5$ and $P(C') = 1/4$

A and B hit but not C = $3/5 \times 2/5 \times 1/4 = 3/50 = 6/100$

A and C hit but not B = $3/5 \times 3/4 \times 3/5 = 27/100$

B and C hit but not A = $2/5 \times 3/4 \times 2/5 = 3/25 = 12/100$

So total probability is all 3 added = $(6+27+12)/100 = 45/100 = 9/20$

Q10 Text Solution:

i). The probability of both of them being selected = $1/6 \times 1/5 = 1/30$

ii). The probability of A is not selected = $1 - 1/6 = 5/6$

The probability of B is not selected = $1 - 1/5 = 4/5$

\therefore The probability of one of them selected = $(1/6 \times 4/5) + (1/5 \times 5/6)$

$= 4/30 + 5/30 = 9/30 = 3/10$

Q11 Text Solution:

The probability of choosing one pot = $1/2$

The probability of choosing white ball in first pot = $1/2 \times [5C1 / 8C1] = 5/16$

The probability of choosing white ball = $1/2 \times [5C1 / 8C1] + 1/2 \times [4C1 / 10C1] = 1/2 \times [5/8] + 1/2 \times [4/10] = 5/16 + 1/5 = 41/80$
 \therefore The probability that it is from the first pot = $(5/16) / (41/80)$

$= 5/16 \times 80/41 = 25/41$

Q12 Text Solution:

There are 5 women and 10 men in the committee, out of these 11 members are selected. So, $n(S) = 15C11$

The probability of atleast 3 women in the committee is,

$= (5C3 \times 10C8) / 15C11 + (5C4 \times 10C7) / 15C11 + (5C5 \times 10C6) / 15C11$

$= 1/15C11 \times [5C2 \times 10C2 + 5C1 \times 10C3 + 5C5 \times$

$10C4] = 1/1365 [450 + 600 + 210] = 1260/1365 = 12/13$

Q13 Text Solution:

Picked P (2 green + 2 blue)

\Rightarrow So, required Probability = ${}^2C_2 \times {}^3C_2 \div {}^{10}C_4$

$$\Rightarrow \frac{(1 \times 3)}{210} = \frac{1}{70}$$

Q14 Text Solution:

Total No. of Marbles = $3 + 2 + 5 = 10$

So, $n(S) = {}^{10}C_3$

Now, $P(\text{at least one red}) = 1 - P(\text{No red})$

$1 - ({}^5C_3 \div {}^{10}C_3)$

$$1 - \frac{10}{120} = \frac{11}{12}$$

Q15 Text Solution:

Total executives = 1200

Subscribed for The Hindu = 880

Subscribed for Hindustan Times = 650

No. of executives subscribed for both = $(880 + 650) - 1200 = 330$

Required probability = $\frac{650}{1200} = \frac{13}{24}$

Q16 Text Solution:

Given, total number of yellow balls = 10

And, total number of balls = $y + 8 + 10 = 18 + y$

Also, One ball is taken randomly and the probability of getting a yellow colour ball is $\frac{1}{3}$

As, $[\text{Probability} = \frac{\text{Total number of favourable outcomes}}{\text{Total number of outcomes}}]$

So, probability of getting a yellow colour ball is $= \frac{10}{18+y}$

Comparing both conditions, we get

$$\Rightarrow \frac{10}{18+y} = \frac{1}{3}$$

$$\Rightarrow 3(10) = 18 + y$$

$$\Rightarrow 30 = 18 + y$$

$$\Rightarrow 30 - 18 = y$$

$$\Rightarrow 12 = y$$

Hence, total number of balls = $18 + y = 18 + 12 = 30$

Q17 Text Solution:

Total number = 40.

Event of getting a multiple of 5 or 7 = $\{5, 7, 10, 14, 15, 20, 21, 25, 28, 30, 35, 40\}$

$$\text{Probability} = \frac{12}{40} = \frac{3}{10}$$

Q18 Text Solution:



Probability of drawing 1 blue pen = $\frac{8}{16}$

Probability of drawing another blue pen = $\frac{7}{15}$

Probability of drawing 1 red pen = $\frac{3}{14}$

Probability of drawing 2 blue pens and 1 red pen = $\frac{8}{16} \times \frac{7}{15} \times \frac{3}{14} = \frac{1}{20}$

Q19 Text Solution:

From the given information,

Let B, Y, W, O represent no. of black, yellow, white and orange coloured marbles contained in the selection of 12 marbles.

No. of ways of selecting 12 marbles is equal to the no. of non-negative integral solutions of

$$B + Y + W + O = 12$$

$$\text{Total no. of ways} = {}^{12+4-1}C_{4-1} = {}^{15}C_3$$

The no. of selections that contain at least one marble of each colour is equal to the number of positive integral solutions of $B + Y + W + O = 12$

$$= {}^{12-1}C_{4-1} = {}^{11}C_3$$

$$\text{Required probability} = \frac{{}^{11}C_3}{{}^{15}C_3} = \frac{33}{91}$$

Therefore, the probability that the selection contains at least one marble of each colour is $\frac{33}{91}$.

Q20 Text Solution:

Let total number of stones in bag = x

And, total number of green stones in bag = a

While total blue stones in bag = b

According to the question,

$$\frac{a}{x} - \frac{7}{x} = \frac{1}{7} \dots (i)$$

$$\text{And } \frac{b}{x} - \frac{7}{x} = \frac{9}{35} \dots (ii)$$

From equation (ii) we can say the value of x should be multiple of 35.

So, let x = 35

Now, when we take x = 35, so both equations satisfied by it and we get

$$\frac{a}{35} - \frac{7}{35} = \frac{1}{7}$$

$$\frac{a}{35} - \frac{7}{35} = \frac{1}{7}$$

$$7a - 49 = 35$$

$$7a = 35 + 49$$

$$7a = 84$$

$$a = 12$$

Similarly, b = 16

So, total blue stones in bag = 16



Level-3

Q1 Text Solution:

Let the number of red and black colored balls be x and y respectively.

$$\frac{{}^xC_2}{{}^{(9+x)}C_2} = \frac{1}{7}$$

$$\frac{x(x+1)}{(9+x)(8+x)} = \frac{1}{7}$$

$$\Rightarrow x = 6$$

Total number of balls = 15

$$\Rightarrow \frac{{}^yC_2}{{}^{15}C_2} = \frac{1}{7} \times \frac{100}{250}$$

$$\Rightarrow y = 4$$

Number of yellow colored ball = $15 - (6+4) = 5$

Q2 Text Solution:

Let, total no. of flags be $168a$,

$$\text{Then no. of blue flags} = \frac{100}{300} \times 168a = 56a$$

$$\text{no. of red flags} = \frac{200}{700} \times 168a = 48a$$

$$\text{no. of yellow flags} = \frac{25}{100} \times 168a = 42a$$

Now,

$$56a + 48a + 42a + 33 = 168a$$

$$\text{or, } 168a - 146a = 33$$

$$\text{or, } 22a = 33$$

$$a = \frac{33}{22} = \frac{3}{2}$$

$$\text{Total no. of flags} = 168a = 168 \times \frac{3}{2} = 252$$

$$\text{Multiples of 19} = 19 \times 13 = 247 < 252$$

$$\text{Multiple of 15} = 15 \times 16 = 240$$

There are 13 multiples of 19 and 16 multiples of 15 from 1 to 252.

But, there is not a multiple of $15 \times 19 = 285$ in 1 to 252.

So, total multiple of 15 and 19 = $13 + 16 = 29$

$$\text{Hence, required probability} = \frac{29}{252}$$

Q3 Text Solution:

let number of girls, number of boys and total number of students be

For section X, $2a, 3a$ and $5a$

For section Y, $4b, 5b$ and $9b$

For section Z, $5c, 4c$ and $9c$

	x	y	z
girls	2a	4b	5c

total	5a	9b	9c
boys	5-2=3a	9-4=5b	9-5=4c

number of girls in section X = number of boys in section Z

$$2a = 4c$$

$$a = 2c$$

Number of boys in section X: number of boys in section Z = $3a:4c = 6c:4c = 3:2$

Q4 Text Solution:

let number of girls, number of boys and total number of students be

For section X, $2a, 3a$ and $5a$

For section Y, $4b, 5b$ and $9b$

For section Z, $5c, 4c$ and $9c$

Ratio of total number of students in the three sections, $5a:9b:9c = 10:12:9$

$$a:b:c = 6:4:3$$

Let the values of a, b and c be the $6k, 4k$ and $3k$ respectively.

Total number of girls in all the three sections = $2a+4b+5c = 12k+16k+15k = 43k$

Total number of students in all the three sections = $30k+36k+27k = 93k$

Probability of a girl being selected

= Total girls in the sections / total students in the sections = $43k/93k = 43/93$

Q5 Text Solution:

According to question,

$$\frac{X}{X+3+X+5} = \frac{3}{10}$$

$$10X = 6X + 24$$

$$4X = 24$$

$$X = 6$$

Pipe P can fill the tank = 9 min

Pipe Q can fill the tank = 12 min

Total capacity of the tank (L.C.M. of 9 & 12) = 36 liters



Efficiency of pipe p and Pipe Q is 4 liters/min and 3 liters/min respectively.

Efficiency of pipe R = $4 \times \frac{125}{100} = 5$ liters/min

Total amount of liters filled by pipe R & Q together in 3 mins = $(5 + 3) \times 3 = 24$ liters

Total amount of liters filled by pipe R in another 2 more mins = $5 \times 2 = 10$ liters

Req. min = $\frac{36 - 24 - 10}{4 + 5} + 3 + 2 = 5 + \frac{2}{9} = 5\frac{2}{9}$ min.

Q6 Text Solution:

According to the question,

$$\frac{X}{X+3+X+5} = \frac{3}{10}$$

$$10X = 6X + 24$$

$$4X = 24$$

$$X = 6$$

Pipe P can fill the tank = 9 min

Pipe Q can fill the tank = 12 min

Total capacity of the tank (L.C.M. of 9 & 12) = 36 liters

The efficiency of pipe p and Pipe Q is 4 liters/min and 3 liters/min respectively.

Efficiency of pipe R = $4 \times \frac{125}{100} = 5$ liters/min

$$= \frac{{}^5C_1 \times {}^{15}C_1 + {}^{15}C_2}{{}^{20}C_2} = \frac{75 + 105}{190} = \frac{18}{19}$$

Q7 Text Solution:

Total number of balls in the bag = $x + 1 + 2x - 1 + z = 3x + z$

Probability of drawing a red ball from the bag = $\frac{x+1}{3x+z} = \frac{1}{5}$

$$(x+1)/(3x+z) = 1/5$$

$$5x + 5 = 3x + z$$

$$z - 2x = 5 \text{ -----(i)}$$

Probability of drawing a blue ball from the bag = $\frac{2x-1}{3x+z} = \frac{3}{10}$

$$(2x-1)/(3x+z) = 3/10$$

$$20x - 10 = 9x + 3z$$

$$11x - 3z = 10 \text{ -----(ii)}$$

Solving (i) and (ii), we get $x = 5$ and $z = 15$

So, the bag contains 6 red, 9 blue and 15 green balls.

Case I: 3 red balls are drawn

Number of ways = ${}^6C_3 \times {}^{24}C_2 = 20 \times 276 = 5520$

Case II: 4 red balls are drawn

Number of ways = ${}^6C_4 \times {}^{24}C_1 = 15 \times 24 = 360$

Case III: 5 red balls are drawn

Number of ways = ${}^6C_5 = 6$

So, the total number of ways = $5520 + 360 + 6 = 5886$

Hence, option d.

Q8 Text Solution:

From statements I, II and III

We can find

Red + blue = 4 and Green = 3

From these data, we cannot find the required answer. Because the number of blue balls not given.

Q9 Text Solution:

Statement 1:

Let the total number of balls be 10k.

Red balls = 60% of 10k = 6k

Statement 2:

The ratio of black: blue marbles = 23 : 1

From both the statement,

Balls left = 10k - 6k = 4k

So, black balls = 3k and blue balls = k.

% blue balls = $\frac{k}{10k} = 10\%$

Both statements are together necessary

Q10 Text Solution:

Let, the number of Rs. 2 coins, Rs. 5 coins, and Rs. 10 coins are 8x, 6x, and 9x, respectively.

So $8x + 6x + 9x + 7 = 30$

$$\Rightarrow 23x = 23$$

$$\Rightarrow x = 1$$

So the number of Rs. 2 coins = $8x = 8$

Number of Rs. 5 coin = $6x = 6$

Number of Rs. 10 coin = $9x = 9$

Favourable number of ways = $({}^6C_2 \times {}^8C_1 \times {}^7C_1) + ({}^6C_2 \times {}^8C_1 \times {}^9C_1) = 840 + 1080 = 1920$

Total number of ways of selecting 4 coins = ${}^{30}C_4 = 27405$

$$\text{Probability} = \frac{1920}{27405} = \frac{128}{1827}$$

Hence, option B is the answer.

