1. There are three events X,Y and Z, one of which must and only can happen. If the odds are 7:4 against X, 5:3 against Y, the odds against Z must be:

a. 65/23

b. 47/51

c. 27/65

d. 37/53

e. None of these

Directions (2-3) Study the following information carefully and answer the given questions:

Box	Red	Pink	Black
1	4	6	5
2	5	5	5

2. Three balls are taken from either of the box, what is the probability of getting at least two pink colour balls?

a. 53/182

b. 52/183

c. 57/182

d. 51/182

e. None of these

3. Three balls are taken from either of the box, what is the probability of getting at most two balls black colour?

a. 87/91

b. 88/91

c. 7/90

d. 89/91

e. None of these

Direction (4-5) Read the following carefully and Answer the Questions.

Bag A contains 3 different color tiles.i.e, Yellow, white and brown. In that, there are 12 yellow tiles, 8 white tiles and X brown tiles. The probability of choosing Brown tiles 2/7. In Another Bag B, it contains, 12 blue tiles and number of red tiles was equal to five more tiles than brown tiles in Bag A.

4. What is the probability of not choosing white color tiles in Bag A?

a. 2/7

b. 3/7

c. 5/7

d. 1/7

e. None of these

5. What is probability choosing 2 tiles from bag B, if both are same in color?

a. 12/25

b. 13/25

c. 1/2

d. 14/25

e. None of these

Direction (6-8): Study the information carefully and answer the question asked below.

A Gems packet contains 5 Red, 4 Blue and 6 Yellow gem stones.

6. If two are picked randomly, then what is the probability that either two balls are Red or Yellow?

a. 6/21

b. 10/21

c. 12/21

d. 5/21

e. none of these

7. If 3 chocolates ate by Varun. What is the probability that all the gemstones are in same color?

a. 36/455

b. 34/455

c. 421/455

d. 419/455

e. none of these

8. If three gem stones are taken out at random, what is the probability that at least one is blue?

a. 33/91

b. 58/91

c. 55/91

d. 36/91

e. None of these

9. A three-digit number is chosen at random. What is the probability that all the digits are distinct, the digits at odd places are odd and the digits at even places are even?

a. 1/99

b. 1/9

c. 3/100

d. 2/99

e. None of these

10. If two dice are thrown then what is the probability that the sum of the faces of dice are prime?

a. 5/12

b. 1/2

c. 1/3

d. 7/12

e. None of these

11. In a class 15 boys and 12 girls. For a committee ,we need 7 members. What is the probability that they should contain at least 2 boys and one girl?

a. 2919 /2990

b. 89945/98570

c. 96327/98570

d. 98554/98570

e. none of these

Question (12-13): Study the information carefully and answer the question asked below.

Three letters are written to three different persons and addresses on three envelop are also written without looking at the addresses.

12. What is the probability that all the letters go to right address?

a. 1/3

b. 2/3

c. 1/6

d. 1/9

e. None of these

13. What is the probability that none of the letter goes to right address?

a. 5/6

b. 1/3

c. 2/3

d. 1/6

e. None of these

14. Nikesh forms a code for locker of two distinct digits selected from 0, 1, 2… 9 such that the first digit of the code is nonzero. The code, handwritten on a slip, can however potentially create confusion, when read upside down-for example, the code 81 may appear as 18. How many codes are there for which no such confusion can arise?

a. 80

b. 78

c. 71

d. 69

e. None of these

15. How many arrangements of the letters of the word 'BENGALI' can be made? I. If the vowels are never come together II. If the vowels are to occupy only odd places

a. I.620 II.576

b. I.576 II.720

c. I.720 II.620

d. I.4320 II.576

e. I.840 II.576

16. A question paper consists of 10 questions divided into two parts I and II. Each part contains five questions. A candidate is required to attempt six questions in all of which at least 2 should be from part I and at least 2 from part II. In how many ways can the candidate select the questions if he can answer all questions equally well?

a. 240

b. 200

c. 300

d. 250

e. 100

17. The Indian Cricket team consists of 16 players. It includes 2 wicket keepers and 5 bowlers. In how many ways can a cricket team of eleven be selected if we have to select 1 wicket keeper and at least 4 bowlers?

a. 1090

b. 1290

c. 1200

d. 1920

e. 1092

18. In a box there are 10 apples and 2/5th of the apples are rotten. If three apples are taken out from the box, what will be the probability that at least one apple is rotten.

a. 3/4

b. 5/6

c. 9/10

d. 8/13

e. 4/7

19. Find the probability that at least two of the tube lights that he buys work.

a. 29/30

b. 34/35

c. 14/15

d. 24/ 25

e. None of these

20. Find the probability that all of Salman's tube lights work.

a. 1/15

b. 1/25

c.1/30

d. 1/35

e. None of these

21. A box contains slips with numbers from 1 to 50 written on them. A slip is drawn and replaced. Then another slip is drawn and after replacing another slip is drawn. What is the probability that an even number appears on the first draw, an odd number on the second draw and a number divisible by 3 on the third draw?

a. 1/25

b. 2/25

c. 8/25

d. 4/25

e. None of the above

Question (22-33): Study the information carefully and answer the question asked below.

Five students are to be arranged on five chairs for a photograph. Three of these are girls and the rest are boys.

22. Find out the total number of ways in which three girls are together.

a. 36

b. 84

c. 100

d. 120

e. None of these

23. Find out the number of ways in which all three girls do not occupy consecutive seats.

a. 120

b. 36

c. 84

d. 136

e. None of these

Directions (24-25): Kindly study the following information carefully and answer the question that follows:

Using all the letters of the word LINEAR.

24. How many words start with a vowel but end with a consonant?

a. 224

b. 316

c. 212

d. 216

e. None of these

25. How many different words can be formed that start and end with vowel?

a. 126

b. 108

c. 144

d. 216

e. None of these

26. A six letter word is to be formed by using at least two vowels in it. How many such words can be formed (not necessarily meaningful) if all the letters in word are different?

a. 53349120

b. 53439120

c. 53431920

d. 54339120

e. 53493120

Directions (27-29): Study the following information carefully and answer the question that follows:

A joker have 10 balls, 10 ribbon and 10 plates of red, yellow and blue color in ratio 2 : 3 : 5, 5 : 2 : 3 and 3 : 5 : 2 respectively. He does his performance by using one item of each category.

27. What is the probability that he performs with only red color?

a. 0.3

b. 0.02

c. 0.25

d. 0.03

e. 0.15

28. What is the probability that he chooses yellow color for ribbons?

a. 0.0333

b. 0.025

c. 0.2

d. 0.25

e. 0.03

29. If he chooses 3 balls, 5 ribbons and 1 plate then find the probability that all items are of same color.

a. 1

b. 0

c. 0.05

d. 0.5

e. 0.002

30. A man has 5 identical chocolate and 5 different size boxes. If he ties a ribbon of different color on each chocolate, then find the probability of putting a particular colored ribbon on a chocolate put in a particular box.

a. 1/625

b. 1/5

c. 2/25

d. 1/25

e. 1/125

31. A Bag contains some White and Black Balls. The probability of picking two white balls one after other without replacement from that bag is 14/33. Then what will be the probability of picking two Black balls from that Bag if bag can hold maximum 15 balls only?

a. 11/32

b. 14/33

c. 7/33

d. 1/11

e. Cannot be determined

Direction (32-34): Study the following information carefully and answer the question that follows:

There is three bags A, B and C. In each bag there are three types of colored balls Yellow, Green and Black.

In bag A, no. of yellow colored balls are y and no. of green colored balls are g. Number of green colored balls are 4 more than the number of yellow colored balls. When one ball is picked at random then the probability of getting black color ball is 5/13. The value of y is 18 2/11% less then g.

In bag B, number of yellow colored balls is 200/9% more than that of bag A. If two balls are picked at random from bag B then the probability of getting both green color ball is 4/37. Total number of balls in bag B is 75.

In bag C, the ratio of number of green colored balls and number of black colored balls is 7 : 5. Total number of green and black colored balls is 36. If one ball is picked at random then the probability of getting one yellow ball is 7/13.

32. If x number of yellow balls from bag B are taken and placed into bag A and 20% of black balls from bag A are taken and placed into in bag B. If we pick one ball from bag B then the probability that the ball is of black color is 11/26. Then find the value of x?

a. 5

b. 6

c. 3

d. 2

e. None of these

33. If one ball picked at random from each of the bag A and bag B then find the probability that both of the balls are of the same color?

a. 21×47/65×75

b. 22×43/65×75

c. 11×17/65×75

d. Can't be determined

e. None of these

34. Difference between the number of green balls in bag A and bag C is how much percent more/less than

the sum of the number of black balls in bag A and bag C together?

a. 100%

b. 95%

c. 97.5%

d.102.5%

e. None of these

35. If P(5, 2) = P(n, 2), find n.

a. 5

b. - 4

c. 1

d. 3

e. 4

36. How many four digit numbers greater than 5000 can be formed with the digits 4 ,5, 7, 8, and 9?

a. 96

b.210

c. 216

d. 310

e. None of these

37. How many numbers of five digits may be formed with the digits 5, 0, 9, 0, and 6?

a. 44

b. 36

c. 30

d. 42

e. None of these

38. In how many ways can 2 girls and 8 boys be seated in a row so that girls are always together?

a. 788000

b. 740320

c. 730240

d. 725760

e. None of these

39. If the letters of the word PLAYERS be arranged at random, what is the probability that there are exactly five letters between P and S?

a. 7/55

b. 6/49

c. 8/51

d. 1/42

e. None of these

40. In a group of artists, there are 10 dancers and 8 singers. If four artists are to be selected at random, what is the probability that 2 dancers and 2 singers are selected?

a. 7/17

b. 2/19

c. 1/17

d. 2/17

e. None of these

Directions (41 – 43): Study the following information carefully and answer the question that follows:

A bag contains 6 red balls and 8 green balls. Two balls are drawn at random one after one with replacement. What is the probability that-

41. Both the balls are green

a. 13/49

b. 15/49

c. 16/49

d. 17/49

e. None of these

42. First one is green and second one is red

a. 16/49

b 14/49

c. 11/49

d. 12/49

e. None of these

43. Both the balls are red

a. 14/49

b. 9/49

c. 11/49

d. 12/49

e. None of these

Directions (44 – 45): Study the following information carefully and answer the question that follows:

A box contains 6 red, 4 blue, 2 green and 4 yellow pens.

44. Two pens are picked at random, what is the probability that one is blue and one is yellow?

a. 3/19

b. 2/11

c. 4/15

d. 2/15

e. None of these

45. If four pens are picked at random, what is the probability that one is green, two are blue and one is red?

a. 13/248

b. 18/455

c. 14/335

d. 12/545

e. None of these

Directions (46 – 48): Study the following information carefully and answer the question that follows:

A person has 140 colored cups in four colors. The number of red cup is eight times the number of green cups. For every blue cup there are three yellow cups. The number of green color cup is 4. The number of each of them is a positive integer number.

46. How many Blue cups are there?

a. 18

b. 26

c. 31

d. 29

e. 15

47. What will be the number of red cups if the number of blue cup replaced by green cup is one-third of the average of initial number of green cup and blue cup?

a. 58

b. 66

c. 70

d. 72

e. 76

48. By what percentage is the number of yellow cup more than number of red cup?

a. 118.66%

b. 155.66%

c. 162.89%

d.121.26%

e. 143.75%

49. If the digits of a 2 digit number are interchanged then original number is greater than four times the new number so obtained. How many such natural numbers are there? Assume that '0' cannot be at the unit place of the number.

a. 3

b. 4

c. 5

d. 6

e. None of these

50. In bag A, there are 2 Black balls, 3 Red balls & 5 green balls. In bag B, there are 6 red balls, 5 black balls & x green balls. Two balls are drawn from both bags. The probability of getting 2 green balls from bag A is 52/315 more than that from bag B. What is x?

a. 3

b. 4

c. 5

d. 6

e. None of these

Answer Key with Detailed Solution

1. A

According to the question,

P(X')/P(X)=7/4

P(X')=7/11

P(X)=4/11

P(Y')/P(Y)=5/3

P(Y')=5/8,P(Y)=3/8

Now, out of X,Y and Z, one and only one can happen.

P(X)+P(Y)+P(Z)=1

4/11+3/8+P(Z)=1

P(Z)=1-4/11-3/8

=88-32-33/88

=23/88

P(Z')=1-P(Z)

=1-23/88

=65/88

So odd against z

P(z')/p(z)=65/23

2. A

Required probability = ½ (6c2*9c1+6c3)/15c3+1/2 (5c2*10c1+5c3)/15c3

=1/2*1/15c3 (155+110) =53/182

3. D

Required probability = ½ ((5c2*10c1+5c1*10c2+10c3)/15c3+(5c2*10c1+5c1*10c2+10c3)/15c3)

= 445/455=89/91

4. C

First we have to find the no. of brown tiles,

2/7 = X / (12+8+X)

2* (20+X) = 7X

40+2X = 7X

5X =40

X=8

Probability of choosing white color tiles,

= 8 / (8+8+12)

= 2/7.

Not Choosing = 1-(2/7) = 5/7

5. A

Red tiles = X+5 =8+5 =13

Blue tiles = 12

Total probability = 13C2 +12C2

= [(13*12) /2] + [(12*11)/2]

= [78 +66] = 144

No. of probability= 25C2

= [(25*24) /2]

= 25*12 = 300

Probability = 144/300 = 12/25.

6. D

All are Red = 5C2 = (5*4/2) =10

All are Yellow = 6C2 = (6*5 /2) =15

Total probability = 15C2 = (15*14/2) = 105

Either all are Red or all are yellow =10/105 +15/105

= 25/105 =5/21

7. B

All are in blue = 4C3 = (4*3*2/2*3) =4

All are in Red = 5C3 = (5*4*3/2*3) =10

All are in Yellow = 6C3 = (6*5*4/2*3) =20

Total probability = 15C3 = (15*14*13/3*2*1) =455

Possible probability = 4/455 + 10/455 +20/455

= 34 /455

8. B

Possible probability = (4C1*11C2) + (4C2*11C1) + (4C3*11C0)

= 220 +66+4

= 290

Total probability = 15C3 = (15*14*13/3*2*1) =455

Possible probability = 290/455 =58/91

Another Method:

Probability atleast one is blue = 1- Probability of None is blue

Probability of None is blue= 11C3/15C3

=>11*10*9/15*14*13

=>33/91

Probability atleast one is blue = 1- Probability of None is blue

=>1-(33/91)

=>58/91

9.B

Odd digits =1, 3,5,7,9

Even Digits =0, 2,4,6,8

Since,

Odd number= odd position; Even number = Even Position

Favorite ways = 5P2 and 5P1 = 5*4*5 =100

Total three digit numbers that can be formed = 9*10*10 =900

Total Probability =100/900 =1/ 9.

10. A

The sum may be 2,3,5,7, 11

2 can be obtained in 1 way = (1, 1)

3 can be obtained in 2 ways = (1,2) , (2,1)

5 can be obtained in 4 ways= (1,4),(2,3),(3,2),(4,1)

7 can be obtained in 6 ways = (1,6),(2,5),(3,4),(4,3),(5,2),(6,1)

11can be obtained in 2ways = (5,6),(6,5)

So total favorable ways = 1+2+4+6+2=15

Total outcomes ==6^2=36

P(E) = 15/36=5/12

11. A

Probability of choosing 2 boys and 1 girl = (15c2* 12c5) +(15c3 * 12c4) +(15c4*12c3) + (15c5 *12c2) + (15C6*12c1)

Total probability = 27C7

Probability =83160 +225225 +300300 +198198+60060 = 866943

Total probability =888030

12. C

	A	B	C
E1	1	2	3
E2	1	3	2
E3	2	1	3
E4	2	3	1
E5	3	1	2
E6	3	2	1

There are 6 combination of letters put into the envelop, n(s)= 6

. Answer: c)

All the letters put into right envelop is only in E1.

Hence, required probability= 1/6

13. B

None of the letters put into right envelop is E4 and E5

Hence, required probability= 2/6 = 1/3

14. C

The available digits are 0, 1, 2 …9

The first digit can be chosen in 9 ways (0 not acceptable); the second digit can be accepted in 9 ways (digits repetition not allowed)

Thus, the code can be made in 9 × 9 = 81 ways

Now there are only 4 digits 1, 6, 8, 9 which can create confusion

Hence, the total number of codes which create confusion are = 4 × 3 = 12

Out of these 12 codes 69 and 96 will not create confusion

Hence, in total 12 – 2 = 10 codes will create confusion

Hence, the total codes without confusion are 81 – 10 = 71

15.D

There are 7 letters in the word 'Bengali; of these 3 are vowels and 4 consonants.

I. Considering vowels a, e, i as one letter, we can arrange letters in 5! ways in each of which vowels are together. These 3 vowels can be arranged among themselves in 3! ways

Total number of words = 5! × 3! = 120 × 6 = 720

Vowels never together = 7! – 720 = 4320

II. There are 4 odd places and 3 even places. 3 vowels can occupy 4 odd places in 4P3 ways and 4 constants can be arranged in 4P4 ways

Number of words = 4P3 * 4P4 = 24 * 24 = 576

16.B

The candidate has to select six questions in all of which at least two should be from Part I and two should be from Part II. He can select questions in any of the following ways

	(i)	(ii)	(iii)
Part I	2	3	4
Part II	4	3	2

If the candidate follows choice (i), the number of ways in which he can do so is = 5C2 * 5C4

= 10 * 5 = 50

If the candidate follows choice (ii), the number of ways in which he can do so is = 5C3 * 5C3

= 10 * 10 = 100

Similarly, if the candidate follows choice (iii), then the number of ways in which he can do so is = 5C4 * 5C2 = 50

Therefore, the candidate can select the question in 50 + 100 + 50 = 200 ways

17.E

We are to choose 11 players including 1 wicket keeper and 4 bowlers or 1 wicket keeper and 5 bowlers.

Number of ways of selecting 1 wicket keeper, 4 bowlers and 6 other players = 2C1 * 5C4 * 9C6

= 2 * 5* 84 = 840

Number of ways of selecting 1 wicket keeper, 5 bowlers and 5 other players = 2C1 * 5C5 * 9C5

= 2 * 1 * 126 = 252

Total number of ways of selecting the team = 840 + 252 = 1092

18.B

Let rotten apples = $10 \times \frac{2}{5} = 4$, others = 6

If 1 apple is rotten + 2 apples are other

= 4C1 × 6C2 = 60

If 2 apples are rotten + 1 apple is other

= 4C2 × 6C1 = 36

If 3 apples are rotten

= 4C3 = 4

Total outcomes = 10C3 = 120

Probability = $\frac{60 + 36 + 4}{120}$

$= \frac{100}{120} = \frac{5}{6}$

19. A

Following the common explanation, we get

Probability that at least two of Salman's tube lights work

$= \frac{29}{30}$

Common Explanation:

n(S) = 10C4 = 210

7 of the 10 lamps are not defective.

∴ If T is the event that all of Salman's tube lights work,

n(T) = 7C4 = 35

∴ Probability that all of Salman's tube lights work

$= \frac{35}{210} = \frac{1}{6}$

We need the probability that at least two of his tube lights work.

The event that less than two of his tube lights work,

and the event that at least two of his tube lights work, are exhaustive.

So, we calculate the probability that less than two of his tube lights work and subtract it from 1.

The probability that none of Salman's tube lights work = 0 as there are only 3 defective tube-lights and he buys 4.

If K is the probability that only one of Salman's tube lights works,

n(K) = 7C1 × 3C3 = 7

∴ Probability that less than two of Salman's tube lights work

$= \frac{7}{210} = \frac{1}{30}$

∴ Probability that at least two of Salman's tube lights work

$= 1 - \frac{1}{30} = \frac{29}{30}$

20. E

Following the common explanation, we get

Probability that all of Salman's tube lights work

$= \frac{1}{6}$

21. B

The probability of an even number appearing on the first draw is 1/2(since there are 25 even numbers in counting of 1 to 50).

The probability of an odd number appearing on the second draw is 1/2(since there are 25 odd numbers in counting of 1 to 50).

The probability of a number divisible by 3 appearing on the third draw is 16/50 (since there are 16 numbers that are divisible by 3 while counting from 1 to 50.)

Since all these events have no relation with each other and no dependence either, and the slips are replaced, we can directly multiply the individual probabilities to get the resultant probability.

So, the probability of all the events taking place is

$\frac{1}{2} \times \frac{1}{2} \times \frac{16}{50} = \frac{2}{25}$

22. A

Common Explanation: As per the question, three girls can't occupy consecutive seats but two can.

Therefore, if we find the number of ways in which all three girls occupy consecutive seats and subtract this number from the total number of ways in which the five people can be arranged among themselves, we will get the required answer.

5 students can be arranged among themselves in 5p5 ways = 120 ways.

Assume that the 3 girls are one entity. The total number of ways in which they can be arranged among themselves = 3! = 6

Also, the set of three girls and the other students can be arranged among themselves in 3! = 6 ways.

Thus, total number of ways in which three girls are together = 6 × 6 = 36

Thus, number of ways in which all 3 girls will not occupy consecutive seats = 120 – 36 = 84

As per the common explanation, we get

Total number of ways in which three girls are together = 6 × 6 = 36

Hence, option A is correct.

23. C

Following the common explanation, we get

Thus, number of ways in which all 3 girls will not occupy consecutive seats = 120 – 36 = 84

24.D

Following the common explanation, we get

The number of words that start with a vowel but end with a consonant = 9 × 24 = 216.

Hence, option D is correct.

Common Explanation:

The word LINEAR has three vowels - I, E and A. If a word starts and ends with a vowel, the two letters to occupy the first and the last positions can be selected and arranged in 3P2 = 6 ways.

The remaining 4 letters can be arranged among themselves in 4P4 = 4! = 24 ways.

∴ The number of words that start and end with a vowel = 24 × 6 = 144.

If a word starts with a vowel but ends with a consonant, its first letter can be selected from I, E and A in 3 ways. Its last letter can be selected from L, N and R in 3 ways. The remaining three letters can be arranged in 4! ways.

∴ The number of words that start with a vowel but end with a consonant = 3 × 3 × 4! = 9 × 24 = 216.

Using all the letters of the word LINEAR.

25. C

Following the common explanation, we get

The number of words that start and end with a vowel = 144.

Hence, option C is correct.

Common Explanation:

The word LINEAR has three vowels - I, E and A. If a word starts and ends with a vowel, the two letters to occupy the first and the last positions can be selected and arranged in 3P2 = 6 ways.

The remaining 4 letters can be arranged among themselves in 4P4 = 4! = 24 ways.

∴ The number of words that start and end with a vowel = 24 × 6 = 144.

If a word starts with a vowel but ends with a consonant, its first letter can be selected from I, E and A in 3 ways. Its last letter can be selected from L, N and R in 3 ways. The remaining three letters can be arranged in 4! ways.

∴ The number of words that start with a vowel but end with a consonant = 3 × 3 × 4! = 9 × 24 = 216.

26. B

Six letter words with at least two vowels can have 2, 3, 4 or 5 vowels as no letters can be repeated.

There are 21 consonants and 5 vowels.

All possible cases:

2 vowels and 4 consonants

3 vowels and 3 consonants

4 vowels and 2 consonants

5 vowels and 1 consonant

∴ Number of ways in which this can be done = 5C2 × 21C4 + 5C3 × 21C3 + 5C4 × 21C2 + 5C5 × 21C1

= 10 × 5985 + 10 × 1330 + 5 × 210 + 1 × 21 = 74221

In each of these cases, chosen 6 letters can arrange themselves in 6! Ways.

∴ Total number of ways in which this can be done = 6! × 74221 = 720 × 74221 = 53439120

27. D

Balls = 10	Ribbon = 10	Plates = 10
Red = 2	Red = 5	Red = 3
Yellow = 3	Yellow = 2	Yellow = 5
Blue = 5	Blue = 3	Blue = 2

Performance with only red color

One ball of red color, one ribbon of red color and one plate of red color

Required Probability = $\frac{2}{10} \times \frac{5}{10} \times \frac{3}{10} = \frac{3}{100} = 0.03$

28. C

Balls = 10	Ribbon = 10	Plates = 10
Red = 2	Red = 5	Red = 3
Yellow = 3	Yellow = 2	Yellow = 5
Blue = 5	Blue = 3	Blue = 2

Condition is yellow color for ribbon while plate and ball can be of any color so, probability of choosing ball and plate is 1 while probability of choosing one yellow color ribbon is

$= \frac{2}{10} = 0.2$

29. B

Balls = 10	Ribbon = 10	Plates = 10
Red = 2	Red = 5	Red = 3
Yellow = 3	Yellow = 2	Yellow = 5
Blue = 5	Blue = 3	Blue = 2

Now
Joker choose → 3 balls, 5 Ribbon and 1 plate
Condition → all are of some color
⇒ 5 ribbons of same color is only of red color
But, 3 red ball cannot be possible so
Required Probability = 0

30.D

As chocolate are identical so their no. does not affect the probability
Now, probability of choosing a colored ribbon = $\frac{1}{5}$
Probability of choosing a box = $\frac{1}{5}$
Combined probability = $\frac{1}{5} \times \frac{1}{5} = \frac{1}{25}$

31. D

Wc2/ (B+W)c2 = 14/33

W (W-1)/(W+B)*(B+W-1) = 14/33

Now expressing 14/33 in the above format by multiplying 4 in numerator and denominator

W (W-1)/(W+B)*(B+W-1) = 8*7/12*11 (note = balls <15)

W =8

W+B =12 B =4

Probability = 4c2/12c2 = 1/11

32. D

After replacement →
Yellow no of balls in beg B = 22 – x
Black no. of balls in beg B = 28+ 5 = 33
Green no. of balls in bag B = 25
Then, $\frac{33}{22-x+33+25} = \frac{11}{26}$

$\frac{33}{80-x} = \frac{11}{26}$

$78 = 80 - x$

$x = 2$

33.E

Required probability $= \frac{18}{65} \times \frac{22}{75} + \frac{22}{65} \times \frac{25}{75} + \frac{25}{65} \times \frac{28}{75}$

$= \frac{1646}{65 \times 75}$

34. C

$\text{Required \%} = \frac{40-1}{40} \times 100$

$= \frac{39}{40} \times 100$

$= 97.5\%$

35.A

Sol. Given that P (5, 2) = P (n, 2)

$\Rightarrow \frac{5!}{(5-2)} = \frac{n!}{(n-2)!} \Rightarrow \frac{5!}{6!} = \frac{n(n-1)(n-2)!}{(n-2)!}$

$\Rightarrow 20 = n(n-1) \Rightarrow (n^2 - n - 20) = 0$

(n - 5) (n + 4) = 0

n = 5

36.C

For 4 digit numbers greater than 5000, at thousands' place, only 5, 7, 8 & 9 can be placed and remaining 4 digits can be placed in at remaining three places.

4P1 * 4P3 = 4 × 4 x 3 ×2 = 96

All 5 digit numbers would be greater than 5000, therefore, no. of ways = 5! = 5× 4 × 3 ×2 = 120

∴ Required number = 96 +120 = 216

37. B

$^3P1$ ways and remaining 4 digits 4!/2! (as 0 occurs twice) ways

$^3P1 \times 4!/2!$ = (3×4×3×2!)/2! = 36 ways

38. D

Required number of ways = 2! × 9! = 2 × 362880 = 725760

39.D

S = 7! = 7 × 5 × 4 × 3 × 2 × 1 = 5040

Let E= event of getting exactly fiveletters between P and S

n(E) = 5! = 120

∴ P (E) = (n(E))/(n(S)) = (120)/5040 = 1/42

40. A

Total number of artists = 10 + 8 = 18

Let S be the sample space. Then,

n(S) = number of ways selecting 4 artists out of 18 = $^{18}C\_4$ = (18 × 17 × 16 × 15)/(3 × 2 × 1) = 3060

Let E= event of selecting 2 dancers and 2 singers

n(E) = $^{1°}C\_2 \times {}^8C\_2$ = (10 × 9)/(2 ×1) x (8 × 7)/(2 ×1) = 45× 28 = 1260

∴ P (E) = n(E)/n(S) = 1260/3060 = 7/17

41.C

Sol.

Required Probability = $\frac{8}{14} \times \frac{8}{14} = \frac{64}{14 \times 14} = \frac{16}{49}$

42.D

Sol.

Required Probability = $\frac{8}{14} \times \frac{6}{14} = \frac{12}{49}$

43. B

Sol.

Required Probability = $\frac{6}{14} \times \frac{6}{14} = \frac{9}{49}$

44.D

Total number of pens = 6 + 4 + 2 + 4 = 16

Let S be the sample space. Then,

n(S) = number of ways of drawing 2 pens out of 16 = $^{16}C2$ = (16 × 15)/(2 × 1) = 120

Let E= event of drawing two pens so that one is blue and one is yellow

n(E) = $^4C1 \times {}^4C1$= 4 × 4= 16

∴ P (E) = (n(E))/(n(S)) = 16/120 = 2/15

45. B

Total number of pens = 6 + 4 + 2 + 4 = 16

Let S be the sample space. Then,

n(S) = number of ways of drawing 4 pens out of 16 = $^{16}C4$ = (16 × 15× 14 × 13)/(4 × 3 × 2 × 1) = 1820

Let E= event of drawing 4 pens so that one is green, two are blue and one is red = n(E) = $^2C1 \times {}^4C2 \times {}^6C1$= 2 × 6 × 6= 72

∴ P (E) = (n(E))/(n(S))= 72/1820 = 18/455

46.B

Let number of Green cup= G and Number of Blue Cup = B

Red = 8G

Blue: Yellow= 1:3 => Yellow= 3B

Also Red + Green + Blue + Yellow=140

=> 8G + G + 3B + B = 140

=> B= (140-9G)/4 ————- (i)

We have for G=4

B = (140 - 9*4)/4 = 26

47. D

Average = (4 + 26)/2 = 15

Total green cup = 4 + 15/3 = 9

R=8G= 8*9= 72

48. E

Number of yellow cup = 3B

B = 26

Hence number of yellow cup= 3*26 = 78

Number of red cup = 8*4 = 32

Required more % = (78 - 32)*100/32 = 143.75%

49. A

Let original number be 10a+b

So 10a+b>4(10b+a)

10a+b> 40b+4a

6a>39b

If b =1 then 6a>39 or a≥ 7 so possible numbers are 71, 81 & 91.

If b =2 then 6a>78 or a> 13 which is not possible a is a single digit number. Hence possible numbers are only 3.

50. B

Probability of getting 2 green balls from bag A = 5c2/10c2= 2/9

Probability of getting 2 green balls from bag B = xc2/(x+11) c2 = x(x-1)/{(x+11)(x+10)}

Now ATQ,

x (x-1)/{(x+11) (x+10)} = 2/9 – 52/315

x (x-1)/{(x+11) (x+10)} = 18/315 = 2/35 --- (1)

Now putting all the options one by one in equation (1), we will check

When. x= 4,

4(4-1)/{(4+11)(4+10)} = 12/210 = 2/35 which satisfy the equation.