Directions of Test

Test Name	LPU CA 03 - 03 (A)	Total Questions	30	Total Time	50 Mins

Section Name	No. of Questions	Time limit	Marks per Question	Negative Marking
Section 1	6	0:10(h:m)	1	1/4
Section 2	6	0:10(h:m)	1	1/4
Section 3	6	0:10(h:m)	1	1/4
Section 4	6	0:10(h:m)	1	1/4
Section 5	6	0:10(h:m)	1	1/4

Section : Section 1

QNo:- 1 ,Correct Answer:- *D*

Explanation:- *When not written about repetition, take it to be allowed.*
1000 to 5000 means 4 digit numbers. So 4 boxes.
Now 0, 5 and 6 cannot be placed in Box 1. 0 will make it 3-digit number and 5 & 6 will make number greater than 5000.
So 2 choices (1 and 3) for Box 1, all 5 choices for Box 2, 3, and 4
*So total numbers = 2*5*5*5 = 250*

QNo:- 2 ,Correct Answer:- *B*

Explanation:- *Two-digit number having 8 can be made from 8, 5, 2,1,7,6 are 58, 85, 28, 82, 18, 81,78, 87,68, 86, 88. Therefore, total number of such two digits numbers is 11.*

QNo:- 3 ,Correct Answer:- *A*

Explanation:- *Total no. of 3 digit number by using 1, 2, 3 & 4 with repition = 4 × 4 × 4 = 64*
Numbers which are divisible by 4
Last two digits should be divisible by 4
a 1 2 = a can have 4 values
a 2 4 = 4 values
a 3 2 = 4 values
a 4 4 = 4 values
fav. Number of ways = 4 × 4 = 16 ways

$$\text{Probability} = \frac{16}{64} = \frac{1}{4}$$

QNo:- 4 ,Correct Answer:- *A*

Explanation:- *Sum of all such numbers = Sum of digits * (no of digits - 1)! * 11111 (number of ones is equal to the number of digits) = 25*4!*11111 = 6666600*

QNo:- 5 ,Correct Answer:- *D*

Explanation:-
Considering combinations,
Each digit appears in each column 6 times.
So each column must add up to,
6(1 + 2 + 3 + 4) = 60.
Total = 60(1 + 10 + 100 + 1000) = 66660.
Alternatively: The dirsct formula for such questions = (Sum of digits) × (number of digits - 1)! × (1111...11)
Here number of ones is equal to the number of digits.
So (1+2+3+4) × 3! × 1111 = 66660

QNo:- 6 ,Correct Answer:- *D*

Explanation:- *The vowels in DAUGHTER are A, U and E. Take them as one unit. So we are left with one unit (A,U and E) and 5 consonants. These 6 units can be arranged in 6! Ways. Also the three vowels can be arranged in 3! Ways. So the total number of ways = 6! × 3! = 720 × 6 = 4320.*

Section : Section 2

QNo:- 7 ,Correct Answer:- *B*

Explanation:-
Number of alphabhet in ROTATION = 8
Number of O 's = 2 & Number of T = 2
Hence

$$\text{Number of arrangements} = \frac{8!}{2!2!} = 10080$$

Hence the answer is option 2

QNo:- 8 ,Correct Answer:- *C*

Explanation:-
Bungalow has 8 letters with 3 vowels.
The total possible words are 8! = 40320.
The arrangements with vowels together = 6!×3! = 4320.
So the required answer is 40320-4320 = 36000.

QNo:- 9 ,Correct Answer:- *B*

Explanation:-
There are 4 consonants and 3 vowels _C_C_C_C_
There are 5 places which the 3 vowels can take. $\therefore {}^5C_3 \times 3! \times 4! = 1440$

QNo:- 10 ,Correct Answer:- C

Explanation:- Alphabetic order of letters is E,I,M,P,R
Number of words starting with E =4! =24
Number of words starting with I =4! =24
Number of words starting with M =4! =24
Number of words starting with PE =3! =6
Number of words starting with PI =3! =6
Number of words starting with PM =3! =6
Number of words starting with PRE =2! =2
Number of words starting with PRIE =1! =1
Next word is 'PRIME'.
Therefore, rank of PRIME =24+24+24+6+6+6+2+1+1=94

QNo:- 11 ,Correct Answer:- C

Explanation:- Alphabetical order of letters is C, E, E, R, S, T
Number of words starting with C = 5! /2! =60
Number of words starting with E =5! =120
Number of words starting with R = 5!/2!=60
Number of words starting with SC = 4!/2!=12
Number of words starting with SECE =2! =2
Next word is 'SECRET'.
Therefore, rank of SECRET =60+120+60+12+2+1=255

QNo:- 12 ,Correct Answer:- C

Explanation:- Let all the males be one unit. So total arrangements when all the mails are together = (6! × 5!)
Probability when all the males are together = (6! × 5!)/10! = 1/42
So the probability that none of the males is together = 1 – 1/42 = 41/42

Section : Section 3

QNo:- 13 ,Correct Answer:- D

Explanation:-
Arranging boys first:
-- B -- B -- B --
This can be done in 3! ways.
4 spaces are created, girls can be placed here in ${}^4P_3$ ways
Therefore total ways = ${}^4P_3 \times 3! = 144$ ways.

QNo:- 14 ,Correct Answer:- D

Explanation:-
The 4 boys can be arranged in 4! = 24 different ways. There are now 5 slots in which we can arrange the 2 girls in 5 × 4 = 20 ways. Thus the total number of arrangements is 24 × 20 = 480.

QNo:- 15 ,Correct Answer:- *B*

Explanation:- *Case I: Selecting all 7 boys out of 9 and no girl, which can be done in* $^{9}C_{7} = 36$ *ways*
Case II: Selecting 6 boys out of 9 and 1 girl out of 4, which can be done in $^{9}C_{6} \times {}^{4}C_{1} = 336$ *ways*
Case III: Selecting 5 boys out of 9 and 2 girls out of 4, which can be done in $^{9}C_{5} \times {}^{4}C_{2} = 756$ *ways*
Case III: Selecting 4 boys out of 9 and 3 girls out of 4, which can be done in $^{9}C_{4} \times {}^{4}C_{1} = 504$ *ways*
So, required number of ways = 36 + 336 + 756 + 504 = 1632

QNo:- 16 ,Correct Answer:- *B*

Explanation:- *Total number of ways* $= {}^{10}C_{3} \times {}^{7}C_{3} + {}^{10}C_{4} \times {}^{7}C_{2}$
$= 4200 + 4410$
$= 8610$
Now, two women refuse to serve on the same committee.
Cases for this $= {}^{10}C_{4} + {}^{10}C_{3} \times {}^{5}C_{1}$
$= 210 + 600$
$= 810$
Required cases = 8610 – 810 = 7800

QNo:- 17 ,Correct Answer:- *A*

Explanation:- *Since, two girls are already selected, thus we are left with 8 girls out of which at least 2 girls are to be selected.*
So, required no. of cases $= {}^{12}C_{4} \times {}^{8}C_{4} + {}^{12}C_{5} \times {}^{8}C_{3} + {}^{12}C_{6} \times {}^{8}C_{2}$
$= 34650 + 44352 + 25872$
$= 104874$

QNo:- 18 ,Correct Answer:- *C*

Explanation:-
The possible combinations are:

Combinations	I	II	III
1	1	2	7
2	1	3	6
3	1	4	5
4	2	3	5

Hence there are 4 such combinations possible.

Section : Section 4

QNo:- 19 ,Correct Answer:- B

Explanation:- Let us assume number of toys received by five kids is a, b, c, d and e respectively. The question is similar to find solution of the equation a + b + c + d + e = 25, where a, b, c, d and e are more than 2. In this case since toys are identical, hence it does not matter which toy is given to which kid so after giving 2 toys to each kid remaining 15 toys can be distributed according to ${}^{n+r-1}C_{r-1}$
So required number of ways = ${}^{19}C_4 = 3876$

QNo:- 20 ,Correct Answer:- C

Explanation:- In this case since ballons are identical, hence it does not matter which ballon is selected, what matters is that how many ballons are selected. So first we select one ballon of each colour after that remaining 8 ballons can be selected in any way. So according to ${}^{n+r-1}C_{r-1}$
Hence number of ways is ${}^{11}C_3 = 165$

QNo:- 21 ,Correct Answer:- B

Explanation:- Sample space = {(3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6), (1, H), (1, T), (2, H), (2, T), (4, H), (4, T), (5, H), (5, T)}
Consider the events,
A = The coin shows a tail
B = At least one die shows a 2.
A = {(1, T), (2, T), (4, T), (5, T)}
B = {(3, 2), (6, 2), (2, H), (2, T)}
A ∩ B = {(2, T)}
P (B) = P {(3, 2)} + P {(6, 2)} + P {(2, H)} + P {(2, T)}
= 1/6 × 1/6 + 1/6 × 1/6 + 1/6 × ½ + 1/6 × ½
= 1/36 + 1/36 + 1/12 + 1/12
= 2/9
P (A ∩ B) = P {(2, T)} = 1/6 × ½ = 1/12
Required probability = P (A/B) = P (A ∩ B)/P (B)
= 3/8

QNo:- 22 ,Correct Answer:- C

Explanation:-
Let the probability that a Bomb misses the target be a and that it hits be b. (Given b = ½, ∴ a = 1/2)
As the number of Bombs fired (n) increases, the probability that the building is destroyed (p) keeps increasing. The probability that the building is not totally destroyed (1 – p) keeps decreasing i.e. the probability that only 0, 1 or 2 shots hit the building keeps decreasing we denote the probability that i shots hit the building as P(i).
Reqd. probability=1-[P(0)+P(1)+P(2)]

$$=1-\left[{}^{n}C_0\left(\frac{1}{2}\right)^n+{}^{n}C_1\left(\frac{1}{2}\right)^n+{}^{n}C_2\left(\frac{1}{2}\right)^n\right]$$

$$=1-\left(\frac{1}{2}\right)^n\left[1+n+\frac{n(n-1)}{2}\right]$$

$$=1-\left(\frac{1}{2}\right)^n\left[\frac{n^2+n+2}{2}\right]>0.95$$

$$\Rightarrow\frac{n^2+n+2}{2^{n+1}}<1-0.95$$

For n=11, it satisfies. So, n=11 is the answer

QNo:- 23 ,Correct Answer:- A

Explanation:-
They will contradict each other if A speaks the truth and B tells a lie or A tells a lie and B speaks the truth.

$$\therefore\text{Required Probability}=\frac{3}{4}\times\frac{1}{5}+\frac{1}{4}\times\frac{4}{5}=\frac{3}{20}+\frac{4}{20}=\frac{7}{20}$$

QNo:- 24 ,Correct Answer:- C

Explanation:- *let total couples =100*
total employed =10+45=55

total unemployed =100+100-55 =145
hence required probability = 145/200 =29/40

Section : Section 5

QNo:- 25 ,Correct Answer:- C

Explanation:- *P(Head) = 2/5*
P(Tail) = 3/5
Probability that the number of times the head seen is exactly two = $^5C_2 \times (2/5)^2 \times (3/5)^3$
= 216/625

QNo:- 26 ,Correct Answer:- D

Explanation:-
Total cases = 2 × 2 = 4 i.e. (H,H), (T,T), (H,T) and (T,H)
Required cases = 1 i.e. (H, H)

$$\text{Required Probability}=\frac{1}{4}$$

QNo:- 27 ,Correct Answer:- *C*

Explanation:-

$$\text{Required probability} = \frac{1}{6}+\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{1}{6}+\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{1}{6}$$

$$=\frac{\frac{1}{6}}{1-\left(\frac{5}{6}\right)^3}=\frac{\frac{1}{6}}{1-\frac{125}{216}} \quad =\frac{1}{6}\times\frac{216}{91}=\frac{36}{91}$$

QNo:- 28 ,Correct Answer:- *D*

Explanation:-

Prime no.s = 2, 3, 5, 7 & 11. The no of ways to get :
2 as the sum is 1 i.e. 1 +1
3 as the sum are 2 i.e. 1 + 2, 2 + 1
5 as the sum are 4 i.e. 1 + 4, 4 + 1, 2 + 3, 3 + 2
7 as the sum are 6 i.e. 1 + 6, 6 + 1, 2 + 5, 5 + 2, 3 + 4, 4 + 3
11 as the sum are 2 i.e. 5 + 6, 6 + 5
So total no of ways are 1 + 2 + 4 + 6 + 2 = 15
So the probability is 15 / 36 = 5 / 12 (where 36 is total number of possible cases in case of two dices)

QNo:- 29 ,Correct Answer:- *A*

Explanation:-

$\text{Total cases} = 6 \times 6 = 36$

$\text{Favorable cases} = 4\ [(1,6), (6,1), (2,3), (3,2)]$

$$\therefore \text{Required probability} = \frac{4}{36}=\frac{1}{9}$$

QNo:- 30 ,Correct Answer:- *D*

Explanation:-

$P(A\cup B) = P(A) + P(B) - P(A\cap B)$

$$\therefore \text{Required Probability} = =\frac{26\times25}{52\times51}+\frac{4\times3}{52\times51}-\frac{1\times2}{52\times51}=\frac{660}{2652}$$