LPU CA 03 - 02 (A) (Answer Keys)

Directions of Test

Test Name	LPU CA 03 - 02 (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

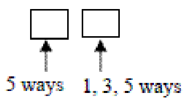
Section : Section 1

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

Explanation:-
As there is no repetition, lock 1 can have 10 numbers, lock 2 can have 9 numbers, lock 3 can have 8 numbers, total ways = 10 × 9 × 8 = 720.

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

Explanation:-



Here unit place can be filled in 3 ways (i.e. 1, 3, 5)
Ten's place can be filled in 5 ways. Required number of numbers = 5 × 3 = 15

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

Explanation:- *We have to select 4 digits from 9 digits, we can not arrange them as their order is fixed.*
So number of ways = $9C_4 = 126$

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

Explanation:-
All the numbers less than 1,00,000 are five digit numbers.
Let x_1, x_2, x_3, x_4 *and* x_5 *be the five digits.*
We want $x_1 + x_2 + x_3 + x_4 + x_5 = 11$.
The number of non-negative solutions to this equation are ${}^{11+5-1}C_{5-1} = {}^{15}C_4 = 1365$.
Of these, one set of solutions is any one $x_i = 11$*, rest all zero. There are 5 such solutions.*
Also, the solutions where one of x_i *is 10 and the other one is 1 should also be removed, which are 20 in number.*
So, actual value = 1,365 – 5 – 20 = 1,340.
Option 3.

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

Explanation:-
If we assume that any digit is in fixed position, then the remaining four digits can be arranged in 4! = 24 ways.
So, each of the 5 digits will appear in each of the five places 24 times.
So the sum of the digits in each position is 24(1+3+5+7+9) = 600 and hence the sum of all such numbers will be 600(1+10+100 + 1000 + 10000) = 6666600

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

Explanation:- *We have 4 alphabets and 4 places, so number of arrangements : 4! = 24.*

So option B.

Section : Section 2

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

Explanation:-
Required number of arrangement = 5! = 120

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

Explanation:-
Total alphabets in MOUSETRAP = 9.
Therefore, total number of arrangement = 9! = 362880

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

Explanation:-
"CONTRIBUTION" has $N = 2$, $T = 2$, $I = 2$, $O = 2$ and four different letters C, R, B and U.

As per the given conditions, there are two types of five letter words.

Type – I: Two letters are alike of one kind and three letters are different.

Required number of words = ${}^4C_1 \times {}^7C_3 \times \frac{5!}{2!}$ = 4 × 35 × 60 = 8,400

Type – II: Two letters are alike of one kind and two are alike of second kind and remaining one letter is different. Required number of words = ${}^4C_2 \times {}^6C_1 \times \frac{5!}{2!2!}$ = 6 × 6 × 30 = 1,080.

∴ Total no. of five – letter words in which at least one of the letters repeated = 8,400 + 1,080 = 9,480.

QNo:- 10 ,Correct Answer:- *D*

Explanation:- *Alphabetic order of letters is I,I, I, I, M, P, P, S, S, S, S*
*Number of words starting with 'I' = 10!/(4!*3!*2!) = 12600*
*Number of words starting with 'MII' = 8!/(4!*2!*2!) = 420*
*Number of words starting with 'MIP' = 8!/(4!*3!) = 280*
*Number of words starting with 'MISI' = 7!/(3!*2!*2!) = 210*
*Number of words starting with 'MISP' = 7!/(3!*3!) = 140*
*Number of words starting with 'MISSII' = 5!/(2!*2!) =30*
*Number of words starting with 'MISSIP' = 5!/(2!*2!) = 30*
Number of words starting with 'MISSISI' = 4!/2! = 12
Number of words starting with 'MISSISP' = 4!/2! = 12
Number of words starting with 'MISSISSII' = 2!/2! =1
Number of words starting with 'MISSISSIPI' = 1
After that the next word will be 'MISSISSIPPI'.
So, the number of words before 'MISSISSIPPI' = 12600+420+280+210+140+30+30+12+12+1+1 = 13736

QNo:- 11 ,Correct Answer:- *A*

Explanation:- *Dictionary order of letters is C,E,E,G,L,L,O*
Number of words starting with C E = 5!/2!= 60
Number of words starting with C G = 5!/(2!x2!)= 30
Number of words starting with C L = 5!/2! = 60
Number of words starting with C O E = 4!/2! = 12
Number of words starting with C O G = 4!/(2!x2!)= 6
Number of words starting with C O L E = 3! = 6
Number of words starting with C O L G = 3!/2! = 3
Number of words starting with C O L L E E = 1! = 1
Number of words starting with C O L L E G E = 1
So rank of COLLEGE = 60 + 30 + 60 + 12 + 6 + 6 + 3 + 1 + 1 =179

QNo:- 12 ,Correct Answer:- *A*

Explanation:- *Number of ways in which the men can be seated is (6 - 1)! = 5!*
Now, as a particular couple sits together, we have two positions for one lady to sit next to her husband and the remaining ladies can sit in 5! Ways.
*Thus, the total number of ways is 5! * 2! * 5! = 28800.*

Section : Section 3

QNo:- 13 ,Correct Answer:- *C*

Explanation:-
Number of arrangement in circle = (Total - 1)!
As number of girls are 8, so required answer = (8 - 1)! = 7!

QNo:- 14 ,Correct Answer:- *A*

Explanation:-
Consider statement (A),
Probability that first is boy = 5/10
Probability that first is boy and second is girl
= 5/10 × 5/9
Similarly, The required probability
= 5/10 × 5/9 × 4/8 × 4/7 × 3/6 = 5/126
Statement 1 is true.

Consider statement (B),
Total number of ways to choose 2 boys and 2 girls for mixed doubles tennis match = $^5C_2 \times {}^5C_2$
= 10 × 10 =100
These 2 boys and 2 girls can team up in two ways.
Total number of ways in which match can be organized = 100 × 2 = 200
If Arjun and Rajani are there in one team, we have to just select (for the second team) 1 boy from the remaining 4 boys and 1 girl from the remaining 4 girls.
Number of ways to do this = $^4C_1 \times {}^4C_1 = 4 \times 4 = 16$
Required probability = 16/200 = 2/25
Statement 2 is not true.
Hence, option A.

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

Explanation:- $^5C_3 \times {}^4C_2 \times {}^3C_2 = 180$ *ways.*

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

Explanation:- *Total persons = 10*
We have to select chairman, a deputy chairman and a secretary i.e. 3 person is to be selected from these 10
So, total cases will be = $^{10}P_3 = 10 \times 9 \times 8 = 720$

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

Explanation:- *Total no. of ways =* $^{10}C_5$
No. of ways in which committee has exactly two boys = $^4c_2 \times {}^6c_3$

$$\text{Required probability} = \frac{^4C_1 \times {}^6C_3}{^{10}C_5} = \frac{10}{21}$$

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

Explanation:- *Minimum number of balls required = 2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 18 = 90*
These 90 balls can be given to the nine children in 1 way.
The remaining 126 - 90 = 36 balls can be distributed among the 9 children in $^{36+9-1}C_{9-1}$ *i.e., in* $^{44}C_8$ *ways. [n non-distinct things can be partitioned in to r distinct groups (some groups may be empty) in* $^{n+r-1}C_{r-1}$ *ways].*

Section : Section 4

QNo:- 19 ,Correct Answer:- *D*

Explanation:- *Required number of ways=10c5=252 ways*
Hence option 4 is the answer.

QNo:- 20 ,Correct Answer:- *C*

Explanation:-
Non negative integral solutions for A+B+C=60 will be $^{62}C_2=1891$
Now these 1891 solutions includes the cases where two or three of them get equal number of balls
There will be exactly one case when all of them equal number of balls i.e.(20 20 20)
There will be cases when exactly two of them get equal number of balls:
(0 0 60) (1 1 58) (2 2 56)......... so on till (30 30 0). These are 31 cases but we need not take the case (20 20 20) as we have counted it above. So there are 30 cases when exactly two of them have same number of balls. All these 30 cases would have come three times each (3!/2!) ways.

*So 30*3=90 cases and 1 case(20 20 20). We need to remove these 91 cases as A>B>C(All are getting unequal number of balls). So total cases left are 1891-91=1800.*
Now these 1800 cases includes the cases where each case for example (19 20 21) would have come 3! times and we need only one case out of these 6 cases as(A>B>C). So 1800/3!=300 cases.

QNo:- 21 ,Correct Answer:- *A*

Explanation:-
Now if 1 or 3 turn up, 1^{st} bag will be selected

Probability of 1 or 3 = $\frac{2}{6} \Rightarrow \frac{1}{3}$

and probability of a black ball from first bag = $\frac{3}{7}$

$\therefore$ Total Probability of black ball from first bag = $\frac{1}{3}\times\frac{3}{7}=\frac{3}{21}$

Now in 2^{nd} case, dice probability = $\frac{2}{3}$

and probability of a black ball from second bag = $\frac{4}{7}$,

Total Probability of black ball from second bag $\frac{2}{3}\times\frac{4}{7}\Rightarrow\frac{8}{21}$

Hence total probability that a black ball will be selected = $\frac{3}{21}+\frac{8}{21}=\frac{11}{21}$

QNo:- 22 ,Correct Answer:- *B*

Explanation:-
Since both are independent events.

So required probability $=1-\frac{1}{4}\times\frac{1}{3}=1-\frac{1}{12}=\frac{11}{12}$

QNo:- 23 ,Correct Answer:- *A*

Explanation:-
Let's take the total cases as:

	Truth	False	Total cases
A	15	5	20
B	16	4	20

The no. of ways are
$\frac{16}{20}\times\frac{5}{20}+\frac{15}{20}\times\frac{4}{20}$
$= \frac{140}{400} = 35\%$

QNo:- 24 ,Correct Answer:- *D*

Explanation:-
No. of ways in which the man can invite 1 or more of his 5 friends = $2^5 - 1 = 31$.
No. of ways in which the wife can invite 1 or more of her 4 friends = $2^4 - 1 = 15$.
Total no. of ways = 31 + 15 = 46.

Section : Section 5

QNo:- 25 ,Correct Answer:- *A*

Explanation:- *Since the cards are drawn one after another with replacement , so the outcome of subsequent draws is independent of the previous ones*
*Therefore the probability that the first is black, the second is diamond and the third is ace, is = 26/52 * 13/52 * 4/52 = 1/104*

QNo:- 26 ,Correct Answer:- *B*

Explanation:-
Required Probability = (4/52) × (4/51) = 4 / (13×51) = 4 / 663
Option B

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

Explanation:-
$\underset{S_1}{\_}\ \underset{S_2}{\_}\ \underset{S_3}{\_}$. S_3 count be 5 or 6. Case 1 ⇒ $\underline{6}\ \underline{5}\ \underline{4}$ Case 2 ⇒ $\_\ \underline{4,5}\ \underline{3}$. $\underset{S_1}{\_}\ \underset{S_2}{\_}\ \underset{S_3}{\_}$. The least value of S_2 is 2. Case 1 ⇒ $S_2 = 2$,then $S_1 = 3, 4, 5, 6$. $S_3 = 1$. Hence $4 \times 1 = 4$ ways. Case 2 ⇒ $S_2 = 3$, $S_3 = 1, 2$, $S_1 = 4, 5, 6$. Hence $3 \times 2 = 6$ ways.
Case 3 ⇒ $S_2 = 5$, $S_3 = 1, 2, 3, 4$, $S_1 = 6$ i.e. 4 ways. Case 4 ⇒ $S_2 = 4$, $S_3 = 1, 2, 3$ & $S_1 = 5, 6$ i.e 6 ways Prob. = $\frac{4+6+6+4}{6^3} = \frac{20}{216} = \frac{5}{54}$. Hence 3.

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

Explanation:-

total Cases = $6^2 = 36$

Favourable Case = (5, 6) (6, 5) = 2

Probability = $\frac{2}{36} = \frac{1}{18}$

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

Explanation:-

Total cases = 2 × 2 = 4 i.e. (H,H), (T,T), (H,T) and (T,H)

Cases not required = 1 i.e. (T, T)

Required Probability = $1 - \frac{1}{4} = \frac{3}{4}$

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

Explanation:-

When three coins are tossed, the total possible cases are HHH, HHT, HTH, THH, TTH, THT, HTT, TTT. Now out of these cases our favourable cases are those, which have exactly one head. Now as there are 3 favorable cases, the answer is

Required Probability = $\frac{3}{8}$