PROBABILITY

Solution :

1. (b) When a natural no. is divided by 9, the remainder may be 0 or 1, or 2 or 3 .. or 8.
So, n(S)=9
E(the remainder is not an even no.)
={1,3,5,7}=4
P(E)=n(E)/n(S) =4/9
Note : We assume zero (0) as even number.
2. (b) Girls ×B× B× B× B× B ×B ×B ×B×
8 boys can be seated in a row in 8! Ways.
For 5 girls there are 9 places so that no two girls sit together.
So they can be seated in ${}^{9}P_5$ ways.
So that Total = ${}^{9}P_5 \times 8! = \frac{9!}{4!} \times 8!$
3. (c) N(S)= ${}^{12}C_3 = \frac{12 \times 11 \times 10}{3 \times 2} = 220$
3 balls can be selected from 4 whtie and 3 black balls in ${}^{7}C_3 = \frac{7 \times 6 \times 5}{3 \times 2} = 35$
So that P(E)=35/220=7/44.
4. (d) S={1,2,3, ...24, 25}
Event E={2,3,5,7,11,13,17,19,23}
So that P(E)=n(E)/n(S)=9/25
5. (d) For Abhinav, n(s) =5, n(A)=4;
So that P(A)=n(A)/n(S)=4/5
Similarly P(L)=3/4 and P(K)=2/3
And P($A \cap L \cap K$) =P(A).P(L).P(K)
$= \frac{4}{5} \times \frac{3}{4} \times \frac{2}{3} = \frac{2}{5}$
(So that all are independent even)
6. (a) If we treat same sports player as one unit then total number is 1+1+1=3, they can sit in 3! Ways. Now players amon themselves can sit in n! ways. Where n=number of players in each sports.
So that Total arrangement 3!7!6!5!
7. (c) In two throws of dice, n(S)=6×6=36
Let E=event of getting sum '9'
={(3,6) (6,3) (4,5) (5,4))
So that P(E)=n(E)/n(S)=4/36=1/9
8. (b) n(S)=6×6=36.
E={(1,1), (1,2), (1,4), (1,6), (2,1), (2,3) (2,5) , (3,2) (3,4), 4,1), (4,3), (5,2), (5,6), (6,1), (6,5)}
So that n(E)=15.
So that P(E)= $\frac{n(E)}{n(S)} = \frac{15}{36} = \frac{5}{12}$
9. (a) We have 8 places which can be arranged in 8!/2! Ways. Out of 8 places, we have 4 odd places and 4 even places. We have altogether 3 vowels which can be arranged in ${}^{4}C_3 = 4!$ ways. Having fixed up the vowels in even places, we will be left with 5 places, namely 4 odd and 1 even, after fixing the 3 vowels. In these 5 places we have to fix 5 consinants, which can be done in 5!/2! Ways.
Required probability = $\frac{4! \times 5!}{8!} = 1/14$
10. (c) Ward A Ward B Ward C
4 5 8
For ward A we have to choose 4 out of 20 and then forward B, 5 out of remaining 16 and then for ward C, 8 our of remaining 11.
Required number = ${}^{20}C_4 \times {}^{16}C_5 \times {}^{11}C_8$
11. (a) P (the vowels are together) = $\frac{n(E)}{n(S)} = \frac{3! \times 3!}{5!} = \frac{3}{10}$
Required probability $= 1 - \frac{3}{10} = \frac{7}{10}$
12. (c) n(S)=5+10=15
N(E)=5
P(E)=n(E)/n(S)=5/15 = 1/3
13. (d) n(S) = ${}^{25}C_3 = \frac{25 \times 24 \times 23}{3 \times 2 \times 1} = 2300$
$n(E) = {}^{10}C_1 \times {}^{15}C_2 = 10 \times \left(\frac{15 \times 14}{2 \times 1}\right) = 10 \times 105 = 1050$
So that P(E) = $\frac{n(E)}{n(S)} = \frac{1050}{2300} = \frac{21}{46}$
14. (b) Girls ×B×B×B×B×B×B×B×B×
8 boys can be seated in a row in 8! Ways.
For 5 girls there are 9 places so that no two girls sit together.
So they an be seated in ${}^{9}P_5$ ways.
Total = ${}^{9}P_5 \times 8! = \frac{9!}{4!} \times 8!$
15. (c) n(S) = ${}^{12}C_3 = \frac{12 \times 11 \times 10}{3 \times 2} = 220$
3 balls can be selected from 4 white and 3 black balls in ${}^{7}C_3$ ways.
So that $n(E) = {}^{7}C_3 = \frac{7 \times 6 \times 5}{3 \times 2} = 35$
So that P(E)= $\frac{35}{220} = \frac{7}{44}$
16. (c); The word contains 1M, 1A, 2T, 1E, 1R
So that Required number of ways
$\frac{6!}{(1!)(1!)(2!)(1!)(1!)} = \frac{720}{2} = 360$
17. (b) After solution n(S)=6×6=36
n(E)=27
P(E)=27/36 =3/4
18. (a) Total number of books =8+7+6=21
Let E be the event that the picked book is neither rin Hindi nor in urdu or the event that the book picked is in English.
n(E)=78
so that p(E)=7/21.
19. (c) n(S) = Number of way of sitting 12 persons at round tale is (12-1) !=11!
Tree particular persons sits together, so we take these three persons as one so number of persons =12-3+1=10
Tey can sit round a table in (10-1)!=9!
Three persons sit in 3 ways among themselves
So that n(E) = 9!×3!
P(E)= $\frac{n(E)}{n(S)} = \frac{9! \times 3!}{11!} = \frac{3}{55}$
20. (c) $\times B \times B \times B \times B \times B \times B \times B \times B \times B \times$

9 boys can sit in 9! Ways. For 7 girls there are 10 place, so girls can sit in $^{10}P_7$ ways.

So that total number of ways = $^{10}p_7 \times 9! = \frac{10!}{3!} \times 9!$

21. (b) n(S) = $^{21}C_2 = 210$

$n(E) = {}^7C_2 + {}^6C_2 + {}^8C_2 = 21 + 15 + 28 = 64$

So that P(E)=64/210=32/105.

22. (a) Number of girls =1

Number of boys =4.

Number of ways = $^5C_1 \times {}^7C_4 = 5 \times 35 = 175$

23. (c) The probability of A's losing any single game $= 1 - 1/3 = 2/3$

And the probability of A's losin al the 3 games $= \left(\frac{2}{3}\right)^3 = \frac{8}{27}$

The probability of A's winning at least one game

$= 1 - \frac{8}{27} = \frac{19}{27}$