1/7/25

Day 6 Aptitude

permutations & Combinations + Probability

1) ways 3 students seated in a rows.

$3! = 3 \times 2 \times 1 =$ **6 ways**

2) Box - 5 diff coloured balls. ways pick 1 ball

1 ball choosing from 5 options = **5 ways**

3) "CAT" arrange the letters of word.

3 Letters $= 3! = 3 \times 2 \times 1 =$ **6 ways**

4) 2 fruits in basket of 4 diff fruits.

choose

$^4C_2 = \frac{4!}{(2! \times 2!)} =$ **6 ways**

5) Probability of getting head flipping a fair coin.

outcomes → head, tail.

head → $\frac{1}{2} = 0.5$

6) die rolled once. probability of getting no. 4.

dice → 6 outcomes.

$P(4) = \frac{1}{6}$

7) 2 digit numbers formed using digits 1, 2, 3, 4 without repetition.

1 (2, 3, 4) 2 (1, 3, 4)

Total $= 4 \times 3 =$ 12 numbers.

8) 3 - Apples, 4 - Oranges. 1 fruit picked random the probability of picking an Apple.

Total $= 3 + 4 = 7$.

Apples $= 3 \rightarrow P(3) = \frac{3}{7}$

9) Ways can 4 people stand in a line

$4! = 4 \times 3 \times 2 \times 1 =$ 24 ways

10) Bag → 3 red, 2 green balls. probability of picking gre

Total = 3+2 = 5.

P(green) = $\frac{2}{5}$

11) 3-digit number formed using digits 1 2 3 4

4 digits = $4 \times 3 \times 2 =$ 24 numbers

1 2 3
1 3 4
1 4 2
⋮

12) Ways can committee of 3 be chosen from 7

$^7C_3 = \frac{7 \times 5 \times 4}{3 \times 2 \times 1} =$ 35 ways

13) Probability of drawing a king from a standard deck of 52 cards.

4 king in 52 cards = $\frac{4}{52} = \frac{1}{13}$

15) Box - 6 white, 4 black balls. 1 ball drawn. probability it is black.

Total balls = 6+4 = 10

Black ball = $\frac{4}{10} = \frac{2}{5}$

14) ways 5 book arranged

5! = 5x4x3x2x1 = 120 ways

16) Diff passwords made with letter A, B, C, D taken 3 at a time.

$^4P_3 = 4 \times 3 \times 2 = 24$

17) probability of getting even no when die rolled

even no's in die = 2, 4, 6 → 3 outcomes

P(even) = 3/6 = 1/2

18) ways 2 letters chosen from word 'MATH'

4 letter $= {}^4C_2 = 6$ ways.

19) probability drawing heart from deck of cards.

13 hearts from 52 cards $= \frac{{}^{13}C_1}{{}^{52}C_4} = \boxed{\frac{1}{4}}$

20) ways can 4 people sit and around circular table.

$4(n-1) = (4-1)! = (3)! = \boxed{6 \text{ ways}}$

21) 4-digit no can form using digits 1, 2, 3, 4, 5 without repetition such that even no?

Even digits - 2, 4.

fix last digit as even.

Remaing 3 digits 4 options $= {}^4P_3 = 24$.

Total $= 2 \times 24 = \boxed{48 \text{ numbers}}$

22) Box - 3 red, 4 blue, 5 green ball. 2 balls drawn. probability both are green.

Total $= 3+4+5 = 12$. Green $= 5$.

$P(\text{green both}) = \frac{{}^5C_2}{{}^{12}C_2} = \frac{10}{66} = \boxed{5/33}$

23) ways 5 students arrange in row. student must not sit together.

$5! = 120$.

2 sit together $= (4! \times 2) = (24 \times 2) = 48$.

$120 - 48 = \boxed{72 \text{ ways}}$

24) Group - 10 men & 8 women. committees of 4 people formed containing atleast 2 women.

2 women, 2 men $= {}^8C_2 \times {}^{10}C_2 = 28 \times 45 = 1260$

3 women, 1 man $= {}^8C_3 \times {}^{10}C_1 = 56 \times 10 = 560$

4 women $= {}^8C_4 = 70$

Total $= 1260 + 560 + 70 = 1890$ ways

25) Die rolled twice. probability the sum is 7.

2 dice = $6 \times 6 = 36$.

ways do get (1,6) (2,5) (3,4) (4,3) (5,2) (6,1) → 6 ways

Probability = $6/36 = \boxed{1/6}$