9. mathematics

letters M, A, T, H, E, M, A, T, I, C, S

Vowels = A, E, A, I

Consonants : M, T, H, M, T, C, S

Total letters = 11

$\frac{8!}{2!\cdot 2!} \times \frac{4!}{2!} = \frac{40320}{4} \times \frac{24}{2} = 10080 \times 12$

$= 120960$

10. OPTICAL

Vowels = O, I, A

Vowel ⇒ 5 units

$5! = 120$

$3! = 6$

$120 \times 6 = 720$

11. $n(n-1)/2 = \frac{30 \times 20}{2} = 435$

12. LOGARITHS

No of 4-letters $= P(10,4) =$

$\frac{10!}{(10-4)!} = 10 \times 9 \times 8 \times 7$

$= 5040$

14 3 girls, 2 days

3 boys, 2 girls

c)

2 boys from 2 girls.

Boys: $C(2,2) = 1$

Girls: $C(2,2) = 1$

Tol

4. 6 men, chosen in $8C_6$ ways and 4 women a
be chosen in $10C_4$ ways

$$8C_6 \times 10C_4 = \frac{8!}{2! \times 6!} \times \frac{10!}{4! \times 6!} = 5880 \text{ ways}$$

5. cost of brown = x
cost of black = $3x$
no of black = 5
no. of brown = b

$$5 \times 3x + b \times x = 15x + bx$$
$$3bx + 5x = 30x + 2bx$$
$$bx = 25x$$
$$b = 25$$

6. Let total people = n
let total handshakes = 24
total ways - handshakes
$$= \frac{n(n-1)}{2} = 24$$

7. 5 tasks, 5 persons
$T_1 \neq P_1$ or $P_2 \rightarrow$ can go to P_3, P_4, P_5
T_2 = only P_3 or $P_4 \rightarrow$ 2 options. $\rightarrow$ 3 persons
3 tasks to remaining 3 people $- 3! = 6$
$(3 \times 2 - 1) \times 6 = (6-1) \times 6 = 5 \times 6 = 30$
$= 30$

Aparna.V

permutation & combination

1. Committe of 5 men & 6 women from 8 men & 10 women

$$^8C_5 \times {}^{10}C_6 = 56 \times 210 = 11760$$

2. 3 men, 2 women $= {}^7C_3 \times {}^6C_2$

4 men, 1 women $= {}^7C_4 \times {}^6C_1$

5 men, 5 women $= {}^7C_5$

$35 \times 15 = 525$

$35 \times 6 = 210$

$= 21$

$525 + 210 + 21 = 756$

3. D, E, T, A, I, L

→ 6 Letter

Odd positions → 3 positions

E A I → 3 vowels

no. of ways to arrange vowels in odd position = $3! = 6$

no. of ways to arrange in remaining 3 position = $3! = 6$

$6 \times 6 = 36$