

# Number System - Part VII, Permutation Combination - Part IV & Probability - Part II

Course on General Aptitude for GATE 2022-23 Batch - Part I

# PERMUTATION COMBINATION

# Agenda : Letters Arrangement



**Q.11** How many different words can be formed from the letters of the word GANESHPURI when:

- (A) All the letters are taken.
- (B) The letter G always occupies the first place.
- (C) The letters P and E respectively occupy the first and last places.
- (D) All the vowels are always together.
- (E) How many words of 5 letters each can be formed each containing 3 consonants and 2 vowels?
- (F) All the vowels are never together.
- (G) No 2 vowels are together.

# Agenda : Team Formation



$$\frac{0}{42} \Rightarrow \underline{A|B|C|D|E}$$

$$\textcircled{1} \quad \underline{3} \Rightarrow \frac{5}{1}C_3 = \frac{5}{1}C_2 = \underline{10}$$

$$\textcircled{2} \Rightarrow \begin{array}{c} \textcircled{A} \\ \hline \end{array} \quad \begin{array}{c} \underline{B|C|D|E} \\ 4C_2 \end{array}$$

(A)

$$\frac{1}{1}C_1 \times \frac{4}{1 \cdot 2}C_2 = 1 \times \frac{4 \cdot 3}{1 \cdot 2} = \underline{6} //$$

$$\begin{array}{ccc} 1C_1 & 1C_1 & 2C_1 \\ \textcircled{A} & \textcircled{C} & \textcircled{\frac{B \times D|E}{1}} \end{array}$$

$1C_1 \cdot 1C_1 \cdot 2C_1$

$\frac{1}{1}C_1 //$



$$\text{Total (No condition)} = {}^{12}C_5$$

**Q.12** How many committees of 5 members each can be formed from 8 official and 4 non-official members in the following cases :

$$8 + 4 = 12$$

$$\begin{aligned} 1. & {}^{12}C_5 \\ 2. & \cancel{{}^{12}C_5} \times 5 \end{aligned}$$

(A) Each consisting of 3 official and 2 nonofficial members.

(B) Each contains at least two non-official members.

(C) Each consisting of at most two official members.

(D) A particular official member is always included.

(E) A particular non-official member is never included.

can be on 2 non-official members.

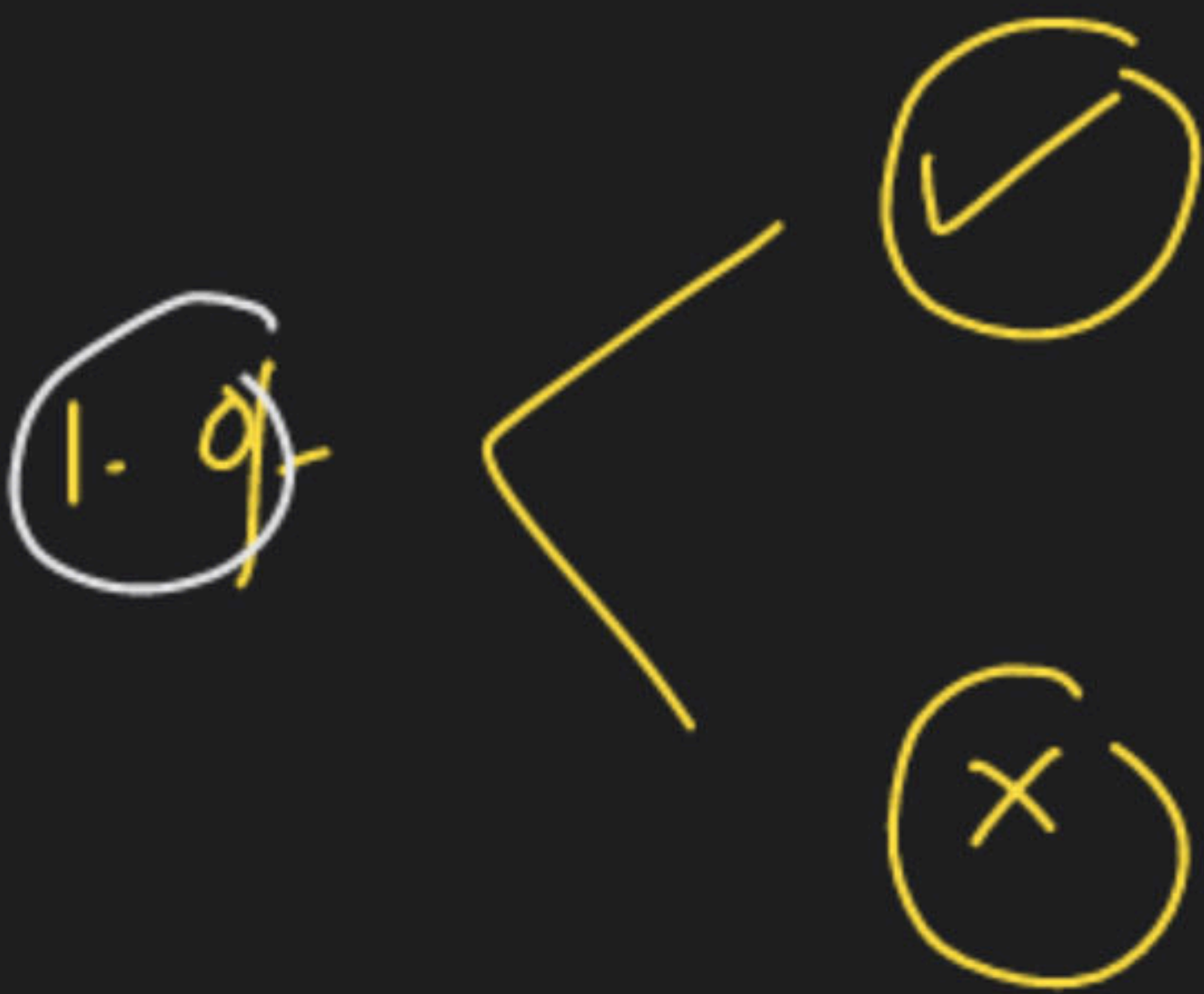
$$\frac{4}{2}$$



① of.

12 < 8 - 0/-  
4, No f.

3 (5)

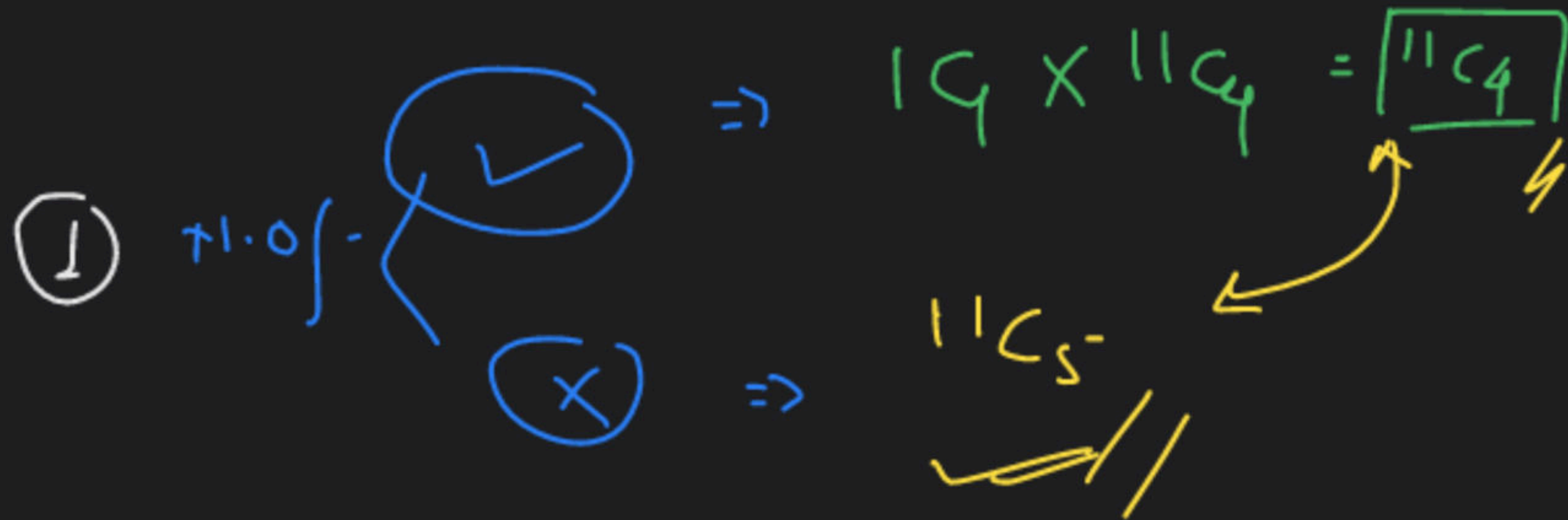


$$\cancel{8} \cancel{4} \perp \boxed{\perp \textcircled{1}} \times \sqrt{\perp \perp \textcircled{4}} = \boxed{\perp \perp \textcircled{4}}$$

$$\boxed{\perp \perp \textcircled{5}} =$$



$12 < \begin{matrix} \text{of. } 2 \\ \text{N. } 04 \end{matrix} > \textcircled{5}$



~~A~~ B | C | D

Boys 4

~~E~~ | F | G

Q. 3

(A) (B) 69

① 7C3.

$\boxed{1C1 \times 6C2} = 6C2 = \boxed{15}$

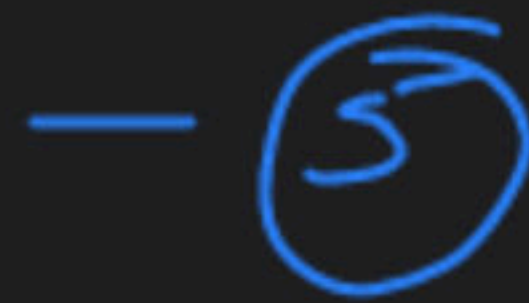
②

(A)  $\boxed{1C1 \times 6C2}$   
(B)

③ 4

(E)  $\boxed{1C1 \times 6C2}$





①  $\boxed{\text{of.} \geq 2}$

or  $\frac{d}{dx} \left( \frac{1}{x^2} \right)$

$$+ \begin{array}{c} < 2 \\ + \\ = 1 \end{array} + |8c_1 \times 4c_4| + \frac{|8c_2 \times 4c_3|}{= e} \checkmark$$

12

8.0f

4 n1.0f

5

At least

2

N.0f.

N.0f. 2  
= 0 + = 1

✓

N.0f. > 2

✗

✓ Total  $4C_2 \times 8C_3 + 4C_3 \times 8C_2 + 4C_4 \times 8C_4$

12C5

- [  $4C_1 \times 8C_4 + 4C_0 \times 8C_5$  ]

~~1 5~~



$$\textcircled{12} \text{C} \textcircled{5} = \underline{\underline{5}}$$

$$\sqrt{\textcircled{5}}$$

$$= \textcircled{30f} \& = 2 \text{ N-of.}$$

$$\textcircled{12} \text{C} \textcircled{5} \times \boxed{\begin{array}{c} 5 \\ 1 \\ 0 \end{array}}$$

$$\begin{array}{c|c} 0 \text{ of} & 4 \text{ N-of.} \\ \hline \hline \textcircled{5} \end{array}$$

$$1. \text{ } 8 \text{C} \textcircled{3} \swarrow \text{X} \quad 4 \text{C} \textcircled{2} \swarrow$$

/ AND  
(of. = 3)

$$2. \quad \underline{\underline{8 \text{C} \textcircled{3}}} + \quad \underline{\underline{4 \text{C} 2}}$$

~~$\underline{\underline{4 \text{C} 2}}$~~



$$(8C_6 \times 10C_5) - [(1C_1 \times 7C_5) \times (1C_1 \times 9C_4)]$$

$M=C$                        $W=5$

**Q.13** Out of 8 men and 10 women a committee consisting of 6 men and 5 women is to be formed. How many such committees can be formed when one particular man A refuses to be a member of the committee is which his boss B's wife is there?

$$8M + 10W = 18$$

$$6M + 5W = 11$$

$$\text{① } 18C_{11}$$

$$\text{② } 8C_6 \times 10C_5$$



	M <sub>AS.B</sub>	M <sub>RA.A</sub>
1.		
2.		
3.		
4.		
	8M   10W.	
	<u>GM   5W</u>	

$$\begin{aligned}
 & \text{M}_{AS.B} \checkmark \\
 & (1C \textcircled{1} \times 9C \textcircled{4}) \times (7C \textcircled{6}) \\
 & \quad \quad \quad W=5 \\
 & \quad \quad \quad \text{M}_{AS.B} \times \\
 & + \frac{(9C \textcircled{5})}{W=5} \times (1C \textcircled{1} \times 7C \textcircled{5}) \\
 & \quad \quad \quad \text{M}_{RA.A} \checkmark \\
 & \quad \quad \quad M = C \\
 & \quad \quad \quad M = \sqrt{6} // \\
 & \quad \quad \quad \text{M}_{AS.B} \times \\
 & \quad \quad \quad 9C \textcircled{5} \times (7C \textcircled{6}) \\
 & \quad \quad \quad (W=5) \quad \quad \quad M=C
 \end{aligned}$$



**Q.15** A three-member committee has to be formed a group of 9 people. How many such distinct committees can be formed?

(A) 27

(B) 72

(C) 81

(D) 84

[GATE 2018 : IIT Guwahati (CE Set – 2)]





$$\left( \begin{array}{c} 69 \times 49 \times 39 \\ \hline 0-5 \quad A-D. \quad \alpha/\beta/\gamma \end{array} \right) \times 3 \frac{1}{2}$$


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$$\boxed{000}$$

$$\Rightarrow 00\textcircled{7}$$



**Q.16** An e-mail password must contain three characters. The password has to contain one numeral from 0 to 9, one upper and one lower case character from the English alphabet. How many distinct passwords are possible?

(A) 6,760

(B) 13,520

(C) ~~40,560~~

(D) 1,05,456

$$10 \times 26 \times 26 \times 3!$$

[GATE 2018 : IIT Guwahati (EE Set – 1)]