# NDA 2 2024

LIVE

# MATHS REVISION

CLASS 6


NAVJYOTI SIR

SSBCrack EXAMS

# 12 August 2024 Live Classes Schedule

| | | |
|---|---|---|
| 8:00AM | 12 AUGUST 2024 DAILY CURRENT AFFAIRS | RUBY MA'AM |
| 9:00AM | 12 AUGUST 2024 DAILY DEFENCE UPDATES | DIVYANSHU SIR |

## SSB INTERVIEW LIVE CLASSES

| | | |
|---|---|---|
| 9:00AM | OVERVIEW OF PIQ & PI | ANURADHA MA'AM |

## NDA 2 2024 LIVE CLASSES

| | | |
|---|---|---|
| 11:00AM | GK - POLITY REVISION - CLASS 3 | RUBY MA'AM |
| 12:00PM | PHYSICS REVISION - CLASS 6 | NAVJYOTI SIR |
| 1:00PM | MATHS REVISION - CLASS 6 | NAVJYOTI SIR |
| 2:00PM | BIOLOGY REVISION - CLASS 6 | SHIVANGI MA'AM |
| 5:30PM | ENGLISH - MATCHING LIST - CLASS 2 | ANURADHA MA'AM |

## CDS 2 2024 LIVE CLASSES

| | | |
|---|---|---|
| 11:00AM | GK - POLITY REVISION - CLASS 2 | RUBY MA'AM |
| 12:00PM | PHYSICS REVISION - CLASS 5 | NAVJYOTI SIR |
| 2:00PM | BIOLOGY REVISION - CLASS 5 | SHIVANGI MA'AM |
| 3:00PM | MATHS REVISION - CLASS 5 | NAVJYOTI SIR |
| 5:30PM | ENGLISH - MATCHING LIST - CLASS 2 | ANURADHA MA'AM |



# REVISION TOPICS :

- 3D Geometry
- Permutations and Combinations

**Q)** Consider the following statements:

1. Equations $ax + by + cz + d = 0$, $a'x + b'y + c'z + d' = 0$ represent a straight line.
2. Equation of the form

$$\frac{x-\alpha}{\ell} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$$

represent a straight line passing through the point $(\alpha, \beta, \gamma)$ and having direction ratio proportional to $l$, m, n.

Which of the statements given above is/are correct ?

(a) 1 only (b) 2 only

(c) Both 1 and 2 (d) Neither 1 nor 2

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Which of the statements given above is/are correct ?

(a) 1 only (b) 2 only

(c) Both 1 and 2 (d) Neither 1 nor 2

**Ans: (c)**

**Q)** If the centre of the sphere $ax^2 + by^2 + cz^2 - 2x + 4y + 2z - 3 = 0$ is $(1/2, -1, -1/2)$, what is the value of b ?

(a) 1 (b) −1

(c) 2 (d) −2

$(\div 2)$

$x^2 + fy^2 + z^2 + 2ux + 2vy + 2wz + c = 0$

$(-u, -v, -w)$ → coordinates of centre

from eqn → $(1, -2, -1)$ $\xrightarrow{\div 2}$ $\left(\frac{1}{2}, -1, -\frac{1}{2}\right)$

**Q)** If the centre of the sphere $ax^2 + by^2 + cz^2 - 2x + 4y + 2z - 3 = 0$ is $(1/2, -1, -1/2)$, what is the value of b ?

(a) 1 (b) $-1$

(c) 2 (d) $-2$

**Ans: (c)**

**Q)** What is the length of the perpendicular from the origin to the plane $ax + by + \sqrt{2ab}\,z = 1$?

(a) $1/(ab)$ (b) $1/(a+b)$

(c) $a+b$ (d) $ab$

Distance of point $(0,0,0)$ from $ax + by + \sqrt{2ab}\,z - 1 = 0$

$$\frac{|a(0) + b(0) + \sqrt{2ab}\,(0) - 1|}{\sqrt{a^2 + b^2 + 2ab}} = \frac{1}{\sqrt{(a+b)^2}} = \frac{1}{a+b}$$

**Q)** What is the length of the perpendicular from the origin to the plane $ax + by + \sqrt{2ab}\, z = 1$?

(a) $1/(ab)$ (b) $1/(a+b)$

(c) $a+b$ (d) $ab$

**Ans: (b)**

**Q)** If O, P are the points (0, 0, 0), (2, 3, –1) respectively, then what is the equation to the plane through P at right angles to OP ?

(a) $2x+3y+z=16$ (b) $2x+3y-z=14$

(c) $2x+3y+z=14$ (d) $2x+3y-z=0$

plane is passing through P, so it should satisfy plane's eqns from options,

(2, 3, -1)

(a) ✗ (c) ✗

(b) ✓ (d) ✗

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(a) $2x+3y+z=16$ (b) $2x+3y-z=14$

(c) $2x+3y+z=14$ (d) $2x+3y-z=0$

**Ans: (b)**

**Q)** Under what condition do $\left\langle \frac{1}{\sqrt{2}}, \frac{1}{2}, K \right\rangle$ represent direction cosines of a line?

(a) $k = \frac{1}{2}$

(b) $k = -\frac{1}{2}$

(c) $k = \pm\frac{1}{2}$

(d) k can take any value

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(b) $k = -\frac{1}{2}$

(c) $k = \pm\frac{1}{2}$

(d) k can take any value

**Ans: (c)**

**Q)** A plane which passes through the point $(3, 2, 0)$ and the line

$$\frac{x-4}{1}=\frac{y-7}{5}=\frac{z-4}{4}$$ is

(a) $x-y+z=1$

(b) $x+y+z=5$

(c) $x+2y-z=1$

(d) $2x-y+z=5$

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$$\frac{x-4}{1}=\frac{y-7}{5}=\frac{z-4}{4}$$ is

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(b) $x+y+z=5$

(c) $x+2y-z=1$

(d) $2x-y+z=5$

**Ans: (a)**

**Q)** The d.r. of normal to the plane through (1, 0, 0), (0, 1, 0) which makes an angle $\pi/4$ with plane $x+y=3$ are

(a) $1, \sqrt{2}, 1$

(b) $1, 1, \sqrt{2}$

(c) $1, 1, 2$

(d) $\sqrt{2}, 1, 1$

**Q)** The d.r. of normal to the plane through (1, 0, 0), (0, 1, 0) which makes an angle $\pi/4$ with plane $x+y=3$ are

(a) $1, \sqrt{2}, 1$

(b) $1, 1, \sqrt{2}$

(c) $1, 1, 2$

(d) $\sqrt{2}, 1, 1$

**Ans: (b)**

**Q)** The shortest distance from the plane $12x+4y+3z=327$ to the sphere $x^2+y^2+z^2+4x-2y-6z=155$ is

(a) 39 (b) 26 (c) $11\frac{4}{13}$ (d) 13

**Q)** The shortest distance from the plane $12x+4y+3z=327$ to the sphere $x^2+y^2+z^2+4x-2y-6z=155$ is

(a) 39 (b) 26 (c) $11\frac{4}{13}$ (d) 13

**Ans: (d)**

**Q)** The two lines $x = ay + b, z = cy + d$ and $x = a`y + b`, z = c`y + d`$ will be perpendicular, if and only if

(a) $aa` + cc` + 1 = 0$

(b) $aa` + bb` + cc` + 1 = 0$

(c) $aa` + bb` + cc` = 0$

(d) $(a + a`)(b + b`) + (c + c`) = 0.$

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(c) $aa` + bb` + cc` = 0$

(d) $(a + a`)(b + b`) + (c + c`) = 0.$

**Ans: (a)**

**Q)** The lines $\frac{x-2}{1}=\frac{y-3}{1}=\frac{z-4}{-k}$ and $\frac{x-1}{k}=\frac{y-4}{1}=\frac{z-5}{1}$ are coplanar if

(a) $k=3$ or $-2$

(b) $k=0$ or $-1$

(c) $k=1$ or $-1$

(d) $k=0$ or $-3$

**Q)** The lines $\frac{x-2}{1}=\frac{y-3}{1}=\frac{z-4}{-k}$ and $\frac{x-1}{k}=\frac{y-4}{1}=\frac{z-5}{1}$ are coplanar if

(a) $k=3$ or $-2$

(b) $k=0$ or $-1$

(c) $k=1$ or $-1$

(d) $k=0$ or $-3$

**Ans: (d)**

**Q)** The radius of the circle in which the sphere

$x^2 + y^2 + z^2 + 2x - 2y - 4z - 19 = 0$ is cut by the plane

$x + 2y + 2z + 7 = 0$ is

(a) 4 (b) 1 (c) 2 (d) 3

**Q)** The radius of the circle in which the sphere $x^2 + y^2 + z^2 + 2x - 2y - 4z - 19 = 0$ is cut by the plane $x + 2y + 2z + 7 = 0$ is

(a) 4 (b) 1 (c) 2 (d) 3

**Ans: (d)**

**Q)** Distance between two parallel planes $2x + y + 2z = 8$ and $4x + 2y + 4z + 5 = 0$ is

(a) $\frac{9}{2}$ (b) $\frac{5}{2}$ (c) $\frac{7}{2}$ (d) $\frac{3}{2}$

**Q)** Distance between two parallel planes $2x + y + 2z = 8$ and $4x + 2y + 4z + 5 = 0$ is

(a) $\frac{9}{2}$ (b) $\frac{5}{2}$ (c) $\frac{7}{2}$ (d) $\frac{3}{2}$

**Ans: (c)**

**Q)** The intersection of the spheres

$x^2 + y^2 + z^2 + 7x - 2y - z = 13$ and

$x^2 + y^2 + z^2 - 3x + 3y + 4z = 8$

is the same as the intersection of one of the sphere and the plane

(a) $2x - y - z = 1$

(b) $x - 2y - z = 1$

(c) $x - y - 2z = 1$

(d) $x - y - z = 1$

**Q)** The intersection of the spheres

$x^2 + y^2 + z^2 + 7x - 2y - z = 13$ and

$x^2 + y^2 + z^2 - 3x + 3y + 4z = 8$

is the same as the intersection of one of the sphere and the plane

(a) $2x - y - z = 1$

(b) $x - 2y - z = 1$

(c) $x - y - 2z = 1$

(d) $x - y - z = 1$

**Ans: (a)**

**Q)** If the angel $\theta$ between the line $\frac{x+1}{1} = \frac{y-1}{2} = \frac{z-2}{2}$ and the plane $2x - y + \sqrt{\lambda}\, z + 4 = 0$ is such that $\sin\theta = \frac{1}{3}$ then the value of $\lambda$ is

(a) $\frac{5}{3}$

(b) $\frac{-3}{5}$

(c) $\frac{3}{4}$

(d) $\frac{-4}{3}$

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(a) $\frac{5}{3}$

(b) $\frac{-3}{5}$

(c) $\frac{3}{4}$

(d) $\frac{-4}{3}$

**Ans: (a)**

**Q)** The angle between the lines $2x = 3y = -z$ and $6x = -y = -4z$ is

(a) $0°$ (b) $90°$

(c) $45°$ (d) $30°$

**Q)** The angle between the lines $2x = 3y = -z$ and $6x = -y = -4z$ is

(a) $0°$ (b) $90°$

(c) $45°$ (d) $30°$

**Ans: (b)**

**Q)** What is the equation of the sphere with unit radius having centre at the origin ?

(a) $x^2+y^2+z^2=0$

(b) $x^2+y^2+z^2=1$

(c) $x^2+y^2+z^2=2$

(d) $x^2+y^2+z^2=3$

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(a) $x^2+y^2+z^2=0$

(b) $x^2+y^2+z^2=1$

(c) $x^2+y^2+z^2=2$

(d) $x^2+y^2+z^2=3$

**Ans: (b)**

**Q)** What is the sum of the squares of direction cosines of $x$-axis ?

(a) 0

(b) $\frac{1}{3}$

(c) 1

(d) 3

**Q)** What is the sum of the squares of direction cosines of $x$-axis ?

(a) 0

(b) $\frac{1}{3}$

(c) 1

(d) 3

**Ans: (c)**

**Q)** What is the distance of the line $2x + y + 2z = 3$ from the origin ?

(a) 1 units

(b) 1.5 units

(c) 2 units

(d) 2.5 units

**Q)** What is the distance of the line $2x + y + 2z = 3$ from the origin ?

(a) 1 units
(b) 1.5 units
(c) 2 units
(d) 2.5 units

**Ans: (a)**

**Q)** What is the angle between the lines $\frac{x-2}{1}=\frac{y+1}{-2}=\frac{z+2}{1}$ and $\frac{x-1}{1}=\frac{2y+3}{3}=\frac{z+5}{2}$ ?

(a) $\frac{\pi}{2}$

(b) $\frac{\pi}{3}$

(c) $\frac{\pi}{6}$

(d) None of the above

**Q)** What is the angle between the lines $\frac{x-2}{1}=\frac{y+1}{-2}=\frac{z+2}{1}$ and $\frac{x-1}{1}=\frac{2y+3}{3}=\frac{z+5}{2}$ ?

(a) $\frac{\pi}{2}$

(b) $\frac{\pi}{3}$

(c) $\frac{\pi}{6}$

(d) None of the above

**Ans: (a)**

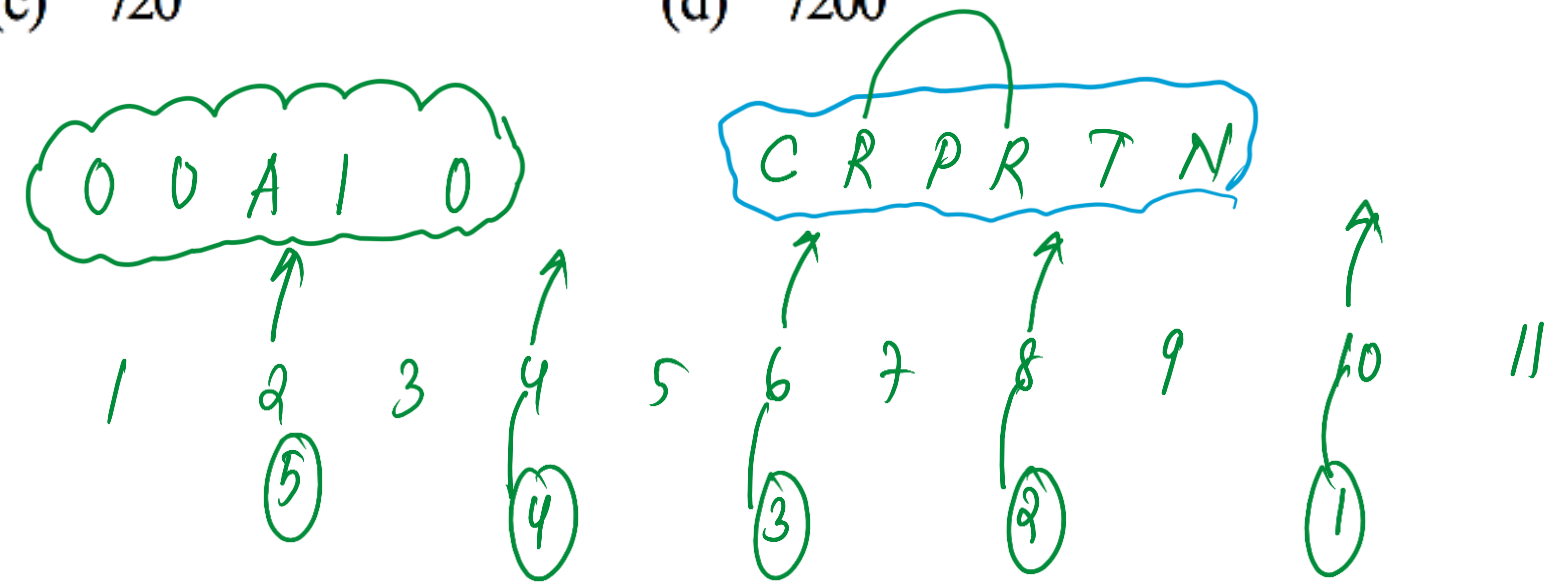
# PERMUTATIONS AND COMBINATIONS

**Q)** In how many ways can the letters of the word CORPORATION be arranged so that vowels always occupy even places ?

(a) 120 (b) 2700

(c) 720 (d) 7200

11 places




$\frac{5!}{3!} \times \frac{6!}{2!}$

$5 \times 4 \times (6 \times 5 \times 4 \times 3)$

$= 20 \times 30 \times 12$

$= 7200$

**Q)** In how many ways can the letters of the word CORPORATION be arranged so that vowels always occupy even places ?

(a) 120
(b) 2700
(c) 720
(d) 7200

**Ans: (d)**

**Q)** If all permutations of the letters of the word 'LAGAN' are arranged as in dictionary, then what is the rank of 'NAAGL'?

(a) 48th word (b) 49th word

(c) 50th word (d) 51st word

(A) AAGLN → $4! = 24$

(G) AALN → $\frac{4!}{2!} = 12$

(L) AAGN → $\frac{4!}{2!} = 12$

$24 + 12 + 12 = 48$ words

(N) AAGL → 49th word

**Q)** If all permutations of the letters of the word 'LAGAN' are arranged as in dictionary, then what is the rank of 'NAAGL'?

(a) 48th word
(b) 49th word
(c) 50th word
(d) 51st word

**Ans: (b)**

**Q)** What is $\dfrac{(n+2)!+(n+1)\,(n-1)!}{(n+1)\,(n-1)!}$ equal to ?

(a) 1
(b) Always an odd integer
(c) A perfect square
(d) None of the above

$$\frac{(n+2)(n+1)! + (n+1)(n-1)!}{(n+1)(n-1)!}$$

$$1 + \frac{(n+2)(n+1)\,n\,(n-1)!}{(n+1)(n-1)!}$$

$$1 + (n+2)(n)$$

$$= n^2 + 2n + 1$$

$$= (n+1)^2$$

perfect square

$7! = 7 \times 6!$

$n! = n \times (n-1)!$

**Q)** What is $\frac{(n+2)!+(n+1)\,(n-1)!}{(n+1)\,(n-1)!}$ equal to ?

(a) 1
(b) Always an odd integer
(c) A perfect square
(d) None of the above

**Ans: (c)**

**Q)** A group consists of 5 men and 5 women. If the number of different five-person committees containing k men and (5–k) women is 100, what is the value of k ?

(a) 2 only (b) 3 only

(c) 2 or 3 (d) 4

5 M 5 W

$${}^5C_k \times {}^5C_{5-k} = 100$$

$$\frac{5!}{(5-k)!\,k!} \times \frac{5!}{k!\,(5-k)!} = 100$$

$$\left(\frac{5!}{(5-k)!\,k!}\right)^2 = 100$$

$$\frac{5!}{(5-k)!\,k!} = 10$$

$${}^5C_k = 10$$

$${}^nC_r = \frac{n!}{(n-r)!\,r!}$$

$${}^nC_r = {}^nC_{n-r}$$

**Q)** A group consists of 5 men and 5 women. If the number of different five-person committees containing k men and (5–k) women is 100, what is the value of k ?

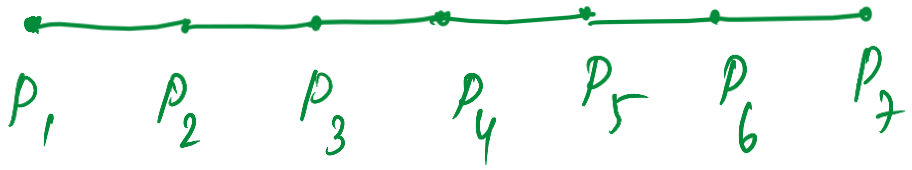
(a) 2 only
(b) 3 only
(c) 2 or 3
(d) 4

**Ans: (c)**

**Q)** If 7 points out of 12 are in the same straight line, then what is the number of triangles formed ?

(a) 84 (b) 175

(c) 185 (d) 201




$$\frac{5\times\cancel{4}^{2}}{\cancel{2}} + 7\times\frac{5\times\cancel{4}^{2}}{\cancel{2}} + \frac{7\times\cancel{6}^{3}}{\cancel{2}}\times 5$$

$$= 10 + 70 + (21\times 5)$$

$$= 80 + 105 = \boxed{185}\ \checkmark$$

$$\left.\begin{matrix}\\\\\\\end{matrix}\right\} {}^{5}C_{3} + {}^{7}C_{1}\times{}^{5}C_{2} + {}^{7}C_{2}\times{}^{5}C_{1}$$

**Q)** If 7 points out of 12 are in the same straight line, then what is the number of triangles formed ?

(a) 84 (b) 175

(c) 185 (d) 201

**Ans: (c)**

**Q)** How many different words can be formed by jumbling the letters in the word MISSISSIPPI in which no two S are adjacent?

(a) $8.{}^{6}C_{4}.{}^{7}C_{4}$

(b) $6.7.{}^{8}C_{4}$

(c) $6.8.{}^{7}C_{4}.$

(d) $7.{}^{6}C_{4}.{}^{8}C_{4}$

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(a) $8.{}^{6}C_{4}.{}^{7}C_{4}$

(b) $6.7.{}^{8}C_{4}$

(c) $6.8.{}^{7}C_{4}.$

(d) $7.{}^{6}C_{4}.{}^{8}C_{4}$

**Ans: (d)**

**Q)** What is the total number of combination of $n$ different things taken 1, 2, 3, ...., n at a time?

(a) $2^{n+1}$

(b) $2^{2n+1}$

(c) $2^{n-1}$

(d) $2^{n}-1$

**Q)** What is the total number of combination of $n$ different things taken 1, 2, 3, ...., n at a time?

(a) $2^{n+1}$

(b) $2^{2n+1}$

(c) $2^{n-1}$

(d) $2^{n}-1$

**Ans: (d)**

**Q)** What is the value of $n$, if $P(15, n-1) : P(16, n-2) = 3 : 4$?

(a) 10 (b) 12

(c) 14 (d) 15

**Q)** What is the value of $n$, if $P(15, n-1) : P(16, n-2) = 3 : 4$?

(a) 10 (b) 12

(c) 14 (d) 15

**Ans: (c)**

**Q)** If $a_n = n(n!)$, then what is $a_1 + a_2 + a_3 + \ldots + a_{10}$ equal to?

(a) $10! - 1$ (b) $11! + 1$

(c) $10! + 1$ (d) $11! - 1$

**Q)** If $a_n = n(n!)$, then what is $a_1 + a_2 + a_3 + \ldots + a_{10}$ equal to?

(a) $10! - 1$ (b) $11! + 1$

(c) $10! + 1$ (d) $11! - 1$

**Ans: (d)**

**Q)** How many distinct matrices exist with all four entries taken from {1, 2}?

(a) 16 (b) 24

(c) 32 (d) 48

**Q)** How many distinct matrices exist with all four entries taken from {1, 2}?

(a) 16 (b) 24

(c) 32 (d) 48

**Ans: (a)**

**Q)** What is the number of three-digit odd numbers formed by using the digits 1, 2, 3, 4, 5, 6 if repetition of digits is allowed?

(a) 60
(b) 108
(c) 120
(d) 216

**Q)** What is the number of three-digit odd numbers formed by using the digits 1, 2, 3, 4, 5, 6 if repetition of digits is allowed?

(a) 60
(b) 108
(c) 120
(d) 216

**Ans: (b)**

**Directions**

Consider the letters of the word 'Krishna'.

**Q)** How many words can be formed the vowels are not separated?

(a) 1250
(b) 550
(c) 1440
(d) None of these

**Q)** How many words can be formed the vowels are not separated?

(a) 1250
(b) 550
(c) 1440
(d) None of these

**Ans: (c)**

**Q)** How many words can be formed the vowels may occupy only odd places?

(a) 100 (b) 720
(c) 700 (d) 4

**Q)** How many words can be formed the vowels may occupy only odd places?

(a) 100 (b) 720
(c) 700 (d) 4

**Ans: (b)**

**Q)** How many words can be formed begin with $s$ and end in $k$ ?

(a) 150
(b) 70
(c) 200
(d) 120

**Q)** How many words can be formed begin with $s$ and end in $k$ ?

(a) 150
(b) 70
(c) 200
(d) 120

**Ans: (d)**

**Q)** What is the number of different messages that can be represented by three 0's and two 1's?

(a) 10 (b) 9

(c) 8 (d) 7

**Q)** What is the number of different messages that can be represented by three 0's and two 1's?

(a) 10 (b) 9

(c) 8 (d) 7

**Ans: (a)**

**Q)** From 7 men and 4 women a committee of 6 is to be formed such that the committee contains at least two women. What is the nubmer of ways to do this?

(a) 210
(b) 371
(c) 462
(d) 5544

**Q)** From 7 men and 4 women a committee of 6 is to be formed such that the committee contains at least two women. What is the nubmer of ways to do this?

(a) 210 (b) 371

(c) 462 (d) 5544

**Ans: (b)**

**Q)** A polygon has 44 diagonals. The number of its sides is

(a) 11
(b) 10
(c) 8
(d) 7

**Q)** A polygon has 44 diagonals. The number of its sides is

(a) 11
(b) 10
(c) 8
(d) 7

**Ans: (a)**

**Q)** If the letters of the word SACHIN are arranged in all possible ways and these words are written out as in dictionary, then the word SACHIN appears at serial number

(a) 601 (b) 600 (c) 603 (d) 602

**Q)** If the letters of the word SACHIN are arranged in all possible ways and these words are written out as in dictionary, then the word SACHIN appears at serial number

(a) 601 (b) 600 (c) 603 (d) 602

**Ans: (a)**

**Q)** A man has 7 friends. In how many ways he can invite one or more of them for a tea party?

(a) 128
(b) 256
(c) 127
(d) 130

**Q)** A man has 7 friends. In how many ways he can invite one or more of them for a tea party?

(a) 128 (b) 256

(c) 127 (d) 130

**Ans: (c)**

# REVISION TOPICS : (13/08/24)

- Binomial Theorem
- Sequences and Series

# NDA 2 2024

LIVE

# MATHS REVISION

CLASS 7


NAVJYOTI SIR

SSBCrack EXAMS