13 August 2024 Live Classes Schedule

Time	Topic	Instructor
8:00AM	13 AUGUST 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	13 AUGUST 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

Time	Topic	Instructor
9:00AM	OVERVIEW OF GROUP TASKS	ANURADHA MA'AM

NDA 2 2024 LIVE CLASSES

Time	Topic	Instructor
11:00AM	GK – GEOGRAPHY REVISION – CLASS 1	RUBY MA'AM
12:00PM	PHYSICS REVISION – CLASS 7	NAVJYOTI SIR
1:00PM	MATHS REVISION – CLASS 7	NAVJYOTI SIR
2:00PM	BIOLOGY REVISION – CLASS 7	SHIVANGI MA'AM
5:30PM	ENGLISH – REVISION – CLASS 3	ANURADHA MA'AM

CDS 2 2024 LIVE CLASSES

Time	Topic	Instructor
11:00AM	GK – GEOGRAPHY REVISION – CLASS 1	RUBY MA'AM
12:00PM	PHYSICS REVISION – CLASS 7	NAVJYOTI SIR
2:00PM	BIOLOGY REVISION – CLASS 7	SHIVANGI MA'AM
3:00PM	MATHS REVISION – CLASS 7	NAVJYOTI SIR
5:30PM	ENGLISH – REVISION – CLASS 3	ANURADHA MA'AM

SSBCrack EXAMS

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REVISION TOPICS :

- **Binomial Theorem**
- **Sequences and Series**

If $(1 + ax)^n = 1 + 8x + 24x^2 + \ldots$, then the value of a and n, is

(a) 2, 4   (b) 2, 3   (c) 3, 6   (d) 1, 2

$$(1+x)^n = 1 + nx + {}^nC_2 x^2 + {}^nC_3 x^3 + \cdots$$

$$(1+ax)^n = 1 + n(ax) + {}^nC_2(ax)^2 + {}^nC_3(ax)^3 + \cdots = 1 + 8x + 24x^2 + \cdots$$

$$\left(\underline{na = 8}\right) \qquad {}^nC_2 \, a^2 = 24 \Bigg\} \text{ comparing coefficients of } x \ \& \ x^2,$$

If $(1+ax)^n = 1 + 8x + 24x^2 + \dots$, then the value of a and n, is

(a) 2, 4   (b) 2, 3   (c) 3, 6   (d) 1, 2

ANSWER : (a)

The coefficient of x^{-7} in the expansion of $\left(ax - \dfrac{1}{bx^2}\right)^{11}$ will be $=$

(a) $\dfrac{462\,a^6}{b^6}$

(b) $\dfrac{462\,a^5}{b^6}$ ✓

(c) $\dfrac{462\,a^3}{b^7}$

(d) None of these

$11 - 3r = -7$

$3r = 18$

$\underline{r = 6}$

$$^{11}C_6\,(a)^{11-6}\left(\dfrac{1}{b}\right)^6$$

$\left(ax - \dfrac{1}{bx^2}\right)^{11}$

General Term,

$T_{r+1} = {}^{11}C_r\,(ax)^{11-r}\left(\dfrac{1}{bx^2}\right)^r$

$x^{11-r-2r}$

x^{11-3r} ✓

$$\left(\dfrac{11 \times 10 \times 9 \times 8 \times 7}{5 \times 4 \times 3 \times 2}\right)a^5 b^{-6}$$

$= 42 \times 11 \,\dfrac{a^5}{b^6} = \dfrac{462\,a^5}{b^6}$

The coefficient of x^{-7} in the expansion of $\left(ax - \dfrac{1}{bx^2}\right)^{11}$ will be

(a) $\dfrac{462\,a^6}{b^6}$

(b) $\dfrac{462\,a^5}{b^6}$

(c) $\dfrac{462\,a^3}{b^7}$

(d) None of these

ANSWER : (b)

The coefficient of the middle term in the expansion of $(2 + 3x)^4$ is

(a) 6   (b) 5!   (c) 8!   (d) 216

If $n = 4$,

no. of Terms $= (4 + 1) = 5$

$\left(\frac{5+1}{2}\right)^{th}$ — middle Term

$T_{r+1} = {}^nC_r \, a^{n-r} b^r$

$T_3 = {}^4C_2 \, (2)^2 (3x)^2$

$= \frac{4 \times 3}{2} \times 4 \times 9$

$= 24 \times 9$

$= 216$

The coefficient of the middle term in the expansion of $(2 + 3x)^4$ is

(a) 6   (b) 5!   (c) 8!   (d) 216

ANSWER : (d)

If p and q be positive , then the coefficients of x^p and

x^q in the expansion of $(1 + x)^{p + q}$ will be

(a) equal

(b) equal in magnitude but opposite in sign

(c) reciprocal to each other

(d) None of the above

$$(1+x)^{p+q} = 1 + (p+q)x + {}^{p+q}C_2 \, x^2 + {}^{p+q}C_3 \, x^3 + \cdots$$

$$x^p \longrightarrow {}^{p+q}C_p$$

$$x^q \longrightarrow {}^{p+q}C_q$$

equal

$${}^n C_r = {}^n C_{n-r}$$

$${}^{11} C_8 = {}^{11} C_3$$

If p and q be positive , then the coefficients of x^p and x^q in the expansion of $(1 + x)^{p+q}$ will be

(a) equal
(b) equal in magnitude but opposite in sign
(c) reciprocal to each other
(d) None of the above

ANSWER : (a)

The term independent of x in the expansion of $\left(\sqrt{\dfrac{x}{3}} + \dfrac{3}{2x^2}\right)^{10}$ will be

(a) 3/2   (b) 5/4

(c) 5/2   (d) None of these

The term independent of x in the expansion of $\left(\sqrt{\dfrac{x}{3}} + \dfrac{3}{2x^2}\right)^{10}$ will be

ANSWER : (b)

(a) 3/2

(b) 5/4

(c) 5/2

(d) None of these

What is the coefficient of x^4 in the expansion of $\left(\dfrac{1-x}{1+x}\right)^2$?

(NDA 2010 II)

(a) -16 (b) 16

(c) 8 (d) -8

What is the coefficient of x^4 in the expansion of $\left(\dfrac{1-x}{1+x}\right)^2$?

(NDA 2010 II)

(a) -16

(b) 16

(c) 8

(d) -8

ANSWER : (b)

For all $n \in N$, $2^{4n} - 15n - 1$ is divisible by)

(NDA 2011 I)

(a) 125

(b) 225

(c) 450

(d) None of these

For all $n \in N$, $2^{4n} - 15n - 1$ is divisible by)

ANSWER : (b)

(NDA 2011 I)

(a) 125

(b) 225

(c) 450

(d) None of these

What is the number of terms in the expansion of $(a + b + c)^n$, $n \in N$?

(a) $n + 1$

(b) $n + 2$

(c) $n(n + 1)$

(d) $\dfrac{(n + 1)(n + 2)}{2}$

What is the number of terms in the expansion of $(a + b + c)^n$, $n \in N$?

(NDA 2010 II)

(a) $n + 1$

(b) $n + 2$

(c) $n(n + 1)$

(d) $\dfrac{(n + 1)(n + 2)}{2}$

ANSWER : (d)

If the coefficients of 5th , 6th and 7th terms in the expansion of $(1 + x)^n$ be in AP, then the value of n is

(a) 7 only
(b) 14 only
(c) 7 or 14
(d) None of these

If the coefficients of 5th , 6th and 7th terms in the expansion of $(1 + x)^n$ be in AP, then the value of n is

(a) 7 only

(b) 14 only

(c) 7 or 14

(d) None of these

ANSWER : (c)

The correct matching of List I from List II is

List I	List II
A. $(1-x)^n$	1. $\dfrac{x}{x+1}$
B. $(1+x)^{-n}$	2. $1-nx+\dfrac{n(n+1)}{2!}\cdot x^2 -\ldots,$ if $\lvert x\rvert<1$
C. If $x>1$, then $1+\dfrac{1}{x}+\dfrac{1}{x^2}+\ldots$ is	3. $1+nx+\dfrac{n(n+1)}{2!}\cdot x^2 +\ldots,$ if $\lvert x\rvert<1$
D. If $\lvert x\rvert>1$, then $1-\dfrac{2}{x^2}+\dfrac{3}{x^4}-\dfrac{4}{x^6}+\ldots$ is	4. $\dfrac{x}{x-1}$
	5. $\dfrac{x^4}{(x^2+1)^2}$
	6. $\dfrac{x^4}{(x^2-1)^2}$

Codes

	A	B	C	D			A	B	C	D
(a)	1	3	4	5		(b)	2	3	4	1
(c)	3	2	4	5		(d)	2	3	1	5

ANSWER : (c)

The correct matching of List I from List II is

List I	List II
A. $(1-x)^n$	1. $\dfrac{x}{x+1}$
B. $(1+x)^{-n}$	2. $1-nx+\dfrac{n(n+1)}{2!}\cdot x^2-\ldots,$ if $|x|<1$
C. If $x>1$, then $1+\dfrac{1}{x}+\dfrac{1}{x^2}+\ldots$ is	3. $1+nx+\dfrac{n(n+1)}{2!}\cdot x^2+\ldots,$ if $|x|<1$
D. If $|x|>1$, then $1-\dfrac{2}{x^2}+\dfrac{3}{x^4}-\dfrac{4}{x^6}+\ldots$ is	4. $\dfrac{x}{x-1}$
	5. $\dfrac{x^4}{(x^2+1)^2}$
	6. $\dfrac{x^4}{(x^2-1)^2}$

Codes

	A	B	C	D			A	B	C	D
(a)	1	3	4	5		(b)	2	3	4	1
(c)	3	2	4	5		(d)	2	3	1	5

Q) If b_1, b_2, b_3 are three consecutive terms of an arithmetic progression with common difference $\underline{d > 0}$, then what is the value of d for which $b_3^2 = b_2 b_3 + b_1 d + 2$?

(a) $\dfrac{1}{2}$

(b) 0

(c) 1

(d) 2

$$\left. \begin{array}{l} b_1 = a - d \\[4pt] b_2 = a \\[4pt] b_3 = a + d \end{array} \right\} \text{3 consecutive terms}$$

$(a+d)^2 = (a)(a+d) + (a-d)d + 2$

$a^2 + 2ad + d^2 = a^2 + ad + ad - d^2 + 2$

$2d^2 = 2$

$d^2 = 1$

$d^2 = 1 \Rightarrow d = 1, -1$

$(As \ d > 0)$

$So, \ d = 1$

Q) If b_1, b_2, b_3 are three consecutive terms of an arithmetic progression with common difference $d > 0$, then what is the value of d for which $b_3^2 = b_2 b_3 + b_1 d + 2$?

(a) $\dfrac{1}{2}$

(b) 0

(c) 1

(d) 2

Ans: (c)

Q) If 1, x, y, z, 16 are in geometric progression, then what is the value of $x + y + z$?

(a) 8

(b) 12

(c) 14

(d) 16

$a = 1$ ✓

$x = ar = 2$

$ar^4 = 16$

$y = ar^2 = 4$

$z = ar^3 = 8$

$r^4 = \dfrac{16}{a} = \dfrac{16}{1} = 16$ $+$

$r = 2$ ✓

$2 + 4 + 8 = \boxed{14}$

Q) If 1, x, y, z, 16 are in geometric progression, then what is the
value of x + y + z ?

(a) 8

(b) 12

(c) 14

(d) 16

Ans: (c)

Q) What is the value of $9^{1/3} \cdot 9^{1/9} \cdot 9^{1/27} \ldots\ldots \infty$?

   (a) 9   (b) 3

   (c) $9^{1/3}$ (d) 1

$9^{\frac{1}{3}} \cdot 9^{\frac{1}{9}} \cdot 9^{\frac{1}{27}} \ldots \infty$

$$9^{\frac{1/3}{1-1/3}} = 9^{\frac{1}{2}} = \boxed{3}$$

$$9^{\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \ldots \infty}$$

$\frac{1}{3}, \frac{1}{9}, \frac{1}{27} \ldots \infty$ forms an infinite GP,

$a = \frac{1}{3}, \quad r = \frac{1}{3}$ $\Bigg| \quad S_\infty = \frac{a}{1-r} \left(|r| < 1 \right)$

Q) What is the value of $9^{1/3} \cdot 9^{1/19} \cdot 9^{1/27} \ldots\ldots \infty$?

(a) 9

(b) 3

(c) $9^{1/3}$

(d) 1

Ans: (b)

Q) Which one of the following is correct?

If $\dfrac{1}{b-c} + \dfrac{1}{b-a} = \dfrac{1}{a} + \dfrac{1}{c}$, then a, b, c are in

(a) AP

(b) HP

(c) GP

(d) None of these ✓

$\dfrac{1}{b-c} + \dfrac{1}{b-a} = \dfrac{1}{a} + \dfrac{1}{c}$

$b = 6$; $a = 4$; $c = 2$

$AP \longrightarrow 2b = a+c$ ✗

$HP \rightarrow \dfrac{2}{b} = \dfrac{1}{a} + \dfrac{1}{c}$ | $LHS = \frac{1}{3}$ | $\begin{cases} b = \dfrac{2ac}{a+c} \end{cases}$

$RHS = 3/4$

$GP \Rightarrow b^2 = 36$ $ac = 8$ ✗

Q) Which one of the following is correct?

If $\dfrac{1}{b-c}+\dfrac{1}{b-a}=\dfrac{1}{a}+\dfrac{1}{c}$, then a, b, c are in

(a) AP

(b) HP

(c) GP

(d) None of these

Ans: (d)

Q) What is sum to the 100 terms of the series
$9 + 99 + 999 + \ldots$?

(a) $\dfrac{10}{9}\left(10^{100} - 1\right) - 100$ (b) $\dfrac{10}{9}\left(10^{99} - 1\right) - 100$

(c) $100\left(100^{10} - 1\right)$ (d) $\dfrac{9}{100}\left(10^{100} - 1\right)$

$\left(10-1\right) + \left(100-1\right) + \left(1000-1\right) + \ldots$

$\left(10-1\right) + \left(10^2-1\right) + \left(10^3-1\right) + \ldots \text{ (100 terms)}$

$\left(10 + 10^2 + \ldots 10^{100}\right) - \left(1+1+\ldots \text{ (100 times)}\right)$

$\dfrac{10\left((10)^{100} - 1\right)}{10 - 1} - 100$

$\dfrac{10}{9}\left((10)^{100} - 1\right) - 100$

for $r > 1$,

$\left(S_n = \dfrac{a\left(r^n - 1\right)}{r - 1}\right)$

Q) What is sum to the 100 terms of the series
$9 + 99 + 999 + ...$?

(a) $\dfrac{10}{9}\left(10^{100} - 1\right) - 100$

(b) $\dfrac{10}{9}\left(10^{99} - 1\right) - 100$

(c) $100\left(100^{10} - 1\right)$

(d) $\dfrac{9}{100}\left(10^{100} - 1\right)$

Ans: (a)

Q) If A, B and C are in AP and $b : c = \sqrt{3} : \sqrt{2}$, then what is the value of sin C?

(a) 1

(b) $\dfrac{1}{\sqrt{3}}$

(c) $\sqrt{3}$

(d) $\dfrac{1}{\sqrt{2}}$ ✓

$$2B = A + C$$

$$A + B + C = 180^\circ$$

$$B = 180^\circ - (A+C)$$

$$B = 180^\circ - 2B$$

$$3B = 180^\circ$$

$$B = 60^\circ$$

$$\frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{\sqrt{3}}{\sqrt{2}} = \frac{\sin 60^\circ}{\sin C}$$

$$\frac{b}{c} = \frac{\sin B}{\sin C}$$

$$\frac{1}{\sin C} = \sqrt{2} \implies \left(\sin C = \frac{1}{\sqrt{2}} \right)$$

Q) If A, B and C are in AP and $b : c = \sqrt{3} : \sqrt{2}$, then what is the value of $\sin C$?

(a) 1

(b) $\dfrac{1}{\sqrt{3}}$

(c) $\sqrt{3}$

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

Ans: (d)

Q) If the AM and GM between two number are in the ratio $m : n$, then what is the ratio between the two numbers?

(a) $\dfrac{m + \sqrt{m^2 - n^2}}{m - \sqrt{m^2 - n^2}}$

(b) $\dfrac{m + n}{m - n}$

(c) $\dfrac{m^2 - n^2}{m^2 + n^2}$

(d) $\dfrac{m^2 + n^2 - mn}{m^2 + n^2 + mn}$

Q) If the AM and GM between two number are in the ratio $m : n$, then what is the ratio between the two numbers?

(a) $\dfrac{m + \sqrt{m^2 - n^2}}{m - \sqrt{m^2 - n^2}}$

(b) $\dfrac{m + n}{m - n}$

(c) $\dfrac{m^2 - n^2}{m^2 + n^2}$

(d) $\dfrac{m^2 + n^2 - mn}{m^2 + n^2 + mn}$

Ans: (a)

Q) The arithmetic mean of two numbers exceeds their geometric mean by 2 and the geometric mean exceeds their harmonic mean by 1.6. What are the two numbers?

(a) 16, 4

(b) 81, 9

(c) 256, 16

(d) 625, 25

Q) The arithmetic mean of two numbers exceeds their geometric mean by 2 and the geometric mean exceeds their harmonic mean by 1.6. What are the two numbers?

(a) 16, 4

(b) 81, 9

(c) 256, 16

(d) 625, 25

Ans: (a)

Q) What is the sum of $\sqrt{3} + \dfrac{1}{\sqrt{3}} + \dfrac{1}{3\sqrt{3}} + \ldots \ldots ?$

(a) $\dfrac{\sqrt{3}}{2}$

(b) $\dfrac{3\sqrt{3}}{2}$

(c) $\dfrac{2\sqrt{3}}{3}$

(d) $\sqrt{3}$

Q) What is the sum of $\sqrt{3} + \dfrac{1}{\sqrt{3}} + \dfrac{1}{3\sqrt{3}} + \ldots ?$

(a) $\dfrac{\sqrt{3}}{2}$

(b) $\dfrac{3\sqrt{3}}{2}$

(c) $\dfrac{2\sqrt{3}}{3}$

(d) $\sqrt{3}$

Ans: (b)

Q) If $\dfrac{1}{b-a}+\dfrac{1}{b-c}=\dfrac{1}{a}+\dfrac{1}{c}$, then a, b, c are in

(a) AP

(b) GP

(c) HP

(d) None of these

Q) If $\dfrac{1}{b-a} + \dfrac{1}{b-c} = \dfrac{1}{a} + \dfrac{1}{c}$, then a, b, c are in

(a) AP

(b) GP

(c) HP

(d) None of these

Ans: (c)

Q) Which one of the following options is correct?

   (a) $\sin^2 30°$, $\sin^2 45°$, $\sin^2 60°$ are in GP

   (b) $\cos^2 30°$, $\cos^2 45°$, $\cos^2 60°$ are in GP

   (c) $\cot^2 30°$, $\cot^2 45°$, $\cot^2 60°$ are in GP

   (d) $\tan^2 30°$, $\tan^2 45°$, $\tan^2 60°$ are in GP

Q) Which one of the following options is correct?

(a) $\sin^2 30°$, $\sin^2 45°$, $\sin^2 60°$ are in GP

(b) $\cos^2 30°$, $\cos^2 45°$, $\cos^2 60°$ are in GP

(c) $\cot^2 30°$, $\cot^2 45°$, $\cot^2 60°$ are in GP

(d) $\tan^2 30°$, $\tan^2 45°$, $\tan^2 60°$ are in GP

Ans: (d)

Q) What is the 10th common term between the series
$2+6+10+....$ and $1+6+11+....$?

(a) 180   (b) 186

(c) 196   (d) 206

Q) What is the 10th common term between the series

$2 + 6 + 10 + \ldots$ and $1 + 6 + 11 + \ldots$?

(a) 180

(b) 186

(c) 196

(d) 206

Ans: (b)

Q) If the AM and HM of two numbers are 27 and 12 respectively, then what is their GM equal to?

(a) 12

(b) 18

(c) 24

(d) 27

Q) If the AM and HM of two numbers are 27 and 12 respectively, then what is their GM equal to?

(a) 12

(b) 18

(c) 24

(d) 27

Ans: (b)

Q) Which term of the sequence $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, \dots$ is the first negative term?

(a) 27th

(b) 28th

(c) 29th

(d) No such term exists

Q) Which term of the sequence $20,\ 19\dfrac{1}{4}, 18\dfrac{1}{2}, 17\dfrac{3}{4}, \ldots$ is the first negative term?

(a) 27th

(b) 28th

(c) 29th

(d) No such term exists

Ans: (b)

Q) If the sequence $\{S_n\}$ is a geometric progression and $S_2 \, S_{11} = S_p \, S_8$, then what is the value of p?

(a)   1

(b)   3

(c)   5

(d)   cannot be determined

Q) If the sequence $\{S_n\}$ is a geometric progression and $S_2 S_{11} = S_p S_8$, then what is the value of p?

(a) 1

(b) 3

(c) 5

(d) cannot be determined

Ans: (c)

DIRECTIONS : *For the next two (02) Questions that follow:*

The sum of first 10 terms and 20 terms of an AP are 120 and 440 respectively.

Q) What is its first term?

   (a)   2   (b)   3

   (c)   4   (d)   5

Q) What is its first term?

(a) 2
(b) 3
(c) 4
(d) 5

Ans: (b)

Q) What is the common difference?

   (a)   1   (b)   2

   (c)   3   (d)   4

Q) What is the common difference?

   (a)   1   (b) 2

   (c)   3   (d) 4

Ans: (b)

Q) What is the number of diagonals which can be drawn by joining the angular points of a polygon of 100 sides?

(a) 4850

(b) 4950

(c) 5000

(d) 10000

Q) What is the number of diagonals which can be drawn by joining the angular points of a polygon of 100 sides?

(a)   4850

(b)   4950

(c)   5000

(d)   10000

Ans: (a)

Q) What is the geometric mean of the sequence $1, 2, 4, 8, \ldots$ 2^n ?

(a) $2^{n/2}$

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

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

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

Q) What is the geometric mean of the sequence $1, 2, 4, 8, \ldots$ 2^n ?

(a) $2^{n/2}$

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

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

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

Ans: (a)

Q) The harmonic mean H of two numbers is 4 and the arithmetic mean A and geometric mean G satisfy the equation $2A + G^2 = 27$. The two numbers are

(a)   6, 3

(b)   9, 5

(c)   12, 7

(d)   3, 1

Q) The harmonic mean H of two numbers is 4 and the arithmetic mean A and geometric mean G satisfy the equation $2A + G^2 = 27$. The two numbers are

(a)   6, 3

(b)   9, 5

(c)   12, 7

(d)   3, 1

Ans: (a)

REVISION TOPICS :

(14/08/24)

- **Sequence and Series**
- **Permutations and Combinations**