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CTQ - 2023

CTQ : Concept Through Questions

Year : 2023

Topic : Progression I

1. $x^2, x^4, x^8, x^{16}, \dots$ to ∞ is equal to
 - (a) 0
 - (b) 1
 - (c) x
 - (d) ∞
2. If $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in A.P., then
 - (a) a, b, c are in AP
 - (b) a^2, b^2, c^2 are in AP
 - (c) $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in AP
 - (d) None of these
3. If a,b,c are in A.P. as well as in G.P. then
 - (a) $a = b \neq c$
 - (b) $a \neq b = c$
 - (c) $a \neq b \neq c$
 - (d) $a = b = c$
4. If $A_1, A_2; G_1, G_2$ and H_1, H_2 be two AM's, GM's and HM's between two quantities, then the value of $\frac{G_1 G_2}{H_1 H_2}$ is
 - (a) $\frac{A_1 + A_2}{H_1 + H_2}$
 - (b) $\frac{A_1 - A_2}{H_1 + H_2}$
 - (c) $\frac{A_1 + A_2}{H_1 - H_2}$
 - (d) $\frac{A_1 - A_2}{H_1 - H_2}$
5. The sum of all odd numbers between 1 and 1000 which are divisible by 3, is
 - (a) 83667
 - (b) 90000
 - (c) 83660
 - (d) None of the above
6. The sum of the series $\frac{1}{1+1^2+1^4} + \frac{1}{1+2^2+2^4} + \frac{1}{1+3^2+3^4} + \dots$ to n terms is
 - (a) $\frac{n(n^2+1)}{n^2+n+1}$
 - (b) $\frac{n(n+1)}{2(n^2+n+1)}$
 - (c) $\frac{n(n^2-1)}{2(n^2+n+1)}$
 - (d) None of these
7. Number of identical terms in the sequence 2, 5, 8, 11, ... upto 100 terms and 3, 5, 7, 9, 11, ... upto 100 terms, are
 - (a) 17
 - (b) 33
 - (c) 50
 - (d) 147
8. $(666 \dots 6)^2 + (888 \dots 8)^2$ is equal to
n digits n digits
 - (a) $\frac{4}{9}(10^n - 1)$
 - (b) $\frac{4}{9}(10^{2n} - 1)$
 - (c) $\frac{4}{9}(10^n - 1)^2$
 - (d) None of these
9. The sum to n terms of the infinite series $1.3^2 + 2.5^2 + 3.7^2 + \dots \infty$ is
 - (a) $\frac{n}{6}(n+1)(6n^2 + 14n + 7)$
 - (b) $\frac{n}{6}(n+1)(2n+1)(3n+1)$

[Video Solution](#)



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- (c) $4n^3 + 4n^2 + n$
 (d) None of the above [Video Solution](#)
10. A G.P. consists of an even number of terms. If the sum of all the terms is 5 times the sum of the terms occupying odd places, the common ratio will be equal to
 (a) 2 (b) 3 (c) 4 (d) 5 [Video Solution](#)
11. If S be the sum, P be the product and R be the sum of the reciprocals of n terms of a GP, then P^2 is equal to
 (a) $\left(\frac{S}{R}\right)^n$ (b) S/R (c) $\left(\frac{R}{S}\right)^n$ (d) $\frac{R}{S}$ [Video Solution](#)
12. If the ratio of AM between two positive real numbers a and b to their HM is m:n, then a:b is equal to
 (a) $\frac{\sqrt{(m-n)}+\sqrt{n}}{\sqrt{m-n}-\sqrt{n}}$ (b) $\frac{\sqrt{n}+\sqrt{m-n}}{\sqrt{n}-\sqrt{m-n}}$
 (c) $\frac{\sqrt{m}+\sqrt{m-n}}{\sqrt{m}-\sqrt{m-n}}$ (d) $\frac{\sqrt{(m-n)}+\sqrt{m}}{\sqrt{m-n}-\sqrt{m}}$ [Video Solution](#)
13. The product of three geometric means between 4 and $1/4$ will be
 (a) 4 (b) 2 (c) -1 (d) 1 [Video Solution](#)
14. If it is given that $\frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \dots \text{to } \infty = \frac{\pi^4}{90}$, then the value of $\frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \dots \text{to } \infty$ is equal to
 (a) $\frac{\pi^4}{96}$ (b) $\frac{\pi^4}{45}$
 (c) $\frac{89\pi^4}{90}$ (d) None of these [Video Solution](#)
15. If a, b, c are in AP, $b - a$, $c - b$ and a are in GP, then a:b:c is
 (a) 1:2:3 (b) 1:3:5
 (c) 2:3:4 (d) 1:2:4 [Video Solution](#)
16. If the (p+q)th term of a geometric series is m and the (p-q)th term is n, then the pth term is
 (a) $(mn)^{1/2}$ (b) mn
 (c) m+n (d) m-n [Video Solution](#)
17. If $\frac{1}{b-c}, \frac{1}{c-a}, \frac{1}{a-b}$ be consecutive terms of an AP, then $(b-c)^2, (c-a)^2, (a-b)^2$ will be in
 (a) GP (b) AP
 (c) HP (d) None of these [Video Solution](#)
18. The sum to infinity of the series $1 + \frac{4}{5} + \frac{7}{5^2} + \frac{10}{5^3} + \dots$, is
 (a) 16/35 (b) 11/8
 (c) 35/16 (d) 8/6 [Video Solution](#)
19. Let a_1, a_2, \dots, a_{10} be in AP and h_1, h_2, \dots, h_{10} be in HP. If $a_1 = h_1 = 2$ and $a_{10} = h_{10} = 3$ then $a_4 h_7$ is
 (a) 2 (b) 3
 (c) 5 (d) 6 [Video Solution](#)
20. If $a, a_1, a_2, \dots, a_{2n}, b$ are in arithmetic progression and $a, g_1, g_2, \dots, g_{2n}, b$ are in geometric progression and h is the harmonic mean of a and b, then $\frac{a_1+a_{2n}}{g_1g_{2n}} + \frac{a_2+a_{2n-1}}{g_2g_{2n-1}} + \dots + \frac{a_n+a_{n+1}}{g_ng_{n+1}}$ is equal to
 (a) 2nh (b) n/h
 (c) nh (d) 2n/h [Video Solution](#)
21. The sets S_1, S_2, S_3, \dots are given by $S_1 = \left\{ \frac{2}{1} \right\}, S_2 = \left\{ \frac{3}{2}, \frac{5}{2} \right\}, S_3 = \left\{ \frac{4}{3}, \frac{7}{3}, \frac{10}{3} \right\}, S_4 = \left\{ \frac{5}{4}, \frac{9}{4}, \frac{13}{4}, \frac{17}{4} \right\}, \dots$. Then, the sum of the numbers in the set S_{25} is



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Answer Key

Ques.	1	2	3	4	5	6	7	8	9	10
Ans.	C	B	D	A	A	B	B	B	A	C
Ques.	11	12	13	14	15	16	17	18	19	20
Ans.	A	C	D	A	A	A	B	C	D	D
Ques.	21	22	23	24	25	26	27	28	29	
Ans.	D	C	A	C	A	A	B	C	A	