MATHS

BOOKS - CENGAGE MATHS (HINGLISH)

SEQUENCE AND SERIES

Question Bank

1. Number of terms common to the two. sequences 17,21 ,25, ..., 417 and 16,21,26, ldots, 466 is

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2. If the value of $\sum_{r} = 0^{50}(2r+1)(-1)^{r}$ is a two digit number, then the sum of digits, is

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3. Let $a, b, c \in R^{+}$ and $2ab^3 + a^2b^3 + b^3 = 243$. If $2a + 3b + 2$ assumes its least value, then $a + b$ is equal to

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4. If $3 + \frac{1}{4}(3 \div d) + \frac{1}{4^2}(3 + 2d) + . . +$ upto $\infty = 8$, then the value of d is

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5. Evaluate: $\left[(2+1)\left(2^2+1\right)\left(2^4+1\right)l\left(2^8+1\right)\left(2^{16}+1\right)+\frac{1}{2^{32}}\right]$

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6. If $2p, p$ and $\left[p^2 - 14\right], p \in R - 0$ are the first three terms of a G.P. in order, then find the $50^t h$ term of the sequence, $p, 3p, 6p, 10p, \ldots.$ [Note:

$[y]$ denotes greatest integer function of y.]

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7. Consider two positive numbers a and b. If arithmetic mean of a.and b exceeds their geometric mean by $\frac{3}{2}$ and geometric mean of a and b exceeds their harmonic mean by $\frac{6}{5}$, then the absolute value of $\left(a^2 - b^{\square}\right)$ is equal to

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8. The difference between the sum of the first k terms of the series $1^3 + 2^3 + 3^3 + .. + n^3$ and the sum of the first k terms of $1 + 2 + 3 \div ... + n$ is 1980 . The value of k is

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9. Let $\alpha, \beta, \gamma, \delta$ are zeroes of $P(x) = 5x^4 + px^3 + qx^2 + r...x \div s(p, q, r, s \in R)$ and α, γ, δ are zeroes of $Q(x) = x^3 - 9x^2 \div ax - 24(\alpha < \beta < \gamma < \delta)$. If α, γ, δ (taken in that order) are in arithmetic progression and $\alpha, \beta, \gamma, \delta$ (taken in that order) are in harmonic progression, then find the value of $\left|P\frac{1}{Q}(1)\right|$

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10. If $1^3 + 3^3 + 5^3 + \ldots \frac{(2k-1)^3}{2^3} + 4^3 + 6^3 + (2k)^3 = \frac{199}{242}$, then the value of $\frac{k}{5}$

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11. Let $a_1, a_2, \ldots, a_{10}$ be in A.P. and $h_1, h_2, \ldots h_{10}$ be in H.P. If $a_1 = h_1 = 2a_{10} = h_{10} = 3$ then $a_4 h_7$ is

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12. The sum of the first 10 terms of the series $\frac{7}{2^2}5^2 + \frac{13}{5^2}8^2 + \frac{19}{8^2}11^2 + \ldots.$ is m/n the find the value of (n -12 m) .

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13. The value of $\sum_n = 2^\infty \frac{n}{1} + n^2(n^2 - 2)$ is equal to

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14. Let $S = \sum_k = 0^\infty \frac{2^k}{7^2} \hat{} k + 1$ then $\frac{1}{S}$ is equal to

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15. If $x = \log 2$ and $y = \log 3,$ then $a + bx + cy = [\log 1 + \log(1 + 3) + \log(1 + 3 + 5) + \ldots + \log(1 + 3 + 5 +$

, where a, b and c are poositive integers. The value of $2a + 3b + 5c$ is équal to (where $\log a = \log_{10} a$)

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16. Least value of n for which $3+6+9+\ldots.$ to n terms exceeds'900 is k, then $\sqrt{k}$ is equal to

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17. $narithmeticmeans$A_1, A_2 .., A_n $are \in sertedbetween7$ and $49sucht\widehat{\sum ofthesemeansis}364. IftheG.M.$ A_3 and A_6$isk, then$(k/4)` is equal to

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18. If p, q, r are G.M. between positive number ab and A is one arithmetic mean, then $\left(p^2+\frac{r^2}{A}q\right)$ is equal to

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19. Let a, b, c, d be four numbers such that b, c, d are in G.P. with common ratio 3 and a, b, c are in $A. P.$ with common difference 2 , then $a+b \div c+d$ is equal to

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20.

$1+(1+2)\frac{1+3}{2^2}\left(1^3+2^3\right)+(1+2+3)\frac{1+3+5}{3^2}\left(1^3+2^3+3^3\right)+(1+$

upto 10 terms $=\frac{a}{b}$ where a b are relatively prime, then $a-b$ is equal to

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21. If the first and third terms of a G.P. áre $a-2$ and $a+6$ respectively and arithmetic mean of these terms is 5 , then the ratio of third and first term is

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22. If $\sqrt{3}, H, \sqrt{2}$ are in H.P., then the value of $\dfrac{H+\sqrt{2}}{H-\sqrt{2}+\frac{H+\sqrt{3}}{H-\sqrt{3}}}$ is

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23. If $S_n = 1 + \dfrac{1}{3} + \dfrac{1}{3^2} + \ldots + \dfrac{1}{3^n} - 1, n \in N$, then least value of n such that $3 - 2S_n < \dfrac{1}{100}$, is

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24. The value of $1.1 + 2.3 + 3.5 + 4.7 + \ldots +$ upto 100 terms is equal to $100 \times 101 \times \dfrac{k}{6}$, then value of k is-

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25. If $abcd = 1$ where a, b, c, d are positive reals then the minimum value of $a^2 + b^2 + c^2 + d^2 + ab \div ac + ad + bc + bd + cd$ is

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26. $\sum_{k=1}^{360}\left(\frac{1}{k\sqrt{k}+1+(k+1)\sqrt{k}}\right)$ is the ratio of two relative prime positive integers m and n. The value of $(m+n)$ is equal to

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27. If x, y, z are arbitrary positive real numbers satisfying the equation $4xy+6yz+8zx=9$ and maximum possible value of (xyz) is M, then $(2016M)$ is

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28. If a, b, c are non-zero real numbers, then the minimum value of the expression $\left(\frac{(a^4+3a^2+1)(b^4+5b^2+1)(c^4+7c^2+1)}{a^2b^2c^2}\right.$ equals

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29. The value of sum $\sum_{r=1}^{10}\left(2^{r}-1+8r-3\right)$ is equal to

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30. Let $a_1, a_2, a_3, \ldots, a_{21}$ be in arithmetic progression. If $\sum_{k-1}^{21} a_k = 693$, then $\sum_{k-1}^{21} a_{2r+1}$ equals

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31. Let $S_1, S_2, S_3, S_4, S_5, \ldots . S_n$ are the sums of infinite geometric series whose first terms are $1, 2, 3, 4, -5, \ldots n$ and whose common ratios are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6} \ldots, \frac{1}{n}+1$ respectively. If $S_1^2 + S_3^2 + S_5^2 + S_7^2 + \ldots + S_{99}^2 = 100k$, then find the value of k

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32. The positive integral value of n such that $1.2^1 + 2.2^2 + 3.2^3 + 4.2^4 + \ldots. + n.2^n = 2 + 2^n + 5$, is

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33. For any $x, y \in R, xy > 0$ then the minimum value of. $\frac{2x}{y^3} + \frac{x^3 y}{3} + \frac{4y^2}{9x^4}$ equals

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34. Let .E=x^(2017)+y^(2017)+z^(2017)-2017 x y z($where$x, y, z ge 0`) , then the maximum value of -E is

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35. The equation $x^3 - 6x^2 + px - 8 = 0$ has only positive real roots. The value of p is

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36. If a, b, c are the first three non-zero terms of a geometric progression such that $a = 2, 2b$ and $12c$ forms another geometric progression with common ratio 5, then the sum of the series $a + b + c + . . \infty$, is.

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