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Daily Practice Problems

JEE MATHS

Topic: Sequence and Series

Q.1 Find the sum of all the even positive integers less than 200 which are not divisible by 6-

(A) 6535 (B) 6539

(C) 6534 (D) 6532

Q.2 The sum of n terms of the series

$\log a + \log \frac{a^2}{b} + \log \frac{a^3}{b^2} + \ldots$ is-

(A) $n \log \left(\frac{a}{b}\right)$

(B) n log (ab)

(C) $\frac{n^2}{2} \log \frac{a}{b} + \frac{n}{2} \log (ab)$

(D) $\frac{n^2}{2} \log \frac{a}{b} - \frac{n}{2} \log (ab)$

Q.3 The sum of 40 terms of the series

1+ 2 + 3 + 4 + 5 + 8 + 7+ 16 + 9 + ... is-

(A) $398 + 2^{20}$ (B) $398 + 2^{21}$

(C) $398 + 2^{19}$ (D) None of these

Q.4 If first and $(2n - 1)^{th}$ terms of an A.P., G.P. and H.P. are equal and their n^{th} terms are respectively a, b, c, then -

(A) a = b = c (B) a + c = b

(C) $ac - b^2 = 0$ (D) None of these

Q.5 Certain numbers appear in both the arithmetic progressions 17, 21, 25.... and 16, 21, 26.... find the sum of the first two hundred terms appearing in both-

(A) 4022 (B) 402200

(C) 201100 (D) 398000

Q.6 If S denotes the sum to infinity and S_n the sum of n terms of the series $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+....$, such that $S - S_n .< \frac{1}{1000}$, then the least value of n is-

(A) 11 (B) 9

(C) 10 (D) 8

Q.7 The sum of 10 terms of the series

$\left(x+\frac{1}{x}\right)^2+\left(x^2+\frac{1}{x^2}\right)^2+\left(x^3+\frac{1}{x^3}\right)^2+....$ is -

(A) $\left(\frac{x^{20}-1}{x^2-1}\right)\left(\frac{x^{22}+1}{x^{20}}\right)+20$

(B) $\left(\frac{x^{18}-1}{x^2-1}\right)\left(\frac{x^{11}+1}{x^9}\right)+20$

(C) $\left(\frac{x^{18}-1}{x^2-1}\right)\left(\frac{x^{11}-1}{x^9}\right)+20$

(D) None of these

Q.8 If 0 < x, y, a, b < 1, then the sum of the infinite terms of the series

$\sqrt{x}\,(\sqrt{a}+\sqrt{x})+\sqrt{x}\,(\sqrt{ab}+\sqrt{xy})$

$+\sqrt{x}\,(b\sqrt{a}+y\sqrt{x})+...$ is-

(A) $\frac{\sqrt{ax}}{1+\sqrt{b}}+\frac{x}{1+\sqrt{y}}$ (B) $\frac{\sqrt{x}}{1+\sqrt{b}}+\frac{x}{1+\sqrt{y}}$

(C) $\frac{\sqrt{x}}{1-\sqrt{b}}+\frac{\sqrt{x}}{1-\sqrt{y}}$ (D) $\frac{\sqrt{ax}}{1-\sqrt{b}}+\frac{x}{1-\sqrt{y}}$

Q.9 If sum of 3 terms of a G.P. is S. product is P, and sum of reciprocal of its terms is R, then

$P^2 R^3$ equals to -

(A) S (B) S^3

(C) $2S^2$ (D) S^2/R

Q.10 If A and G are respectively A.M. and G.M. of roots of a quadratic equation, then it is-

(A) $x^2 + 2Ax + G^2 = 0$

(B) $x^2 - 2Ax + G^2 = 0$

(C) $x^2 - Ax + G = 0$

(D) None of these

Q.11 If t_n be the n^{th} term of an A.P. and if $t_7 = 9$, then the value of the c.d. that would make $t_1 t_2 t_7$ least is-

(A) 33/40 (B) 33/20

(C) 33/10 (D) None of these

Q.12 If m^{th} terms of the series 63 + 65 + 67 + 69 + ... and 3 + 10 + 17 + 24 + ... be equal, then m =

(A) 11 (B) 12 (C) 13 (D) 15

Q.13 A ball falls from a height of 100 mts. on a floor. If in each rebound it describes 4/5 height of the previous falling height, then the total distance travelled by the ball before coming to rest is-

(A) ∞ (B) 500 mts

(C) 1000 mts (D) 900 mts

Q.14 If A,G and H are respectively A.M., G.M., and H.M. of three positive numbers a, b and c, then the equation whose roots are a, b and c is given by-

(A) $x^3 - 3Ax^2 + 3G^3 x + G^3 = 0$

(B) $x^3 - 3Ax^2 + 3(G^3/H) x - G^3 = 0$

(C) $x^3 + 3Ax^2 + 3(G^3/H) x - G^3 = 0$

(D) $x^3 - 3Ax^2 - 3(G^3/H) x + G^3 = 0$

Q.15 The G.M. of roots of the equation $x^2 - 2ax + b^2 = 0$ is equal to which type of mean of roots of $x^2 - 2bx + a^2 = 0$?

(A) A.M. (B) G.M.

(C) H.M. (D) None of these

Q.16 The maximum sum of the series $20 + 19\frac{1}{3} + 18\frac{2}{3} + \ldots\ldots$ is -

(A) 310 (B) 300

(C) 320 (D) None of these

Q.17 Let a, b be the roots of $x^2 - 3x + p = 0$ and let c, d be the roots of $x^2 - 12x + q = 0$, where a, b, c, d form an increasing G.P. Then the ratio of q + p : q – p is equal to -

(A) 8 : 7 (B) 11 : 10

(C) 17 : 15 (D) None of these

Q.18 If $\frac{a+bx}{a-bx} = \frac{b+cx}{b-cx} = \frac{c+dx}{c-dx}$ $(x \neq 0)$, then a, b, c, d are in -

(A) A.P. (B) G.P.

(C) H.P. (D) None of these

Q.19 The sum of the first n terms of the series $\frac{3}{1^2} + \frac{5}{1^2+2^2} + \frac{7}{1^2+2^2+3^2} + \ldots\ldots\ldots$ is -

(A) $\frac{6n}{n+1}$ (B) $\frac{9n}{n+1}$

(C) $\frac{12n}{n+1}$ (D) $\frac{15n}{n+1}$

Q.20 If $\sum_{r=1}^{n} t_r = 2(3^n - 1) \forall n \geq 1$, then $\lim_{n\to\infty} \sum_{r=1}^{n} \frac{1}{t_r}$ =

(A) 3 (B) $\frac{3}{2}$

(C) $\frac{3}{4}$ (D) $\frac{3}{8}$

Q.21 Let the sequence $a_1, a_2, a_3, \ldots\ldots, a_n$ form an A.P., then $a_1^2 - a_2^2 + a_3^2 - a_4^2 + \ldots\ldots + a_{2n-1}^2 - a_{2n}^2$ is equal to -

(A) $\frac{n}{2n-1}(a_1^2 - a_{2n}^2)$ (B) $\frac{2n}{n-1}(a_{2n}^2 - a_1^2)$

(C) $\frac{n}{n+1}(a_1^2 + a_{2n}^2)$ (D) None of these

Q.22 If 1, $\log_9(3^{1-x} + 2)$ and $\log_3(4.3^x - 1)$ are in A.P., then x is equal to -

(A) $\log_4 3$ (B) $\log_3 4$

(C) $1 - \log_3 4$ (D) $\log_3 0.25$

Q.23 If S_1, S_2, S_3 are the sums of first n natural numbers, their squares, their cubes respectively, then $\frac{S_3(1+8S_1)}{S_2^2}$ is equal to -

(A) 1 (B) 3 (C) 9 (D) 10

Q.24 The sum of three consecutive terms in a geometric progression is 14. If 1 is added to the first and the second terms and 1 is subtracted from the third, the resulting new terms are in arithmetic progression. Then the lowest of the original terms is -

(A) 1 (B) 2 (C) 4 (D) 8

Q.25 If S_n denotes the sum of n terms of an A.P., then $S_{n+3} - 3S_{n+2} + 3S_{n+1} - S_n$ is equal to -

(A) 0 (B) 1 (C) 1/2 (D) 2

Q.26 If $a_1, a_2, a_3, \ldots\ldots, a_{24}$ are in A.P. and $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$, then $a_1 + a_2 + a_3 + \ldots\ldots + a_{23} + a_{24}$ is equal to-

(A) 909 (B) 75 (C) 750 (D) 900

Q.27 The value of x + y + z is 15 if a, x, y, z, b are in A.P. while the value of $\frac{1}{X} + \frac{1}{Y} + \frac{1}{Z}$ is $\frac{5}{3}$ if a, X, Y, Z, b are in H.P., then a and b are-

(A) 1, 9 (B) 3, 7

(C) 7, 3 (D) 9, 1

Q.28 If $I_n = \int_0^{\pi/4} \tan^n x \sec^2 x \, dx$, then I_1, I_2, I_3,... are in -

(A) A. P. (B) G.P.

(C) H.P. (D) None of these

Q.29 A G.P. consists of 2n terms. If the sum of the terms occupying the odd places is S_1 and that of the terms at the even places is S_2, then S_2/S_1 is -

(A) Dependent on a

(B) Independent of r

(C) Independent of a and r

(D) Dependent on r

Q.30 If $x^{18} = y^{21} = z^{28}$, then 3, 3 $\log_y x$, 3 $\log_z y$, 7 $\log_x z$ are in -

(A) A.P. (B) G.P. (C) H.P. (D) None

ANSWER KEY

Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Ans.	C	C	B	C	B	A	A	D	B	B
Que.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.	B	C	D	B	A	A	C	B	A	D
Que.	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Ans.	A	C	C	B	A	D	A-D	C	D	A