Shiksha Classes Bhandara

Mathematics **Topic : Sequences & Series** **MM 100**

Q.1 If log 2, log $(2^x - 1)$ and log $(2^x + 3)$ are in A.P. then find the value of x.
(A) $\log_2 5$ (B) $\log_2 3$
(C) $\log_2 8$ (D) $\log_2 6$

Q.2 If x, y, z are in A.P. and x, y, t are in G.P. then x, x – y, t – z are in
(A) G.P. (B) A.P.
(C) H.P. (D) A.P. and G.P. both

Q.3 If the pth, qth and rth terms of a harmonic progression are a, b, c respectively, then $\frac{q-r}{a}+\frac{r-p}{b}+\frac{p-q}{c}$ is equal to
(A) $\frac{pqr}{abc}$ (B) $\frac{p+q+r}{a+b+c}$
(C) $\frac{par}{bqc}$ (D) none of these

Q.4 If the positive numbers a, b, c are in G.P., the equation $ax^2 + bx + c = 0$ has-
(A) Two coincident roots
(B) Two distinct real roots
(C) Two complex roots of the form $ke^{\pm i\frac{2\pi}{3}}$, k > 0
(D) Two complex roots of the form $ke^{\pm i\frac{\pi}{3}}$, k > 0.

Q.5 The sum of the latter half of the first 1000 terms of any A.P. is equal to one third of the sum of the first n terms of the same A.P. Then n =
(A) 1500 (B) 3000
(C) 2000 (D) 1000

Q.6 If the $(2p)^{th}$ term of a H.P. is q and the $(2q)^{th}$ term is p, then the $2(p + q)^{th}$ term is-
(A) $\frac{pq}{2(p+q)}$ (B) $\frac{2pq}{p+q}$
(C) $\frac{pq}{p+q}$ (D) $\frac{p+q}{pq}$

Q.7 The arithmetic mean between two numbers is A and the geometric mean is G. Then these numbers are –
(A) $\sqrt{A^2 - G^2 \pm A}$ (B) $\frac{1}{2}(\sqrt{A^2+G^2}+A)$
(C) $A \pm \sqrt{A^2 - G^2}$ (D) None of these

Q.8 If the $(m+1)^{th}$, $(n+1)^{th}$,$(r+1)^{th}$ terms of an A.P. are in G.P. and m,n,r, are in H.P. then find the ratio of common difference to the first terms in the A.P.
(A) n/2 (B) 2/n
(C) – n/2 (D) – 2/n

Q.9 If n arithmetic means a_1, a_2 ,....., a_n are inserted between 50 and 200 and n harmonic means h_1, h_2 ,....., h_n are inserted between the same two numbers, then $a_2\, h_{n-1}$ is equal to
(A) 500 (B) 10000/n
(C) 10000 (D) 250/n

Q.10 If a_1, a_2, a_3, a_4, a_5 are in H.P., then find the value of $a_1a_2 + a_2a_3 + a_3a_4 + a_4a_5$.
(A) $2a_1a_5$ (B) $8a_1a_5$
(C) $10a_1a_5$ (D) $4a_1a_5$

Q.11 If positive numbers a, b, c are in H.P. then the value of $e^{\log(a+c)+\log(a-2b+c)}$ is equal to
(A) $\log (a - c)^2$ (B) $(a - c)$
(C) $(a - c)^2$ (D) zero

Q.12 $\frac{1}{2}$ $\text{cosec}^2\theta$, $2\cot\theta$, $\sec\theta$ $(0 < \theta < \frac{\pi}{2})$, are in G.P. if θ is equal to
(A) $\pi/6$ (B) $\pi/4$
(C) $\pi/3$ (D) None of these

Q.13 If the sum of four numbers in A.P be 96 and that the product of the means to the product of the extermes is 35 to 27. then the numbers are
(A) 6, 18,30, 42 (B) 12, 20, 28, 36
(C) 4, 16, 18, 40 (D) 21, 23, 25, 27

Q.14 If x, y, z are three real numbers of the same sign then the value of $\frac{x}{y}+\frac{y}{z}+\frac{z}{x}$ lies in the interval
(A) $[2, +\infty)$ (B) $[3, +\infty)$
(C) $(3, +\infty)$ (D) $(-\infty, 3)$

Q.15 cos x = b. For what b do the roots of the equation form an A.P. ?
(A) $\sqrt{3}/2$ (B) 1/2
(C) –1 (D) None of these

Q.16 If the 10th and 15th terms of an H.P. are respectively 15 and 10, then 6th term is
(A) 6 (B) 12
(C) 20 (D) 25

Q.17 The sum of the integers lying between 1 and 100 (both inclusive) and divisible by 3 or 5 or 7 is
(A) 2838 (B) 3468
(C) 2738 (D) 3368

Q.18 The sum of $\frac{2a^2-1}{a}, 4a-\frac{3}{a}, \frac{6a^2-5}{a}$ ..... to n series is-
(A) $n(n+1)a - \frac{n^2}{a}$ (B) $n(n+1)a + \frac{n^2}{a}$
(C) $n(n-1)a - \frac{n^2}{a}$ (D) $n(n-1)a + \frac{n^2}{a}$

Q.19 In a G.P., if $(2p)^{th}$ term is q^2 and $(2q)^{th}$ term is p^2 where p and $q \in N$, then its $(p + q)^{th}$ term is –
(A) pq (B) p^2q^2
(C) $\frac{1}{2}p^2q^2$ (D) $\frac{1}{4}p^3q^3$

Q.20 If $a_1 + a_2 + a_3 + a_4 + a_5 + ... + a_n = 1$ for all $a_i > 0$, i = 1, 2, 3, ..., n. Then the maximum value of $a_1^2a_2a_3a_4a_5$ ..... a_n is
(A) $\frac{2}{(n+1)^n}$ (B) $\frac{4}{(n+1)^{n+1}}$
(C) $\frac{2}{n^n}$ (D) $\frac{4}{n^{n+1}}$

For Q.21-Q.25 :

The answer to each question is a NUMERICAL VALUE.

Q.21 The geometric and harmonic means of two numbers x_1 and x_2 are 18 and $16\frac{8}{13}$ respectively. The value of $|x_1 - x_2|$ is

Q.22 If 1, $\log_{81}(3^x + 48)$ and $\log_9\left(3^x - \frac{8}{3}\right)$ are in A.P., then find x

Q.23 a, b, c are first three terms of a G.P. If HM of a and b is 12 and that of b and c is 36, then find the value of a.

Q.24 All terms of a certain A.P are natural numbers. The sum of its nine successive terms beginning with the first is larger than 200 and smaller than 220. If the second term is 12, then the common difference is

Q.25 The sum of the first four terms of a G.P. is $12(1 - \sqrt{5})$. If the common ratio is $-\sqrt{5}$, then the first term of the G.P. is