PAST YEAR PROBLEMS

math on GO

Q.1 The sum of the series $1^3 - 2^3 + 3^3 - ......+ 9^3 =$ **[AIEEE-2002]**

(A) 300 (B) 125

(C) 425 (D) 0

Q.2 If the sum of an infinite GP is 20 and sum of their square is 100 then common ratio will be = **[AIEEE-2002]**

(A) 1/2 (B) 1/4

(C) 3/5 (D) 1

Q.3 If the third term of an A.P. is 7 and its 7th term is 2 more than three times of its 3rd term, then sum of its first 20 terms is- **[AIEEE-2002]**

(A) 228 (B) 74

(C) 740 (D) 1090

Q.4 If x_1, x_2, x_3 and y_1, y_2, y_3 are both in G.P. with the same common ratio, then the points $(x_1, y_1), (x_2, y_2)$ and (x_3, y_3) **[AIEEE-2003]**

(A) are vertices of a triangle

(B) lie on a straight line

(C) lie on an ellipse

(D) lie on a circle

Q.5 If the system of linear equations $x + 2ay + az = 0$; $x + 3by + bz = 0$; $x + 4cy + cz = 0$ has a non- zero solution, then a, b, c **[AIEEE-2003]**

(A) satisfy $a + 2b + 3c = 0$

(B) are in A.P.

(C) are in G.P.

(D) are in H.P

Q.6 Let two numbers have arithmetic mean 9 and geometric mean 4. Then these numbers are the roots of the quadratic equation- **[AIEEE-2004]**

(A) $x^2 + 18x + 16 = 0$

(B) $x^2 - 18x + 16 = 0$

(C) $x^2 + 18x - 16 = 0$

(D) $x^2 - 18x - 16 = 0$

Q.7 Let T_r be the r^{th} term of an A.P. whose first term is a and common difference is d. If for some positive integers m, n, $m \neq n$, $T_m = \frac{1}{n}$ and $T_n = \frac{1}{m}$, then a – d equals- **[AIEEE-2004]**

(A) 0 (B) 1

(C) 1/mn (D) $\frac{1}{m} + \frac{1}{n}$

Q.8 The sum of the first n terms of the series $1^2 + 2.2^2 + 3^2 + 2.4^2 + 5^2 + 2.6^2 + ...$ is $\frac{n(n+1)^2}{2}$ when n is even. When n is odd the sum is- **[AIEEE-2004]**

(A) $\frac{3n(n+1)}{2}$ (B) $\frac{n^2(n+1)}{2}$

(C) $\frac{n(n+1)^2}{4}$ (D) $\left[\frac{n(n+1)}{2}\right]^2$

Q.9 If $x = \sum_{n=0}^{\infty} a^n$, $y = \sum_{n=0}^{\infty} b^n$, $z = \sum_{n=0}^{\infty} c^n$ where a, b, c are in A.P. and $|a| < 1, |b| < 1, |c| < 1$ then x, y, z are in - **[AIEEE-2005]**

(A) GP

(B) AP

(C) Arithmetic - Geometric Progression

(D) HP

Q.10 If in a ΔABC, the altitudes from the vertices A, B, C on opposite sides are in H.P., then sin A, sin B, sin C are in - **[AIEEE-2005]**

(A) G.P.

(B) A.P.

(C) Arithmetic – Geometric progression

(D) H.P.

Q.11 Let $a_1, a_2, a_3, ...$ be terms of an A.P. If $\frac{a_1 + a_2 + ... + a_p}{a_1 + a_2 + ... + a_q} = \frac{p^2}{q^2}$, $p \neq q$ then $\frac{a_6}{a_{21}}$ equals – **[AIEEE-2006]**

(A) $\frac{7}{2}$ (B) $\frac{2}{7}$

(C) $\frac{11}{41}$ (D) $\frac{41}{11}$

Q.12 If $a_1, a_2, ...\ a_n$ are in H.P., then the expression $a_1a_2 + a_2a_3 + ... + a_{n-1}a_n$ is equal to – **[AIEEE-2006]**

(A) $(n-1)(a_1 - a_n)$ (B) na_1a_n

(C) $(n-1)a_1a_n$ (D) $n(a_1 - a_n)$

Q.13 In a geometric progression consisting of positive terms, each term equals the sum of the next two terms. Then the common ratio of this progression equals- **[AIEEE-2007]**

(A) $\frac{1}{2}(1 - \sqrt{5})$ (B) $\frac{1}{2}\sqrt{5}$

(1) 18 months (2) 19 months
(3) 20 months (4) 21 months

(C) $\frac{1}{2}\sqrt{5}$ (D) $\frac{1}{2}(\sqrt{5}-1)$

Q.14 The sum to infinity of the series

$1+\frac{2}{3}+\frac{6}{3^2}+\frac{10}{3^3}+\frac{14}{3^4}+.......$ **[AIEEE 2009]**

(A) 2 (B) 3 (C) 4 (D) 6

15. A person is to count 4500 currency notes. Let a_n denote the number of notes he counts in the n^{th} minute. If $a_1 = a_2 = ...= a_{10} = 150$ and $a_{10}, a_{11},....$are in an AP with common difference –2, then the time taken by him to count all notes is

[AIEEE 2010]

(1) 34 minutes (2) 125 minutes
(3) 135 minutes (4) 24 minutes

16. A man saves Rs. 200 in each of the first three months of his service. In each of the subsequent months his saving increases by Rs. 40 more than the saving of immediately previous month. His total saving from the start of service will be Rs. 11040 after :
[AIEEE 2011]

17. Let a_n be the n^{th} term of an A.P. If $\sum_{r=1}^{100} a_{2r} = \alpha$ and $\sum_{r=1}^{100} a_{2r-1} = \beta$, then the common difference of the A.P. is :

(1) $\alpha-\beta$ (2) $\frac{\alpha-\beta}{100}$

(3) $\beta-\alpha$ (4) $\frac{\alpha-\beta}{200}$

[AIEEE 2011]

18. The sum of first 20 terms of the sequence 0.7, 0.77, 0.777,....., is **[AIEEE - 2013, (4, –¼),360]**

(1) $\frac{7}{81}(179-10^{-20})$ (2) $\frac{7}{9}(99-10^{-20})$

(3) $\frac{7}{81}(179+10^{-20})$ (4) $\frac{7}{9}(99+10^{-20})$

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ans.	C	C	C	B	D	B	A	B	D	B	C	C	D	B

15. (1) **16.** (4) **17.** (2) **18.** (3)