

1. If the sum of first 10 terms of an arithmetic progression with first term  $p$  and common difference  $q$ , is 4 times the sum of the first 5 terms, then what is the ratio  $p : q$ ?

- (a) 1 : 2                      (b) 1 : 4  
(c) 2 : 1                      (d) 4 : 1

2. One of the roots of a quadratic equation with real coefficients is  $\frac{1}{(2-3i)}$ . Which of the following implications is/are true?

1. The second root of the equation will be  $\frac{1}{(3-2i)}$ .

2. The equation has no real root.  
3. The equation is  $13x^2 - 4x + 1 = 0$ .

Which of the above is/are correct ?

- (a) 1 and 2 only              (b) 3 only  
(c) 2 and 3 only              (d) 1, 2 and 3

3. What is the sum of the first 50 terms of the series  $(1 \times 3) + (3 \times 5) + (5 \times 7) + \dots$  ?

- (a) 1,71,650                  (b) 26,600  
(c) 26,650                    (d) 26,900

4. If  $x = 1 + \frac{y}{2} + \left(\frac{y}{2}\right)^2 + \left(\frac{y}{2}\right)^3 + \dots$  where  $|y| < 2$ , what is  $1/y$  equal to ?

- (a)  $\frac{x-1}{x}$                           (b)  $\frac{x-1}{2x}$   
(c)  $\frac{2x-2}{x}$                           (d)  $\frac{2x+1}{2x}$

5. What is the product of first  $2n + 1$  terms of a geometric progression ?

- (a) The  $(n + 1)$ th power of the  $n$ th term of the GP  
(b) The  $(2n + 1)$ th power of the  $n$ th term of the GP  
(c) The  $(2n + 1)$ th power of the  $(n + 1)$ th term of the GP  
(d) The  $n$ th power of the  $(n + 1)$ th terms of the GP

6. The following question consist of two statements, one labelled as the 'Assertion (A)' and the other as 'Reason (R)'. You are to examine these two statements carefully and select the answer.

**Assertion (A) :**  $1/8, \log_2 a \rightarrow$  exponent should be to the base,  $\log^2$  are in GP but not in AP.

**Reason: (R) :**  $x, y, z$  are in AP as well as in GP if  $x = y = z$ .

- (a) Both A and R are individually true and R is the correct explanation of A  
(b) Both A and R are individually true but R is not the correct explanation A  
(c) A is true but R is false  
(d) A is false but R is true

7. If  $x + 1, 4x + 1$ , and  $8x + 1$  are in geometric progression, then what is the non-trivial value of  $x$  ?

- (a) -1                              (b) 1  
(c)  $\frac{1}{8}$                                 (d)  $\frac{1}{4}$

8. The equation  $(a^2 + b^2)x^2 - 2b(a + c)x + (b^2 + c^2) = 0$  has equal roots. Which one of the following is correct about  $a, b$ , and  $c$  ?

- (a) They are in AP  
(b) They are in GP  
(c) They are in HP  
(d) They are neither in AP, nor in GP, nor in HP /

9. If  $p^{\text{th}}$  term of an AP is  $q$ , and its  $q^{\text{th}}$  term is  $p$ , then what is the common difference ?

- (a) -1                              (b) 0  
(c) 2                                (d) 1

10. If  $a, b, c$  are in geometric progression and  $a, 2b, 3c$  are in arithmetic progression, then what is the common ratio  $r$  such that  $0 < r < 1$  ?

- (a)  $\frac{1}{3}$                                 (b)  $\frac{1}{2}$   
(c)  $\frac{1}{4}$                                 (d)  $\frac{1}{8}$

11. For an AP with first term  $u$  and common difference  $v$ , the  $p^{\text{th}}$  term is  $15uv$  more than the  $q^{\text{th}}$  term. Which one of the following is correct ?

- (a)  $p = q + 15v$               (b)  $p = q + 15u$   
(c)  $p = q + 14v$               (d)  $p = q + 14u$

12. If  $a, b$  and  $c$  are three positive numbers in an arithmetic progression, then:

- (a)  $ac > b^2$                       (b)  $b^2 > a + c$   
(c)  $ab + bc \leq 2ac$               (d)  $ab + bc \geq 2ac$

13. If  $|x| < \frac{1}{2}$ , what is the value of

$$1 + n \left[ \frac{x}{1-x} \right] + \left[ \frac{n(n+1)}{2!} \right] \left[ \frac{x}{1-x} \right]^2 + \dots \dots \dots \infty ?$$

- (a)  $\left[ \frac{1-x}{1-2x} \right]^n$                       (b)  $(1-x)^n$   
(c)  $\left[ \frac{1-2x}{1-x} \right]^n$                       (d)  $\left( \frac{1}{1-x} \right)^n$

14. The sum of the first  $(2p + 1)$  terms of an AP is  $\{(p + 1) \cdot (2p + 1)\}$ . Which one of the following inferences can be drawn ?

- (a) The  $(p + 1)^{\text{th}}$  term of the AP is  $(2p + 1)$   
(b) The  $(2p + 1)^{\text{th}}$  term of the AP is  $(2p + 1)$   
(c) The  $(2p + 1)^{\text{th}}$  term of the AP is  $(p + 1)$   
(d) The  $(p + 1)^{\text{th}}$  term of the AP is  $(p + 1)$

15. a, b, c are in G.P. with  $1 < a < b < c$ , and  $n > 1$  is an integer.  $\log_a n$ ,  $\log_b n$ ,  $\log_c n$  form a sequence. This sequence is which one of the following ?

- (a) Harmonic progression (b) Arithmetic progression  
(c) Geometric progression (d) None of these

16. What is the sum of the series  $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \dots$ ?

- (a)  $\frac{1}{2}$  (b)  $\frac{3}{4}$   
(c)  $\frac{3}{2}$  (d)  $\frac{2}{3}$

17. If  $b_1, b_2, b_3$  are three consecutive terms of an arithmetic progression with common difference  $d > 0$ , then what is the value of  $d$  for which  $b_3^2 = b_2 b_3 + b_1 d + 2$ ?

- (a)  $\frac{1}{2}$  (b) 0  
(c) 1 (d) 2

18. If 1, x, y, z, 16 are in geometric progression, then what is the value of  $x + y + z$ ?

- (a) 8 (b) 12  
(c) 14 (d) 16

19. If the  $n$ th term of an arithmetic progression is  $3n + 7$ , then what is the sum of its first 50 terms?

- (a) 3925 (b) 4100  
(c) 4175 (d) 8200

20. If, for positive real numbers x, y, z, the numbers  $x + y$ ,  $2y$  and  $y + z$  are in harmonic progression, then which one of the following is correct?

- (a) x, y, z are in geometric progression  
(b) x, y, z are in arithmetic progression  
(c) x, y, z are in harmonic progression  
(d) None of the above

21. What is the sum of the series

$$1 + \frac{1}{8} + \frac{1.3}{8.16} + \frac{1.3.5}{8.16.24} + \dots \infty ?$$

- (a)  $\frac{2}{\sqrt{3}}$  (b)  $2\sqrt{3}$   
(c)  $\frac{\sqrt{3}}{2}$  (d)  $\frac{1}{2\sqrt{3}}$

22. What is the geometric mean of the ratio of corresponding terms of two series where  $G_1$  and  $G_2$  are geometric means of the two series?

- (a)  $\log G_1 - \log G_2$  (b)  $\log G_1 + \log G_2$   
(c)  $\frac{G_1}{G_2}$  (d)  $G_1 G_2$

23. If the points with the coordinates  $(a, ma)$ ,  $\{b, (m + 1)b\}$ ,  $\{c, (m + 2)c\}$  are collinear, then which one of the following is correct?

- (a) a, b, c are in arithmetic progression for all m

- (b) a, b, c are in geometric progression for all m  
(c) a, b, c are in harmonic progression for all m  
(d) a, b, c are in arithmetic progression only for  $m = 1$

24. The following question consist of two statements, one labelled as the 'Assertion (A)' and the other as 'Reason (R)'. You are to examine these two statements carefully and select the answer.

**Assertion (A) :**  $0.3 + 0.03 + 0.003 + \dots = \frac{1}{3}$ .

**Reason (R) :** For each (+ve) integer n, let  $a_n = a + nd$ , a and d are real numbers. Then,  $a_1 + \dots + a_n = \frac{n}{2} [2a + (n + 1)d]$ .

- (a) Both A and R are individually true and R is the correct explanation of A  
(b) Both A and R are individually true but R is not the correct explanation of A  
(c) A is true but R is false  
(d) A is false but R is true

25. Which one of the following is correct ? If the positive numbers a, b, c, d are in AP, then bcd, cda, dab, abc

- (a) are in AP  
(b) are in GP  
(c) are in HP  
(d) are in none of the above progressions

26. What is the value of  $9^{1/3} \cdot 9^{1/9} \cdot 9^{1/27} \dots \infty$  ?

- (a) 9 (b) 3  
(c)  $9^{1/3}$  (d) 1

27. If a, b, c, d are in harmonical progression such that  $a > d$ , then which one of the following is correct?

- (a)  $a + c = b + d$  (b)  $a + c > b + d$   
(c)  $ac = bd$  (d)  $ab = cd$

28. After paying 30 out of 40 installments of a debt of Rs. 3600, one third of the debt is unpaid. If the installments are forming an arithmetic series, then what is the first instalment?

- (a) Rs 50 (b) Rs 51  
(c) Rs 105 (d) Rs 110

29. The product of first nine terms of a GP is, in general, equal to which one of the following?

- (a) The 9th power of the 4th term  
(b) The 4th power of the 9th term  
(c) The 5th power of the 9th term  
(d) The 9th power of the 5th term

30. The difference between the  $n$ th term and  $(n-1)$ th term of a sequence is independent of n. Then the sequence follows which one of the following?

- (a) AP (b) GP  
(c) HP (d) None of these

31. Which one of the following is correct?

If  $\frac{1}{b-c} + \frac{1}{b-a} = \frac{1}{a} + \frac{1}{c}$ , then a, b, c are in

- (a) AP (b) HP  
(c) GP (d) None of these

32. What is the 15<sup>th</sup> term of the series 3, 7, 13, 21, 31, 43, ....?

- (a) 205 (b) 225  
(c) 238 (d) 241
33. If the  $n$ th term of an arithmetic progression is  $2n - 1$ , then what is the sum upto  $n$  terms?  
(a)  $n^2$  (b)  $n^2 - 1$   
(c)  $n^2 + 1$  (d)  $\frac{1}{2}n(n+1)$
34. If the three observations are 3, -6 and -6, then what is their harmonic mean?  
(a) 0 (b)  $\infty$   
(c)  $-1/2$  (d)  $-3$
35. Sum of first  $n$  natural numbers is given by  $\frac{n(n+1)}{2}$ . What is the geometric mean of the series 1, 2, 4, 8, ...,  $2^n$ ?  
(a)  $2^n$  (b)  $\frac{n}{2^2}$   
(c)  $2^{1/2}$  (d)  $2^{n-1}$
36. If the number of terms of an A.P. is  $(2n + 1)$ , then what is the ratio of the sum of the odd terms to the sum of even terms?  
(a)  $\frac{n}{n+1}$  (b)  $\frac{n^2}{n+1}$   
(c)  $\frac{n+1}{n}$  (d)  $\frac{n+1}{2n}$
37. If the sum of ' $n$ ' terms of an arithmetic progression is  $n^2 - 2n$ , then what is the  $n^{\text{th}}$  term?  
(a)  $3n - n^2$  (b)  $2n - 3$   
(c)  $2n + 3$  (d)  $2n - 5$
38. If  $a, 2a + 2, 3a + 3$  are in GP, then what is the fourth term of the GP?  
(a)  $-13.5$  (b)  $13.5$   
(c)  $-27$  (d)  $27$
39. What is sum to the 100 terms of the series  $9 + 99 + 999 + \dots$ ?  
(a)  $\frac{10}{9}(10^{100} - 1) - 100$  (b)  $\frac{10}{9}(10^{99} - 1) - 100$   
(c)  $100(100^{10} - 1)$  (d)  $\frac{9}{100}(10^{100} - 1)$
40. If the AM and GM of two numbers are 5 and 4 respectively, then what is the HM of those numbers?  
(a)  $\frac{5}{4}$  (b)  $\frac{16}{5}$   
(c)  $\frac{9}{2}$  (d) 9
41. The harmonic mean of two numbers is 21.6. If one of the numbers is 27, then what is the other number?  
(a) 16.2 (b) 17.3  
(c) 18 (d) 20
42. If the sum of the first two terms and the sum of the first four terms of a geometric progression with positive common ratio are 8 and 80 respectively, then what is the 6th term?  
(a) 88 (b) 243  
(c) 486 (d) 1458
43. If  $x > 1$  and  $\log_2 x, \log_3 x, \log_x 16$  are in GP, then what is  $x$  equal to?  
(a) 9 (b) 8  
(c) 4 (d) 2
44. In a geometric progression with first term  $a$  and common ratio  $r$ , what is the arithmetic mean of first five terms?  
(a)  $a + 2r$  (b)  $ar^2$   
(c)  $a(r^5 - 1)/(r - 1)$  (d)  $a(r^5 - 1)/[5(r - 1)]$
45. If  $(1 + 3 + 5 + \dots + p) + (1 + 3 + 5 + \dots + q) = (1 + 3 + 5 + \dots + r)$  where each set of parentheses contains the sum of consecutive odd integers as shown, what is the smallest possible value of  $(p + q + r)$  where  $p > 6$ ?  
(a) 12 (b) 21  
(c) 45 (d) 54
46. If  $x^2, y^2, z^2$  are in AP, then  $y + z, z + x, x + y$  are in  
(a) AP (b) HP  
(c) GP (d) None of these
47. If  $x, 2x + 2, 3x + 3$  are the first three terms of a GP, then what is its fourth term?  
(a)  $-27/2$  (b)  $27/2$   
(c)  $-33/2$  (d)  $33/2$
48. Which term of the sequence  $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, \dots$  is the first negative term?  
(a) 27th (b) 28th  
(c) 29th (d) No such term exists
49. In an AP, the  $m^{\text{th}}$  term  $1/n$  and  $n^{\text{th}}$  term is  $1/m$ . What is its  $(mn)^{\text{th}}$  term?  
(a)  $1/(mn)$  (b)  $m/n$   
(c)  $n/m$  (d) 1
50. The 59th term of an AP is 449 and the 449th term is 59. Which term is equal to 0 (zero)?  
(a) 501<sup>st</sup> term (b) 502<sup>nd</sup> term  
(c) 508<sup>th</sup> term (d) 509<sup>th</sup> term
51. If the AM and HM of two numbers are 27 and 12 respectively, then what is their GM equal to?  
(a) 12 (b) 18  
(c) 24 (d) 27
52. What is the sum of all natural numbers between 200 and 400 which are divisible by 7?  
(a) 6729 (b) 8712  
(c) 8729 (d) 9276
53. Let  $a, b, c$  be in AP. Consider the following statements:  
1.  $\frac{1}{ab}, \frac{1}{ca}$  and  $\frac{1}{bc}$  are in AP.  
2.  $\frac{1}{\sqrt{b} + \sqrt{c}}, \frac{1}{\sqrt{c} + \sqrt{a}}$  and  $\frac{1}{\sqrt{a} + \sqrt{b}}$  are in AP.  
Which of the statements given above is/are correct?  
(a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2
54. If  $p$  times the  $p$ th term of an AP is  $q$  times the  $q$ th term, then what is the  $(p + q)$ th term equal to?



- (a)  $p + q$  (b)  $pq$   
(c) 1 (d) 0
55. The geometric mean of three numbers was computed as 6. It was subsequently found that, in this computation, a number 8 was wrongly read as 12. What is the correct geometric mean?  
(a) 4 (b)  $\sqrt[3]{5}$   
(c)  $2\sqrt[3]{18}$  (d) None of these
56. The arithmetic mean of two numbers exceeds their geometric mean by 2 and the geometric mean exceeds their harmonic mean by 1.6. What are the two numbers?  
(a) 16, 4 (b) 81, 9  
(c) 256, 16 (d) 625, 25
57. The sum of an infinite geometric progression is 6, If the sum of the first two terms is  $9/2$ , then what is the first term?  
(a) 1 (b)  $5/2$   
(c) 3 or  $3/2$  (d) 9 or 3
58. If the AM and GM between two number are in the ratio  $m : n$ . then what is the ratio between the two numbers?  
(a)  $\frac{m + \sqrt{m^2 - n^2}}{m - \sqrt{m^2 - n^2}}$  (b)  $\frac{m + n}{m - n}$   
(c)  $\frac{m^2 - n^2}{m^2 + n^2}$  (d)  $\frac{m^2 + n^2 - mn}{m^2 + n^2 + mn}$
59. What is the geometric mean of the data 2, 4, 8, 16, 32?  
(a) 2 (b) 4  
(c) 8 (d) 16
60. If  $A, B$  and  $C$  are in AP and  $b : c = \sqrt{3} : \sqrt{2}$ , then what is the value of  $\sin C$ ?  
(a) 1 (b)  $\frac{1}{\sqrt{3}}$   
(c)  $\sqrt{3}$  (d)  $\frac{1}{\sqrt{2}}$
61. In a GP of positive terms, any term is equal to one-third of the sum of next two terms. What is the common ratio of the GP?  
(a)  $\frac{\sqrt{13} + 1}{2}$  (b)  $\frac{\sqrt{13} - 1}{2}$   
(c)  $\frac{\sqrt{13} + 1}{3}$  (d)  $\sqrt{13}$
62. Which term of a series  $\frac{1}{4}, -\frac{1}{2}, 1, \dots$  is  $-128$ ?  
(a) 9th (b) 10th  
(c) 11th (d) 12th
63. If  $\frac{1}{b-a} + \frac{1}{b-c} = \frac{1}{a} + \frac{1}{c}$ , then  $a, b, c$  are in  
(a) AP (b) GP  
(c) HP (d) None of these

64. What is the sum of  $\sqrt{3} + \frac{1}{\sqrt{3}} + \frac{1}{3\sqrt{3}} + \dots$ ?  
(a)  $\frac{\sqrt{3}}{2}$  (b)  $\frac{3\sqrt{3}}{2}$   
(c)  $\frac{2\sqrt{3}}{3}$  (d)  $\sqrt{3}$
65. Which one of the following options is correct?  
(a)  $\sin^2 30^\circ, \sin^2 45^\circ, \sin^2 60^\circ$  are in GP  
(b)  $\cos^2 30^\circ, \cos^2 45^\circ, \cos^2 60^\circ$  are in GP  
(c)  $\cot^2 30^\circ, \cot^2 45^\circ, \cot^2 60^\circ$  are in GP  
(d)  $\tan^2 30^\circ, \tan^2 45^\circ, \tan^2 60^\circ$  are in GP
66. What is the 10th common term between the series  $2 + 6 + 10 + \dots$  and  $1 + 6 + 11 + \dots$ ?  
(a) 180 (b) 186  
(c) 196 (d) 206
67. If the 10th term of a GP is 9 and 4th term is 4, then what is its 7th term?  
(a) 6 (b) 14  
(c)  $27/14$  (d)  $56/15$
68. If  $\log_{10} 2, \log_{10} (2^x - 1), \log_{10} (2^x + 3)$  are three consecutive terms of an AP, then which one of the following is correct?  
(a)  $x = 0$  (b)  $x = 1$   
(c)  $x = \log_2 5$  (d)  $x = \log_5 2$
69. If  $n!, 3 \times (n!)$  and  $(n + 1)!$  are in GP, then the value of  $n$  will be  
(a) 3 (b) 4  
(c) 8 (d) 10
70. If  $a, b, c, d, e, f$  are in AP, then  $(e - c)$  is equal to which one of the following?  
(a)  $2(c - a)$  (b)  $2(d - c)$   
(c)  $2(f - d)$  (d)  $(d - c)$

DAY - 5 Answer Key

1	(a)	16	(d)	31	(b)	46	(a)	61	(b)
2	(c)	17	(c)	32	(d)	47	(a)	62	(b)
3	(a)	18	(c)	33	(a)	48	(b)	63	(c)
4	(c)	19	(c)	34	(b)	49	(d)	64	(b)
5	(c)	20	(a)	35	(b)	50	(c)	65	(d)
6	(a)	21	(a)	36	(c)	51	(b)	66	(b)
7	(c)	22	(c)	37	(b)	52	(c)	67	(a)
8	(b)	23	(c)	38	(a)	53	(c)	68	(c)
9	(a)	24	(b)	39	(a)	54	(d)	69	(c)
10	(a)	25	(c)	40	(b)	55	(c)	70	(b)
11	(b)	26	(b)	41	(c)	56	(a)		
12	(d)	27	(b)	42	(c)	57	(d)		
13	(a)	28	(b)	43	(a)	58	(a)		
14	(d)	29	(d)	44	(d)	59	(c)		
15	(a)	30	(a)	45	(b)	60	(d)		