# AP AND GP

## CLASS WORK

1. a, b, c is a geometric progression (a, b, c are real numbers). If $a + b + c = 26$ and $a^2 + b^2 + c^2 = 364$, find the value of b.
   (a) 5 (b) 4 (c) 6 (d) 4.75

2. Let the $n^{th}$ term of AP be defined as $t_n$, and sum up to 'n' terms be defined as $S_n$. If $|t_8| = |t_{16}|$ and $t_3$ is not equal to $t_7$, what is $S_{23}$?
   (a) $23 ( t_6 – t_8)$  (b) 0
   (c) $23 t_{11}$  (d) cannot be determined

3. The sum of 2n terms of A.P. {1, 5, 9, 13.....} is greater than sum of n terms of A.P. {56, 58, 60.....}. What is the smallest value n can take?
   (a) 8 (b) 9 (c) 10 (d) 6

4. Consider a, b, c are in a G.P. such that $|a + b + c| = 15$. The median of these three terms is a and b = 10. If a > c, what is the product of the first 4 terms of this G.P.?
   (a) 40000 (b) 80000 (c) 32000 (d) 48000

5. Second term of a GP is 1000 and the common ratio is r where r is a natural number. $P_n$ is the product of n terms of this GP. $P_6 > P_5$ and $P_6 > P_7$, what is the sum of all possible values of n?
   (a) 4 (b) 9 (c) 5 (d) 13

6. Among four numbers, first three are in G.P and the last three are in A.P whose common difference is 6. If the first and the last terms are the same, then first number is
   (a) 2 (b) 4 (c) 6 (d) 8

7. The set of natural numbers is divided as groups as: (1) (2, 3, 4) (5, 6, 7, 8, 9)..... then the sum of numbers in the $n^{th}$ group is
   (a) $(n + 1)^3 – n^3$  (b) $(n + 1)^3 – (n + 2)^3$
   (c) $(n – 1)^3 + n^3$  (d) None of these

8. If a, b, c are in G.P and x and y are A.M of a, b and b, c respectively, then $a/x + c/y$ is equal to
   (a) 0 (b) 1 (c) 2 (d) 1 /2

9. If the roots of the equation $x^3 – 12 x^2 + 39 x – 28 = 0$ are in A.P, then the common difference is
   (a) ±1 (b) ±2 (c) ±3 (d) ±4

10. If there are 'm' A.M's between 1 and 31 and the ratio of $7^{th}$ and $(m – 1)^{th}$ means is 5:9, the value of m is
    (a) 12 (b) 13 (c) 14 (d) 15

11. After knee surgery, your trainer tells you to return to your jogging program slowly. He suggests jogging for 12 minutes each day for the first week. Each week thereafter, he suggests that you increase that time by 6 minutes per day. How many weeks will it be before you are up to jogging 60 minutes per day?
    (a) 8 weeks (b) 9 weeks
    (c) 7 weeks (d) None of these

12. The sum of the interior angles of a triangle is 180°, of a quadrilateral is 360° and of a pentagon is 540°. Assuming this pattern continues, find the sum of the interior angles of a dodecagon (12 sides).
    (a) 3600° (b) 1980° (c) 1800° (d) 3420°

13. A mine worker discovers an ore sample containing 500 mg of radioactive material. It is discovered that the radioactive material has a half life of 1 day. Find the amount of radioactive material remaining in the sample at the beginning of the $7^{th}$ day.
    (a) 15.63 mg (b) 7.815 mg
    (c) 31.26 mg (d) 3.9075 mg

14. You visit the Grand Canyon and drop a penny off the edge of a cliff. The distance the penny will fall is 16 feet the first second, 48 feet the next second, 80 feet the third second, and so on in an arithmetic sequence. What is the total distance the object will fall in 6 seconds?
    (a) 576 feet (b) 675 feet
    (c) 570 feet (d) 729 feet

15. Solve the following English nursery rhyme:
    As I was going to St.Ives, I met a man with seven wives. Each wife had seven sacks. Each sack had seven cats. Each cat had seven kits. A man, wives, sacks, cats and kits – how many people did I meet?
    (a) 2401 (b) 2400 (c) 2800 (d) 2801

16. A certain city has projected population of 1,86,624 in 10 years from now. If its population increases geometrically at the rate of 20% every two years, what is the population right now?
    (a) 90,000 (b) 36000
    (c) 18000 (d) None of these

17. Hari bought a new car and is slowly breaking it in by increasing his mileage by a constant number of miles each week. How many miles will he have to drive the car in the $11^{th}$ week if he drove it 280 miles in the third week and 400 miles in the sixth week?
    (a) 560 (b) 680 (c) 720 (d) 600

18. Nandhini wants to host a party. She invites 3 friends and told them to invite 3 of their friends. The 3 friends do invite 3 others and asks each to invite 3 more people. The invitation process goes on for 5 generations of invitations. Including herself, how many people can Nandhini expect at her party?
    (a) 120 (b) 124 (c) 121 (d) 240

19. In a library there are certain number of books and they are stacked in layers on a shelf. Each layer of books has one less than the layer below it, if there are 20 books on the bottom layer and one on the top layer, how many books are stacked on the shelf?

    (a) 210    (b) 120    (c) 420    (d) 105

20. A piece of equipment cost a certain factory Rs.600,000. If it depreciates in value, 15% the first year, 13.5 % the next year, 12% the third year and so on, what will be its value at the end of 10 years, all percentages applying to the original cost?

    (a) Rs.2,00,000      (b) Rs.1,05,000
    (c) Rs.4,05,000      (d) Rs.6,50,000

## HOME ASSIGNMENT

1. A virus goes through a computer, infecting the files. If one file was infected initially and the total number of files infected doubles every minute, how many total files will be infected in 20 minutes?

    (a) 1048575      (b) 2097152
    (c) 2097151      (d) 1048576

2. You complain that the hot tub in your hotel suite is not hot enough. The hotel tells you that they will increase the temperature by 10% each hour. If the current temperature of the hot tub is 75° F, what will be the temperature of the hot tub after 3 hours, to the *nearest tenth* of a degree?

    (a) 99.8° F    (b) 98.9° F    (c) 88.9° F    (d) 89.9° F

3. How many 2 digit integers are there which are divisible by 4?

    (a) 20    (b) 22    (c) 24    (d) 27

4. Sum of first 12 terms of a GP is equal to the sum of the first 14 terms in the same GP. Sum of the first 17 terms is 92. What is the third term in the GP?

    (a) 92    (b) 90    (c) 93    (d) 97

5. x, 17, $3x - y^2 - 2$, $3x + y^2 - 30$, ... are in A.P. The sum of the first four terms is divisible by

    (a) 3    (b) 5    (c) 2    (d) 7

6. If $(1^2 + 2^2 + 3^2 + \cdots + 10^2) = 385$, then find out what is $(2^2 + 4^2 + \cdots 20^2)$?

    (a) 1330    (b) 1420    (c) 1500    (d) 1540

7. What is the sum of all 3 digit numbers that give remainder 3 when divided by 5?

    (a) 897    (b) 164,850    (c) 99090    (d) 156720

8. Set A contains even numbers between 2 & 50 both inclusive and set B contains even numbers between 102 & 150 both inclusive. What is the difference between the sum of the above two AP's?

    (a) 2400    (b) 2000    (c) 2500    (d) 3000

9. Sum of an AP consisting of 12 terms is 354 and the ratio of the sum of odd terms to that of even terms is 27:32. What is the common difference of AP?

    (a) 6.2    (b) 8    (c) 5    (d) 6

10. Suppose you go to work for a company that pays 1 cent on the first day, 2 cents on the second day, 4 cents on the third day and so on. If the daily wages keeps doubling, what will your total income be for working 31 days in dollars (approximately)?

    (a) 21.5 million      (b) 20 million
    (c) 18 million      (d) 19.5 million

## ANSWER KEY

| 1. (a) | 2. (a) | 3. (b) | 4. (a) | 5. (c) |
|--------|--------|--------|--------|--------|
| 6. (d) | 7. (c) | 8. (c) | 9. (c) | 10. (a) |

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