

1. Write the AP for the number of triangles used in the figures. Also, write the  $n^{\text{th}}$  term of this AP.

2. Which figure has 61 matchsticks?

5 Marks

Subject: Mathematics

Roll No.:

Questions: 26 Time: 01:45 hh:mm Marks: 50

**Instructions**

1. New section on new page
2. Rough work at the last page should be in proper manner too
3. Honesty is the best policy.

**SECTION-A**

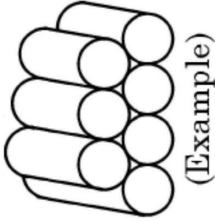
- Q1. The common difference of the AP  $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}, \dots$  is : 1 Mark
- A P B -P C -1 D 1
- Q2. If  $k, 2k-1$  and  $2k+1$  are three consecutive terms of an A.P., the value of  $k$  is: 1 Mark
- A 2 B 3 C -3 D 5
- Q3. The sum of first 20 odd natural numbers is: 1 Mark
- A 100 B 210 C 400 D 420
- Q4. If  $p-1, p+1$  and  $2p+3$  are in A.P., then the value of  $p$  is: 1 Mark
- A -2 B 4 C 0 D 2
- Q5. The  $n^{\text{th}}$  term of the A.P.  $a, 3a, 5a, \dots$  is. 1 Mark
- A  $na$  B  $(2n-1)a$  C  $(2n+1)a$  D  $2na$
- Q6. If  $\theta = 30^\circ$ , the value of  $(2 \sin \theta \cos \theta)$  is: 1 Mark
- A 1 B  $\frac{\sqrt{3}}{2}$  C  $\frac{\sqrt{3}}{4}$  D  $\frac{3}{2}$
- Q7. The value of  $x$  for which  $2x, (x+10)$  and  $(3x+2)$  are the three consecutive terms of an AP, is: 1 Mark
- A 6 B -6 C 18 D -18
- Q8. Probability of happening of an event is denoted by  $p$  and probability of non-happening of the event is denoted by  $q$ . Relation between  $p$  and  $q$  is. 1 Mark
- A  $p+q=1$  B  $p=1, q=1$  C  $p=q=1$  D  $p+a+1=0$
- Q9. The first three terms of an AP respectively are  $3y-1, 3y+5$  and  $5y+1$ . Then  $y$  equals: 1 Mark
- A -3 B 4 C 5 D 2
- Q10. What is the common difference of an A.P. in which  $a_{21} - a_7 = 84$ ? 1 Mark
- Q11. The  $n^{\text{th}}$  term of an A.P. is  $7-4n$ . Find its common difference. 1 Mark
- Q12. For what value of  $k$  will the consecutive terms  $2k+1, 3k+3$  and  $5k-1$  form an A.P.? 1 Mark
- Q13. If in an A.P.,  $a = 15, d = -3$  and  $a_n = 0$ , then find the value of  $n$ . 1 Mark
- Q14. Fill in the blanks in the following table, given that  $a$  is the first term,  $d$  the common difference and  $a_n$  the  $n^{\text{th}}$  term of the AP: 1 Mark
- |     |     |     |       |
|-----|-----|-----|-------|
| $a$ | $d$ | $n$ | $a_n$ |
| ... | -3  | 18  | -5    |

**SECTION-B**

- Q15. The sum of the first 7 terms of an AP is 63 and that of its next 7 terms is 161. Find the AP. 2 Marks
- Q16. Show that  $(a-b)^2, (a^2+b^2)$  and  $(a+b)^2$  are in AP. 2 Marks
- Q17. Find the sum of first 20 terms of an A.P. whose  $n^{\text{th}}$  term is given as  $a_n = 5-2n$ . 2 Marks
- Q18. If  $S_n$ , the sum of the first  $n$  terms of an A.P. is given by  $S_n = 2n^2 + n$ , then find its  $n^{\text{th}}$  term. 2 Marks
- Q19. In an AP, if the sum of third and seventh term is zero, find its 5<sup>th</sup> term. 2 Marks
- Q20. Which of the following are APs? If they form an AP, find the common difference  $d$  and write three more terms. 2 Marks
- $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$
- Q21. If the  $m^{\text{th}}$  term of an A.P. is  $\frac{1}{m}$  and  $n^{\text{th}}$  term is  $\frac{1}{n}$  then show that its  $(mn)^{\text{th}}$  term is 1. 3 Marks
- Q22. In an A.P. given that the first term ( $a$ ) = 54, the common difference ( $d$ ) = -3 and the  $n^{\text{th}}$  term ( $a_n$ ) = 0, find  $n$  and the sum of first  $n$  terms ( $S_n$ ) of the A.P. 3 Marks
- Q23. Find the sum of  $n$  terms of the series  $\left(4 - \frac{1}{n}\right) + \left(4 - \frac{2}{n}\right) + \left(4 - \frac{3}{n}\right) + \dots$  3 Marks

**SECTION-C**

- Q24. In Mathematics, relations can be expressed in various ways. The matchstick patterns are based on linear relations. Different strategies can be used to calculate the number of matchsticks used in different figures. 4 Marks
- One such pattern is shown below. Observe the pattern and answer the following questions using Arithmetic Progression:



6 Marks

Q25. 250 logs are stacked in the following manner: 22 logs in the bottom row, 21 in the next row, 20 in the row next to it and so on (as shown by an example). In how many rows, are the 250 logs placed and how many logs are there in the top row?

Q26. Three consecutive positive integers are such that the sum of the square of the first and the product of the other two is 45, find the integers.