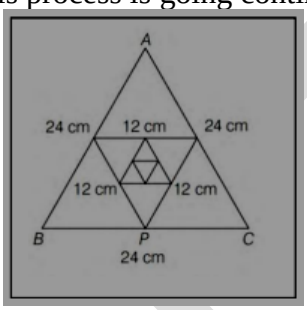
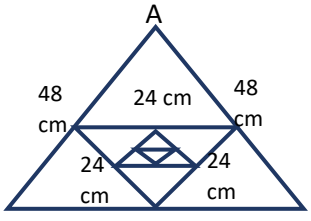
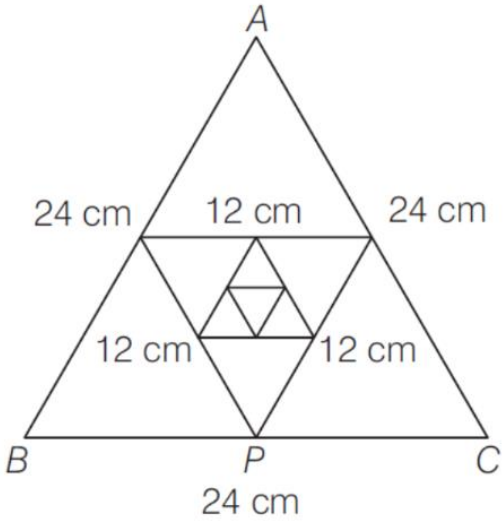
CHAPTER-9

SEQUENCES & SERIES

05 MARK TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	The ratio of the 2nd to 7th of 'n' A.M's between -7 and 65 is 1:7, find 'n'?	5
2.	The lengths of three unequal edges of a rectangular solid block are in G.P. the volume of the block is $216cm^3$ and the total surface area is $252cm^2$. Find the length of the longest side?	5
3.	There is an equilateral triangle with each side of length 24cm. The midpoints of its sides are joined to form another triangle. This process is going continuously infinite times.  Based on the above information answer the following questions : (i) The side of the 5th triangle is (in cm) a) 3 b) 6 c) 1.5 d) 0.75 (ii) The sum of perimeter of first 6 triangles (in cm) is a) 569/4 b) 567/4 c) 120 d) 144 (iii) The area of all the triangles (in sq cm) is a) 576 b)$192\sqrt{3}$ c) $144\sqrt{3}$ d) $169\sqrt{3}$ (iv) The sum of perimeter of all the triangles (in cm) is a) 144 b)169 c) 400 d) 625 (v) The perimeter of the 7th triangle (in cm) is a) 7/8 b)9/8 c) 5/8 d) ¾	5
4.	Three positive integers are in an increasing GP. If the middle term is doubled, the new terms are in AP. Find the common ratio.	5
5.	A Manufacturer reckons that the value of the machine, which costs him Rs. 15625, will depreciate each year by 20%. Find the estimate value of machine at the end of 5 years.	5
6.	In an experiment, the ball was dropped from a height of 6m and begins bouncing. The height of each bounce is three-fourths the height of the previous bounce. Find the total vertical distance travelled by the ball until it stops.	5
7.	There are 25 trees at equal distances of 5 meters in a line with a well, the distance of well from the nearest tree being 10 meters. A gardener waters all the trees separately starting from the well and he returns to the well after watering each tree to get water for the next. Find the total distance the gardener will cover in order to water all the trees.	5
8.	A farmer buys a used tractor for ₹ 12000. He pays ₹ 6000 cash and agrees to pay the balance in annual instalments of ₹ 500 plus 12% interest on the unpaid amount. How much did the tractor cost him?	5

		
9.	A sequence of non-zero numbers is saidto be a geometric progression, if theratio of each term, except the first one,by its preceding term is always constant.Rahul being a plant lover decides to open a nursery and he bought fewplants with pots. He wants to place potsin such a way that number of pots infirst row is 2, in second row is 4 and inthird row is 8 and so on.... Based on the above information, answer  the following questions. (i) The constant multiple by which thenumber of pots is increasing inevery row is (a) 2 (b) 4 (c) 8 (d) 1 (ii) The number of pots in 8th row is (a) 156 (b) 256 (c) 300 (d) 456 (iii) The difference in number of potsplaced in 7th row and 5th row is (a) 86 (b) 50 (c) 90 (d) 96 (iv) Total number of pots upto 10th row is (a) 1046 (b) 2046 (c) 1023 (d) 1024 (v) If Rahul wants to place 510 pots in total, then the total number of rows formed in this arrangement is (a) 7 (b) 8 (c) 9 (d) 5	5
10.	Each side of an equilateral triangle is 48 cm. The mid-point of its sides arejoined to form another triangle. Thisprocess is going continuously infinite.  	5

	B P C 48 cm Based on above information, answer thefollowing questions. (i) The side of the 3rd triangle is (in cm) (a) 10 (b) 24 (c) 12 (d) 6 (ii) The sum of perimeter of first 5triangle is (in cm) (a) 300 (b) 279 (c) 200 (d) 500 (iii) The area of all the triangle is (in cm^2) (a) $689\sqrt{3}$ (b) $768\sqrt{3}$ (c) $748\sqrt{3}$ (d) $702\sqrt{3}$ (iv) The sum of perimeter of all triangle(in cm) (a) 288 (b) 300 (c) 302 (d) 280 (v) The perimeter of 5th triangle is (a) 10 (b) 9 (c) 12 (d) 27	
11.	The Sierpinski Triangle is made by a student of lass XI using equilateral triangles such that each side of an equilateral triangle is 24 cm. The mid-point of its sides are joined to form another triangle. The process is going continuously infinite.  **Based on the above information, answer the following questions.** (i) The side of the 5th triangle is (in cm) (a) 3 (b) 6 (c) 1.5 (d) 0.75 (ii) The sum of perimeter of first 6 triangle is (in cm) (a) 569/4 (b) 567/4 (c) 120 (d) 144	

(iii) The area of all the triangles (in sq. cm)
(a) 576
(b) $192\sqrt{3}$
(c) $144\sqrt{3}$
(d) $169\sqrt{3}$

(iv) The sum of perimeter of all triangles is (in cm)
(a) 144
(b) 169
(c) 400
(d) 625

(v) The perimeter of 7^{th} triangle
(a) $\frac{7}{8}$
(b) $\frac{9}{8}$
(c) $\frac{5}{8}$
(d) $\frac{3}{4}$

12.

A sequence of non-zero numbers is said to be a geometric progression, if the ratio of each term, except the first one, by its preceding term is always constant. Rahul being a plant lover decides to open a nursery and he bought few plants with pots. He wants to place pots in such a way that the number of pots in first row is 2, in second row is 4 and in third row is 8 and soon….

Based on the above information, answer the following questions.

(i) Find out the constant multiple by which the number of pots is increasing in every row? **(1)**

(ii) Solve in order to get the total number of pots upto 10^{th} row Rahul will place if he follows the same pattern. **(2)**

(iii) If Rahul wants to place 510 pots in total, then find out the total number of rows formed in this arrangement. **(2)**

13. Akash write a letter to Bikash , Sukumar , Gourav and Prakash to survey the number of house hoisted National Flag on 15th August under "Har Ghar Tiranga " and ask them to write their four different friend with instruction that they move the chain similarly. Assuming that chain

	is not broken and it costs 50 paise to mail one letter.  (i) How many letters will be mailed when 4th set of letters is mailed? (ii) What will be the amount spent on the postage when the 8th set of letter is mailed ? (iii) What is the form of number of letter mailed ?	
14.	Sibangshu is a student of class XI. His father is working in a business shop. Sibangshu was taught that earning of money is no simple and easy and hence for future uses money should be saved. From his father's earning Sibangshu is trying to save the money for their future. For saving money he opened the account in his nearby nationalized Bank . The bank offer an interest of 10% per annum.  	

	(i) What will Rs 10000.00 amount in 10 years compounded annually . (ii) In Which year the amount will be more tan 20000 if he deposit the Rs 10000 amount at the same interest rate ? (iii) What will be his Rs 10000 amount in 3 years ?	

ANSWERS:

Q. NO	ANSWER	MARKS
1.	Consider, $A_2:A_7=1:7$ $A_2/A_1=1/7$ $(-7+2d)/(-7+7d)=1/7$ $-49d+14d=-$ $7+7d$	5

	d=42/7=6 A_n= -7+6n	
2.	Let the three unequal lengths of the block be A/r,A and Ar the volume A3 equals 216 ⇒A3=216⇒A=6 Also the total surface area =2(A2/r+A2+A2 r) Hence 2(A2/r+A2+A2 r)=252 ⇒1/r+1+r =252/2A2=252/72=7/2 ⇒1/r +r =5/2 ⇒1/r +r =1/2+2 Hence r=2 or 1/2 So the longest side= 6×2=12cm	5
3.	Rs. 5120	5
4.	$6 + 12\frac{3}{4} + 12\left(\frac{3}{4}\right)^2 + 12\left(\frac{3}{4}\right)^3 + \cdots \ldots \ldots$ Ans 42 m	5
5.	(i) c (ii) b (iii) b (iv) a (v) b	5
6.	Let the three numbers are $\frac{a}{r}, a, ar$. ATQ, $\frac{a}{r}, 2a, ar$ are in AP So, 2 x 2a = $\frac{a}{r} + ar$ => $ar^2 - 4ar + a = 0$ => $r^2 - 4r + 1 = 0$ => $r = \frac{4 \pm \sqrt{16-4}}{2} = \frac{4 \pm \sqrt{12}}{2} = 2 \pm \sqrt{3}$	5
7.		5
8.	Given: The price of the tractor is ₹12000. We need to find the total cost of the tractor if he buys it in installments. Total price = ₹ 12000 Paid amount = ₹ 6000 Unpaid amount = ₹ 12000 – 6000 = ₹ 6000 He pays the remaining ₹ 6000 in 'n' number of installments of ₹ 500 each. So, n = 6000/500 = 12 The cost incurred by him to pay the remaining 6000 is The AP will be (500 + 12% of 6000) + (500 + 12% of 5500) + … up to 12 terms 500 × 12 + 12% of (6000 + 5500 + … up to 12 terms) By using the formula, S_n = n/2 [2a + (n – 1)d] n = 12, a = 6000, d = -500 S_{12} = 500×12 + 12/100 × 12/2 [2(6000) + (12-1) (-500)] = 6000 + 72/100 [12000 + 11 (-500)]	5

	= 6000 + 72/100 [12000 – 5500] = 6000 + 72/100 [6500] = 6000 + 4680 = 10680 Total cost = 6000 + 10680 = 16680 *∴ The total cost of the tractor, if he buys it in installments, is ₹ 16680.*	
9.	Number of plant along the row follow G.P. with 1st term a= 2 And common ratio = 2 (i)The constant multiple by which thenumber of pots is increasing inevery row that isthe common ratio = 2 (Ans. a) (ii) The number of pots in 8th row is = 8^{th} term in G.P = $2x2^{8-1}$ =$2x2^7$ = 256 (Ans. b) (iii) The difference in number of potsplaced in 7th row and 5th row is = $2x2^6 – 2x2^4 = 2^5 (2^2 - 1) = 96$ (Ans. d) (iv) Total number of pots upto 10th row is = 2 + 4 + … up to 10^{th} term = $\frac{2(2^{10}-1)}{2-1}$ = 2 x 1023 = 2046 (Ans. b) (v) Let, to place 510 pots in total, then the total number of rows formed in this arrangement is n Then we can write, $\frac{2(2^n-1)}{2-1}$ = 510 $\Rightarrow (2^n - 1) = 255 \Rightarrow 2^n = 256$ $\Rightarrow 2^n = 2^8 \Rightarrow n = 8$ (Ans. b)	

10.	The sides of the triangle are in G.P with first term = 48 And common ratio = ½ (i) The side of the 3rd triangle is = 3rd term of G.P $= 48\left(\frac{1}{2}\right)^{3-1}$ = 12 cm (Ans. c) (ii) The sum of perimeter of first 5 triangle is = 3{ 48 + 48/2 + … up to 5th term} $= 3\frac{48\left(1-\frac{1}{2^5}\right)}{1-\frac{1}{2}}$ = 279 cm (Ans. b) (iii) The area of all the triangle is $= \frac{\sqrt{3}}{4}\left[48^2 + \left(\frac{48}{2}\right)^2 + \left(\frac{48}{2}\right)^3 + \cdots\right]$ $= \frac{\sqrt{3}}{4}\frac{48^2}{1-\frac{1}{4}}$ $= 768\sqrt{3}$ cm^2 (Ans. b) (iv) The sum of perimeter of all triangle = 3{ 48 + 48/2 + … ∝} $= 3x\ 48\left(\frac{1}{1-\frac{1}{2}}\right) = 288$ cm (Ans. a) (v) The perimeter of 5th triangle is = 3 x 48 x $(1/2)^4$ = 9 cm (Ans. b)	
11.	(i) (c) (ii) (b) (iii) (b) (iv) (a) (v) (b)	5
12.	Given series is 2, 4, 8, … Which is in G.P. whose 1st term is 2 (i) Common ratio = $\frac{a_2}{a_1} = \frac{4}{2} = 2$ (ii) Total number of pots upto 10 rows = S_{10}	5

		$\because S_n = \frac{a\left(r^n - 1\right)}{r-1}$ Here a=2, r=2 we need for n=10 $\Rightarrow S_{10} = \frac{2\left(2^{10} - 1\right)}{2-1}$ $\Rightarrow S_{10} = \frac{2\left(1024 - 1\right)}{1}$ $\Rightarrow S_{10} = 2 \times 1023 = 2046$	
	(iii)	As $S_n = 510$, a= 2 and r=2 $\because S_n = \frac{a\left(r^n - 1\right)}{r-1}$ We get $\Rightarrow 510 = \frac{2\left(2^n - 1\right)}{2-1}$ $\Rightarrow \frac{510}{2} = 2^n - 1$ $\Rightarrow 255 + 1 = 2^n$ $\Rightarrow 2^8 = 2^n$ $\Rightarrow n = 8$ Therefore, the total number of rows formed in this arrangement = 8.	
13.	(i) (ii) (iii)	34 43690 GP	
14.	(i) (ii) (iii)	25937.42 8 13310	