



# ANANDALAYA PERIODIC TEST – 2

Class: X

Subject: Mathematics (041)

Date : 30/09/2024

M.M : 80

Time : 3 Hours

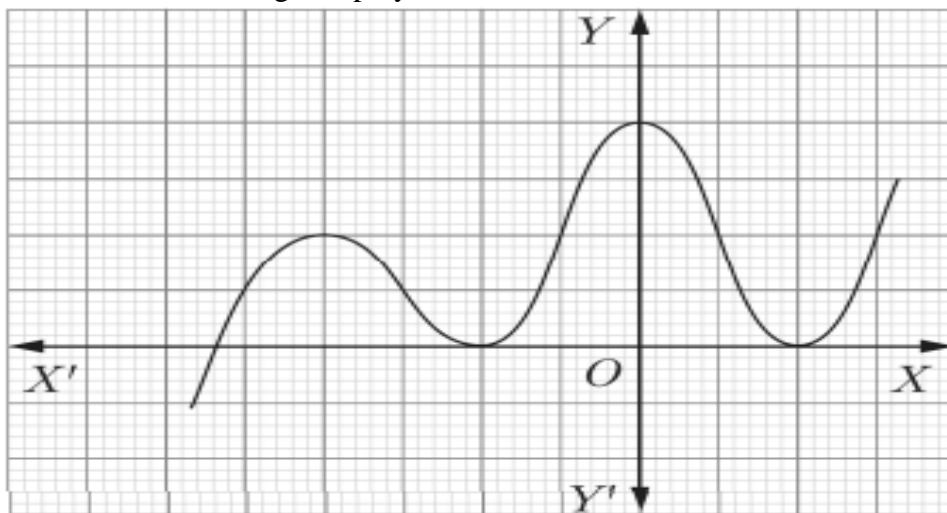
## General Instructions:

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory.
2. Section A has 18 MCQ's and 02 Assertion – Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA) – type questions of 2 marks each.
4. Section C has 6 Short Answer (SA) – type questions of 3 marks each.
5. Section D has 4 Long Answer (LA) – type questions of 5 marks each.
6. Section E has 3 source based/case based/passage based/integrated units of assessment of 4 marks each with sub-parts.
7. All Questions are compulsory. However, an internal choice in 2 questions of 2 marks, 2 questions of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

## SECTION A

1. If  $217x + 131y = 913$  and  $131x + 217y = 827$ , then  $x + y =$  \_\_\_\_\_. (1)  
(A) 5 (B) 6 (C) 7 (D) 18
2. What is the positive value of  $x$ , if  $\sqrt{3x^2 + 6} = 9$  (1)  
(A) 3 (B) 5 (C) 0 (D) 1
3. The common difference of an AP whose  $n$ th term is  $3n+7$  \_\_\_\_\_. (1)  
(A) 7 (B) 3 (C) 4 (D) 5
4. If  $0 \leq A, B \leq 90^\circ$  such that  $\sin A = 1/2$  and  $\cos B = 1/2$ , what is the value of  $\sin(A + B)$ ? (1)  
(A) 1 (B)  $\sqrt{3}/2$  (C)  $1/2$  (D) 0
5. If  $a = 2^3 \times 3, b = 2 \times 3 \times 5, c = 3^n \times 5$  and  $LCM[a, b, c] = 2^3 \times 3^2 \times 5$  then,  $n =$  \_\_\_\_\_. (1)  
(A) 1 (B) 2 (C) 3 (D) 0
6. If  $p^2x^2 - q^2 = 0$ , then find the value of  $x$ ? (1)  
(A)  $\pm p/q$  (B) 1 (C) 0 (D)  $\pm q/p$
7. In triangles PQR and TSM,  $\angle P = 55^\circ, \angle Q = 25^\circ, \angle M = 100^\circ$ , and  $\angle S = 25^\circ$ , then  $\Delta QPR \sim$  \_\_\_\_\_. (1)  
(A)  $\Delta MST$  (B)  $\Delta TMS$  (C)  $\Delta STM$  (D)  $\Delta TSM$
8. The 27th positive odd number is \_\_\_\_\_. (1)  
(A) 27 (B) 51 (C) 53 (D) 55
9. If 2 and  $1/2$  are the zeros of  $px^2 + 5x + r$ , then find value of  $p$  and  $r$ . (1)  
(A)  $p = r = 2$  (B)  $p = r = -2$  (C)  $p = 2, r = -2$  (D)  $p = -2, r = 2$
10. If  $p$  and  $q$  are two coprime numbers, then find the HCF and LCM of  $p$  and  $q$ . (1)  
(A) HCF = 1 and LCM =  $p+q$  (B) HCF =  $p$  and LCM =  $q$   
(C) HCF = 1 and LCM =  $pq$  (D) HCF =  $pq$  and LCM = 1

11. Find the nature of the roots of the quadratic equation  $2x^2 - 4x + 3 = 0$ ? (1)  
 (A) real roots (B) no real roots (C) equal roots (D) zero
12. The point P on x- axis is equidistant from the points A (-1, 0) and B (5, 0) is: (1)  
 (A) (0, 0) (B) (3, 0) (C) (2, 0) (D) (9, 0)
13. The pair of equations  $y=0$  and  $y = -5$  has \_\_\_\_\_. (1)  
 (A) one solution (B) two solution (C) infinite number of solution (D) no solution
14. Point A (-1, y) and B (5, 7) lie on a circle with centre O (2, -3y). The values of y are \_\_\_\_\_. (1)  
 (A) -1, 7 (B) -2, 7 (C) -2, -7 (D) 1, -7
15. The ratio between the LCM and HCF of 5, 15, 20 is \_\_\_\_\_. (1)  
 (A) 9 : 1 (B) 4 : 3 (C) 11 : 1 (D) 12 : 1
16. Find the value of  $\sin^2 30^\circ + \cos^2 45^\circ + \cos^2 30^\circ$ . (1)  
 (A)  $1/4$  (B) 0 (C)  $3/2$  (D)  $\frac{\sqrt{2}+1}{2}$
17. The distance of the point P (-6, 8) from the origin is \_\_\_\_\_. (1)  
 (A) 14 (B) 6 (C) 8 (D) 10
18. How many zeros are there for the given polynomial? (1)



- (A) 0 (B) 1 (C) 2 (D) 3

In the following questions 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (A) Both A and R are true and R is the correct explanation of A.  
 (B) Both A and R are 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.
19. (A) : The value of  $\sin A$  is always less than and equal to 1. (1)  
 (R) :  $\sin A$  is the product of  $\sin$  and A.
20. (A) : In  $\triangle ABC$ ,  $DE \parallel BC$  such that  $AD = (7x - 4)$  cm,  $AE = (5x - 2)$  cm,  $DB = (3x + 4)$  cm and  $EC = 3x$  cm then  $x$  equal to 5. (1)  
 (R) : If a line is drawn parallel to one side of a triangle to intersect the other two sides in distant point, then the other two sides are divided in the same ratio.

## SECTION - B

21. For what value of  $k$ :  $2k$ ,  $k + 10$  and  $3k + 2$  are in AP? (2)

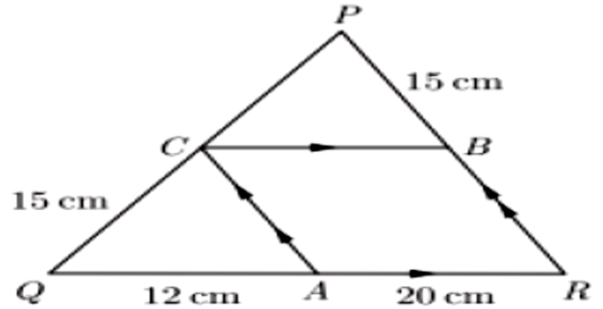
**OR**

How many terms of the AP:  $9, 17, 25, \dots$  must be taken to get a sum of 636?

22. What is the discriminant of the quadratic equation  $(x + 5)^2 = 2(5x - 3)$ ? (2)

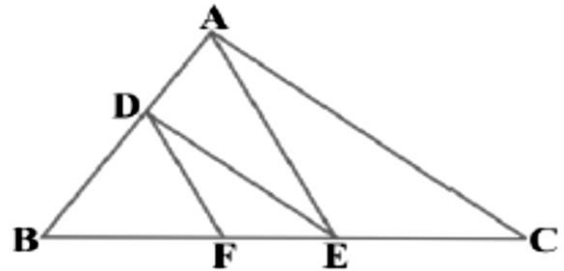
23. If  $\sec \theta = \frac{13}{12}$ , by using suitable identity calculate value of  $\tan \theta$  and  $\sin \theta$ . (2)

24. In the given figure below,  $CB \parallel QR$  and  $CA \parallel PR$   
Also  $AQ = 12$  cm,  $AR = 20$  cm,  $PB = CQ = 15$  cm.  
Calculate  $PC$  and  $BR$ . (2)



**OR**

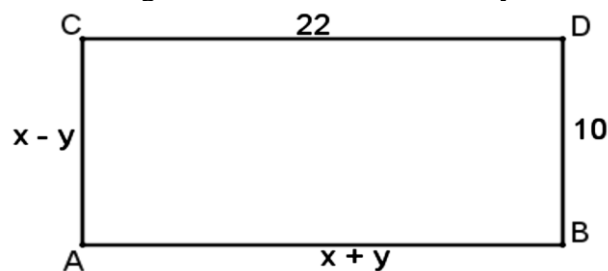
In the adjacent figure, In triangle ABC,  $DE \parallel AC$   
and  $DF \parallel AE$ . Prove that  $\frac{BF}{BE} = \frac{FE}{EC}$ .



25. In what ratio does the point  $P(2, -5)$  divide the line segment joining  $A(-3, 5)$  and  $B(4, -9)$ ? (2)

## SECTION - C

26. In the given figure ABCD is a rectangle. Find the value of  $x$  and  $y$ . (3)



27. Find the positive value of  $k$  for which the equation  $x^2 + kx + 64 = 0$  and  $x^2 - 8x + k = 0$  will both have real roots? (3)

**OR**

If  $(x^2 + y^2)(a^2 + b^2) = (ax + by)^2$ . Prove that  $\frac{x}{a} = \frac{y}{b}$

28. The LCM of two numbers is 64699, their HCF is 97 and one of the numbers is 2231. Find the other. (3)

29. Your friend Veer wants to participate in a 200m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds. What is the minimum number of days he needs to practice till his goal is achieved? (3)

30. Find the value of  $y$  for which the distance between the points  $(2, -3)$  and  $(10, y)$  is 10 units. (3)

**OR**

Find the point on the  $x$ -axis which is equidistant from  $(2, -5)$  and  $(-2, 9)$ .

31. If  $\alpha, \beta$  are the zeros of the polynomial,  $f(x) = ax^2 + bx + c$ , then  $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ . (3)

#### SECTION -D

32. If the squared difference of the zeroes of the quadratic polynomial  $f(x) = x^2 + px + 45$  is equal to 144, find the value of  $p$ . (5)

**OR**

If one zero of the polynomial  $p(x) = 2x^2 - 4kx + 6x - 7$  is the negative of other, find the value of  $k$ . Also find the zeros of  $x^2 - kx - 1$ .

33. State and Prove Basic Proportionality Theorem (Thales Theorem). (5)  
Using this theorem solve the following question.

In a  $\triangle ABC$  if,  $DE \parallel BC$ . If  $AD = 1.5\text{cm}$ ,  $DB = 4.5\text{cm}$ ,  $AE = 2\text{cm}$  then find  $EC$ .

34. Determine graphically the vertices of the triangle, the equations of whose sides are given below: (5)  
 $2y - x = 8$ ;  $5y - x = 14$ ;  $y - 2x = 1$

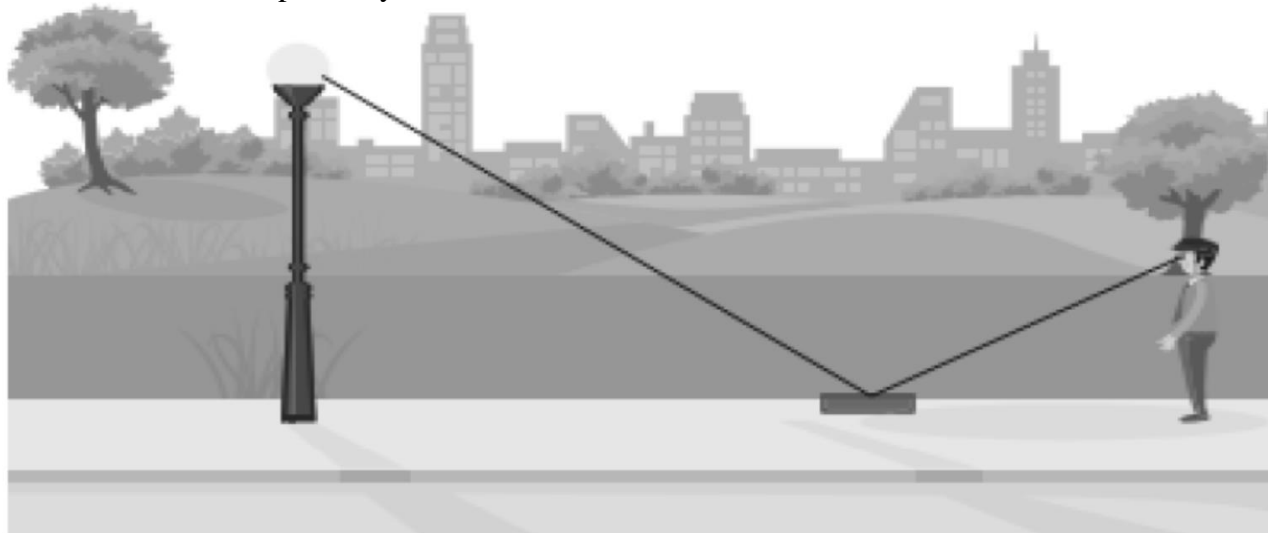
35. If  $\sin(A + B) = 1$  and  $\tan(A - B) = 1/\sqrt{3}$ . (5)  
Find the value of: (i)  $\tan A + \cot B$  (ii)  $\sec A + \operatorname{cosec} B$

**OR**

If  $\sec\theta + \tan\theta = p$ , then find the value of  $\operatorname{cosec}\theta$ .

#### SECTION - E

36. Ramesh places a mirror on level ground to determine the height of a pole (with traffic light fixed on it). He stands at a certain distance so that he can see the top of the pole reflected from the mirror. Ramesh's eye level is 1.5 m above the ground. The distance of Ramesh and the pole from the mirror are 1.8 m and 6 m respectively



- (i) Which criterion of similarity is applicable to similar triangles? (1)  
(ii) What is the height of the pole? (1)  
(iii) Now Ramesh moves behind such that distance between pole and Ramesh is 13 meters. He places mirror between him and pole to see the reflection of light in right position. What is the distance between mirror and Ramesh? (2)

**OR**

What is the distance between mirror and pole?

37. Aditya owns two rectangular fields of the same width but different lengths. They are required to plant 168 trees in the smaller field and 462 trees in the larger field. In both fields, the trees will be planted in the same number of rows but in different number of columns.



(1)

(1)

(2)

- (i) What is the maximum number of rows in which the trees can be planted in each of the fields?
- (ii) If the trees are planted in the number of rows obtained in part (i), how many columns will each field have?
- (iii) If total cost of planted trees in one column is ₹ 500, then find the cost to plant the trees in smaller field.

**OR**

If the total cost of planted trees in one column is ₹ 500, then find the cost to plant the trees in larger field.

38. In the month of April to June 2023, the exports of passenger cars from India increased by 26% in the corresponding quarter of 2023–24, as per a report. A car manufacturing company planned to produce 1800 cars in 4th year and 2600 cars in 8th year. Assuming that the production increases uniformly by a fixed number every year.



Based on the above information answer the following questions.

- (i) Find the production in the 1st year.
- (ii) Find the production in the 12th year.
- (iii) Find the total production in first 10 years.

(1)

(1)

(2)

**OR**

- (iii) In how many years will the total production reach 31200 cars?