विद्या सर्वार्थि साधिका

ANANDALAYA

PERIODIC TEST – 2

Class: X

Subject : Mathematics (041) M.M :80

Date : 22–09–2023 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 5 marks, 2 questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.

SECTION – A

1. Find non zero c if the system of equations $cx + 3y + (3 - c) = 0, 12x + cy - c = 0$ has infinitely many solutions? (1)
   (A) 1 (B) 4 (C) 5 (D) 6

2. The quadratic polynomial, the sum of whose zeroes is – 5 and their product is 6, is _____. (1)
   (A) $x^2 + 5x + 6$ (B) $x^2 - 5x + 6$ (C) $x^2 - 5x - 6$ (D) $-x^2 + 5x + 6$

3. "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio." This theorem is known as _____. (1)
   (A) Pythagoras theorem (B) Thales theorem
   (C) Area theorem (D) Alternate segment theorem

4. Three bulbs red, green and yellow flash at intervals of 80 seconds, 90 seconds and 110 seconds. All three flash together at 8:00 am. At what time will the three bulbs flash altogether again? (1)
   (A) 9:00 am (B) 9:12 am (C) 10:00 am (D) 10:12 am

5. If the nth term of an AP is (2n + 1), then the sum of its first three terms is _____. (1)
   (A) 15 (B) 21 (C) 12 (D) 6n + 3

6. A triangle with vertices $(4, 0), (-1, -1)$ *and* $(3, 5)$ is a/an _____. (1)
   (A) equilateral triangle (B) isosceles right-angled triangle
   (C) right-angled triangle (D) none of these

7. $2\cos^2 30° - 1 =$ _____. (1)
   (A) $\sin 60°$ (B) $\tan 60°$ (C) $\cos 60°$ (D) $\sec 60°$

8. If $x = 3$ is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then the value of k is _____. (1)
   (A) 1/3 (B) 2/3 (C) 1 (D) 1/2

9. The HCF and LCM of two numbers are 33 and 264 respectively. When the first number is completely divided by 2 the quotient is 33. The other number is _____. (1)
   (A) 162 (B) 32 (C) 132 (D) 66

10. If $\cot\theta = \frac{1}{\sqrt{3}}$,the value of $sec^2\theta + cosec^2\theta$ is _____. (1)
    (A) 1 (B) 40/9 (C) 38/9 (D) 16/3

11. In ΔABC and ΔDEF, $\frac{AB}{EF} = \frac{AC}{DE}$, and ∠A = ∠E, then symbolically we write it as _____. (1)
    (A) $\Delta ABC \sim \Delta DEF$ (B) $\Delta ABC \sim \Delta EFD$
    (C) $\Delta ABC \sim \Delta EDF$ (D) $\Delta CBA \cong \Delta DEF$

12. 7^{th} term of an AP is 40. The sum of its first 13 terms is _____. (1)
(A) 520 (B) 540 (C) 260 (D) 560

13. The product of three consecutive integers is equal to 6 times the sum of the three integers. If the smallest integer is x, which of the following equation represent the above situation? (1)
(A) $2x^2 + x - 9 = 0$ (B) $x^2 + 2x - 18 = 0$
(C) $x^2 + 2x + 18 = 0$ (D) $2x^2 - x + 9 = 0$

14. The distance of a point $(-6, 8)$ from the origin is _____. (1)
(A) 10 (B) 6 (C) – 6 (D) 8

15. Which of the following are the roots of the quadratic equation, $x^2 - 9x + 20 = 0$? (1)
(A) 3, 4 (B) 4, 5 (C) 5, 6 (D) 6, 7

16. If α, β are the zeros of the polynomial $x^2 + 5x + c$, and α – β = 3, then c = _____. (1)
(A) 4 (B) 0 (C) 5 (D) 1

17. One end of a line of length 17 units is at point (3, 4). If the abscissa of the other end is 11, then its ordinate will be _____. (1)
(A) 11 or – 19 (B) – 11 or – 19 (C) – 11 or 19 (D) 11 or 19

18. If x = a, y = b is the solution of the pair of equations x – y = 2 and x + y = 4, then the respective values of a and b are _____. (1)
(A) 3, 5 (B) 5, 3 (C) 3, 1 (D) – 1, – 3

In the following question number 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. **Assertion (A):** HCF (105, 225) = 15 and LCM (105, 225) = 225 × k, then the value of k is 7. (1)
Reason (R): For any two positive numbers a and b, HCF (a, b) × LCM (a, b) = a × b.

20. **Assertion (A):** In a ΔABC, right angled at B, if sinA = 8/17, then cosA = 15/17 and tanA =8 /15. (1)
Reason (R): For acute angle θ, cosθ = Hypotenuse/Base and tanθ= base/perpendicular.

SECTION – B

21. Solve for x: $\frac{x+3}{x+2} = \frac{3x-7}{2x-3}, x \neq -2, \frac{3}{2}$. (2)

22. (a) Find the sum of all the natural numbers less than 100 which are divisible by 6. (2)

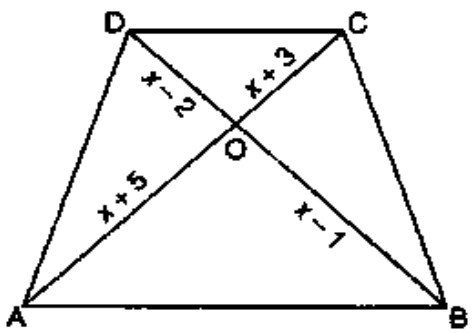
OR

(b) Find the sum of first 24 terms of an A.P. whose n^{th} terms given by $a_n = 3 + 2n$.

23. If $x = a\ sec\theta\ , y = b\ tan\theta$, then prove that $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. (2)

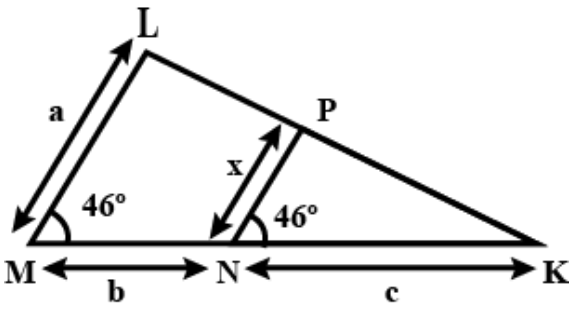
24. Find the point on y – axis which is equidistant from the points (5, - 2) and (-3, 2). (2)

25. (a) In the given figure, if AB||DC, find the value of x. (2)



OR

(b) In figure, ∠M = ∠N = 46° and a, b and c are lengths of LM, MN and NK respectively. Then find PN.



SECTION – C

26. (a) If the price of a book is reduced by ₹ 5, a person can buy 5 more books for ₹ 300. Find the original list price of a book. (3)

OR

(b) Find two consecutive odd natural numbers, the sum of whose squares is 394.

27. Solve for x and y using substitution method. $x + 2y - 3 = 0\ ; 3x - 2y + 7 = 0$. (3)

28. Prove that $15 + 7\sqrt{3}$ be an irrational number given that $\sqrt{3}$ is an irrational number. (3)

29. (a) The coordinates of the mid-point of the line joining the points $(3p, 4)\ and\ (-2, 2q)\ are\ (5, p)$. Find the values of p and q. (3)

OR

(b) Find the point in which the line segment joining $(2, -3) and\ (5, 6)$ is divided by x – axis.

30. If one root of the quadratic polynomial $2x^2 - 3x + p$ is 3, find the other root. Also, find the value of p. (3)

31. The sum of n terms of an A.P. is $5n^2 - 3n$. Find the A.P. and also its 10th term. (3)

SECTION – D

32. (a) Solve the equations graphically: $2x + y = 2\ and\ 2y - x = 4$. (5)

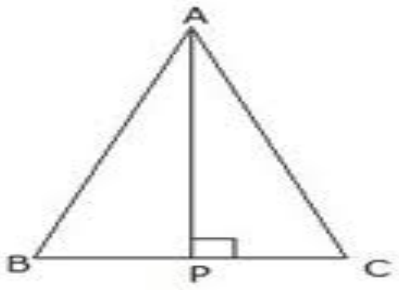
OR

(b) Solve the following pair of linear equations for x and y:

$$2(ax - by) + (a + 4b) = 0; 2(bx + ay) + (b - 4a) = 0$$

33. If one zero of the quadratic polynomial $f(x) = 4x^2 - 8kx + 8x - 9$ is negative of the other then find zeros of $kx^2 + 3kx + 2$. (5)

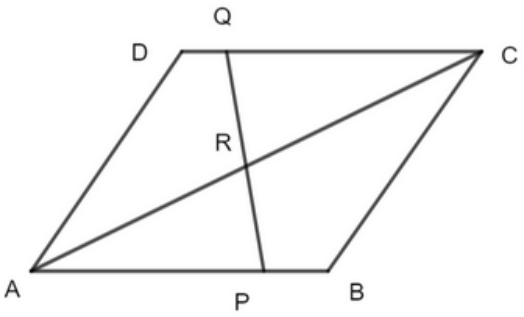
34. (a) In the given figure, AP⊥BC, If tanB = 3/4 ,tanC = 5/12 and BC = 56 cm, find the length of AP. (5)



OR

(b) Prove that: $(tanA + cosec\ B)^2 - (\cot B - \sec A)^2 = 2 \tan A\ .\ \cot B.\ (cosec\ A + secB)$.

35. ABCD is a parallelogram. AB is divided at P and CD at Q so that AP:PB = 3:2 and CQ:QD = 4:1. If PQ meets AC at R, then prove that 7AR = 3AC. (5)



SECTION – E

36. To enhance the reading skills of grade X students for CBSE reading Challenges, the school nominates you and two of your friends to set up a class library. There are two sections – section A and section – B of grade X. There are 32 students in section – A and 36 students in section – B. (4)

Write the answers of the following:

(i) What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of section – A and section – B?

(ii) Express 36 as a product of its primes.

(iii) Find the HCF of 32, 36 and 44.

OR

(iii) If there are 36 students in Section – A and 44 students in section – B, what is minimum number of books you will acquire for the class library so that they can be distributed equally among students of section A or B.

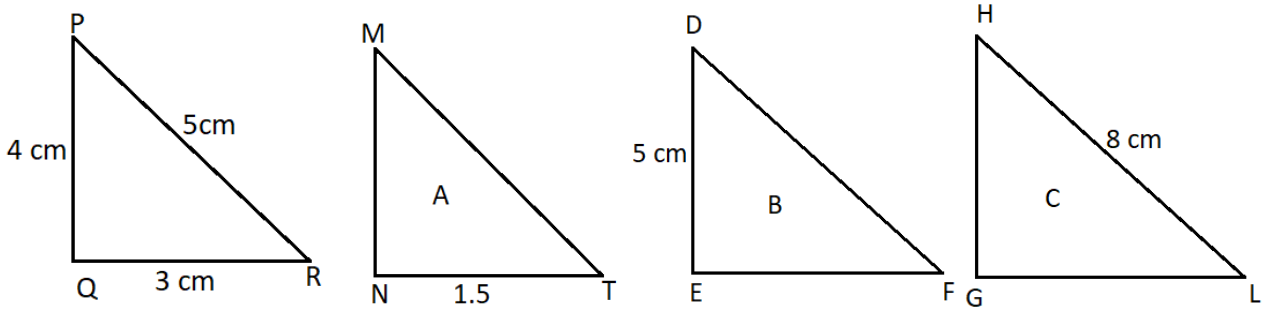
37. As many as 44 IT hardware manufacturers including global PC makers have registered for manufacturing laptops, tablets and personal computers in India. According to Counterpoint Research, Lenovo, HP, Dell, Apple and Acer were the top five companies in the personal computer segment in the June 2023 quarter. One of the manufacturers of laptop produced 60000 units in 3rd year and 70000 units in the 7th year. Assuming that a production increases uniformly by a fixed number every year, find the following data. (4)

(i) The production in the 1st year.

(ii) How many fixed number of units uniform increases in every year?

(iii) The production in the 15th year. **OR** **(iii)** The total production in 7 years.

38. A triangle PQR with sides 3 cm, 4cm and 5 cm is shown. Triangle A, triangle B and triangle C are all similar to triangle PQR. (4)



(i) Find FE

(ii) Find DF

(iii) Find the unknown length of triangle A.

OR

(iii) Find the unknown length of triangle C.