विद्या सर्वार्थि साधिका

ANANDALAYA

PERIODIC TEST – 2

Class : X

Subject: Mathematics M.M: 80

Date : 26– 09 –2022 Time: 3Hours

General Instructions:

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

Part – A:

1. It consists two sections- I and II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

Part – B:

1. Question No 21 to 26 are Very short answer Type questions of 2 mark each,
2. Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks. \

PART- A SECTION - I

1 a) If HCF $(6,\ a)\ =\ 2$and LCM$(6,\ a)\ = 60$then find the value of a. (1)

(A) 10 (B) 20 (C) 30 (D) 120

OR

b) Which of the following is equivalent to a decimal that terminates?

(A) $\frac{1}{5^2 \times 2^2}$ (B) $\frac{1}{2^2 \times 3}$ (C) $\frac{1}{5^2 \times 7}$ (D) $\frac{1}{5^2 \times 11}$

2 a) If the origin is the mid-point of the line segment joining the points (2, 3) and (x, y), then the value of (x, y) is_____ (1)

(A) $(2, 3)$ (B) $(-2, 3)$ (C) $(-2, -3)$ (D) $(2, -3)$

OR

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

(A) $(-2,\ 0)$ (B) $(0, -2)$ (C) $(2, -2)$ (D) $(0, -1)$

3 Determine the values of p and q so that the prime factorization of 168 is expressible as $2^p \times q \times 7$. (1)

(A) $p = 3, q = 3$ (B) $p = 2, q = 3$ (C) $p = 3, q = 2$ (D) $p = 2, q = 4$

4 Write a quadratic polynomial, sum of whose zeroes is $2\sqrt{3}$and their product is 2. (1)

(A) $x^2 + 2\sqrt{3} + 2$ (B) $x^2 - 2\sqrt{3} + 2$ (C) $x^2 - 2\sqrt{3} - 2$ (D) $x^2 - 2 + 2\sqrt{3}$

5 If the difference of the roots of the equation$x^2 - bx + c = 0$be 1, then_____. (1)

(A) $b^2 - 4c + 1 = 0$ (B) $b^2 + 4c = 0$ (C) $b^2 - 4c - 1 = 0$ (D) $b^2 - 4c = 0$

6 a) Which one of the following equations has no real roots? (1)

(A) $x^2 - 4x + 3\sqrt{2}$ (B) $x^2 + 4x - 3\sqrt{2}$ (C) $x^2 - 4x - 3\sqrt{2}$ (D) $3x^2 + 4\sqrt{3}x + 4$

OR

b) Find the value of$k$ for which the quadratic equation$x^2 - 4x + k = 0$ has equal roots.

(A) -4 (B) 1 (C) 4 (D) 16

7 For what value of c, the following system of linear equations have no solutions? (1)
$cx + 3y - 3 = 0, \quad 12x + cy - 6 = 0$.
(A) -6 (B) ± 6 (C) 6 (D) 36

8. If in two triangles ABC and PQR, $\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$, then (1)
(A) $\Delta PQR \sim \Delta CAB$ (B) $\Delta PQR \sim \Delta ABC$
(C) $\Delta CBA \sim \Delta PQR$ (D) $\Delta BCA \sim \Delta PQR$

9 Find the common difference of the AP. $x + 3y, 2x + 5y, 3x + 7y, \ldots\ldots\ldots$ (1)
(A) $x - 2y$ (B) $x + 2y$ (C) $2y$ (D) $x + y$

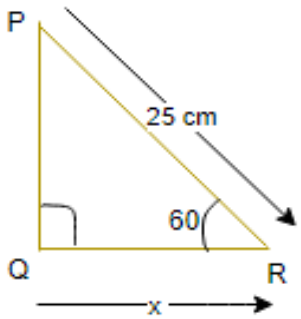
10 a) If Δ ABC is right angled at C, then the value of $cos\,(A + B)$ is_____ (1)
(A) 1 (B) 0 (C) $\frac{\sqrt{3}}{2}$ (D) $\frac{1}{2}$

OR

b) If $\sec^2\theta\,(1 + \sin\theta)\,(1 - \sin\theta) = k$, then k = _____.
(A) 1 (B) 2 (C) 3 (D) 0

11 Find the distance of the point $(1, 2)$ from the midpoint of the line segment joining the points $(6, 8)$ and $(2, 4)$. (1)

12 In figure, PQR is a right angled triangle, the value of x is_____ cm. (1)



13 a) Find the 18^{th} term of the AP $\sqrt{2}, 3\sqrt{2}, 5\sqrt{2}, 7\sqrt{2}$, ... (1)

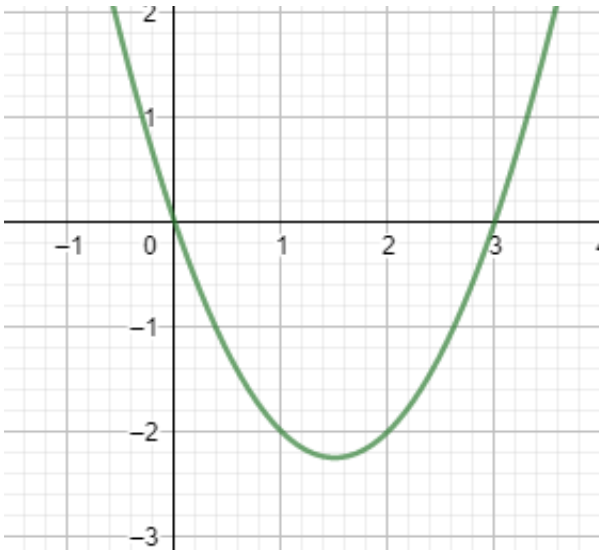
OR

b) The second term of an AP is $(x - y)$and 5th term is $(x + y)$, find the first term.

14 Find the number of solutions of the following pair of linear equations: (1)
$x + 2y - 8 = 0, \quad 2x + 4y = 16$.

15 Solve the following quadratic equation: $5x^2 + 11x + 6 = 0$. (1)

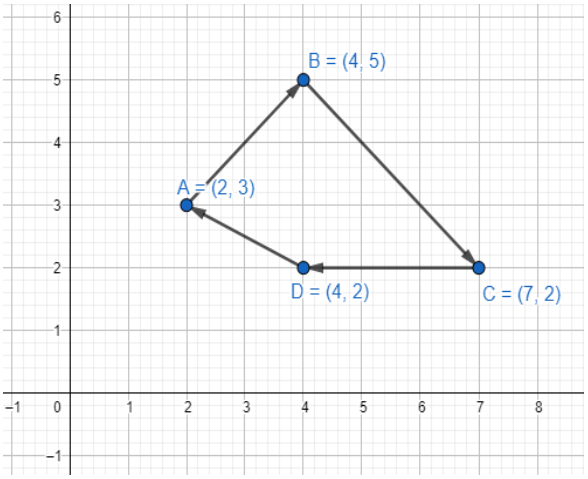
16 The graph of a quadratic polynomial is given. Write the zeroes of the polynomial. (1)



SECTION – II

Case study based questions are compulsory. Attempt any **four** sub parts of each question. Each sub-part carries 1 mark

17 Mansi starts cycling from her home to a park. Instead of going to the park directly, she goes to her friend's house and both started cycling towards the park. After an hour, while coming back to her house she bought 2 packets of Amul gold milk.
Assume that all distances covered are in straight line.
If the house is situated at A (2, 3), friend's house at B (4, 5), park at C (7, 2) and Amul shop at (4, 2). Using the concepts of coordinate geometry, answer the following.



i) What is the actual distance from Mansi's home to Amul shop. (1)
(A) 2 (B) 4 (C) $\sqrt{5}$ (D) 1

ii) Distance covered by Mansi from her home to friend's house = ____ units (1)
(A) $\sqrt{8}$ (B) $\sqrt{10}$ (C) 8 (D) 2

iii) Actual distance from Mansi's house to the park = _____units (1)
(A) $\sqrt{24}$ (B) $\sqrt{27}$ (C) 26 (D) $\sqrt{26}$

iv) Mid -point of side AC =_____ (1)
(A) $\left(\frac{9}{2}, \frac{5}{2}\right)$ (B) $\left(\frac{5}{2}, \frac{9}{2}\right)$ (C) $\left(4, \frac{7}{2}\right)$ (D) $\left(\frac{9}{2}, 0\right)$

v) Mid -point of side AB =_____ (1)
(A) (3 ,3) (B) (4 , 4) (C) (4, 3) (D) (3 , 4)

18 Ajay runs a book shop at Anand. He received 480 chemistry books, 192 physics books and 672 Mathematics books of class XI. He wishes to arrange these books in minimum numbers of stacks such that each stack consists of the books on only one subject and the number of books in each stack is the same. Using the concepts of HCF and LCM, answer the following.

i) Find the number of books in each stack. (1)
(A)26 (B) 48 (C) 24 (D) 54

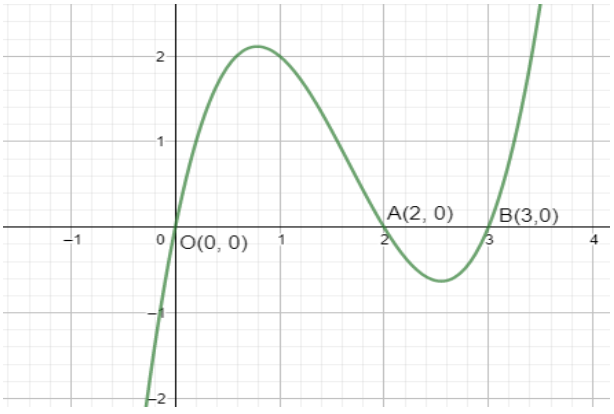
ii) Number of stacks of Mathematics books are ____ (1)
(A) 24 (B) 14 (C) 60 (D) 80

iii) Minimum number of stacks of all the books are _____ (1)
(A) 24 (B) 25 (C) 27 (D) 28

iv) Difference in number of stacks of Mathematics books and sum of stacks of Physics and Chemistry books is _____ (1)
(A) 4 (B) 10 (C) 8 (D) 0

v) If the thickness of each book of physics is 2.5 cm then height of each stack is (1)
(A) 1.4 m (B) 1.3 m (C) 1.2 m (D) 1 m

19 Due to heavy storm, an electric wire got bent as shown in the figure. Based on the figure, answer the following questions.



i) What type of polynomial is represented by the graph? (1)

(A) Quadratic (B) Linear (C) Bi- quadratic (D) cubic

ii) The number of zeroes of the polynomial (formed by the wire) are _____ (1)

(A) 1 (B) 2 (C) 3 (D) 4

iii) The zeroes of the polynomial are _____ (1)

(A) $0,\ 1,\ 2$ (B) $0,\ 2, 3$ (C) $1,\ 2, -3$ (D) $1,\ 2$

iv) A polynomial of degree n has _____ (1)

(A) only one zero (B) at least n zeroes (C) at most n zeroes (D) three zeroes

v) The polynomial is of the form_____ (1)

(A) $x(x-1)(x+3)$ (B) $x(x-2)(x-3)$ (C) $x(x-2)(x+3)$ (D) $(x-1)(x-3)$

20 A two wheeler manufacturer produced 20000 bikes in the third year and 35000 bikes in the ninth year. Assuming the production increases uniformly by a fixed number every year. Using the concepts of AP, find the following.

i) The production in the first year is _____ (1)

(A) 15500 (B) 15000 (C) 10000 (D) 17250

ii) The uniform increase of production (d) = _____ (1)

(A) 5000 (B) 2000 (C) 2250 (D) 2500

iii) The production in the 11^{th} year is _____ (1)

(A) 40000 (B) 37250 (C) 42250 (D) 50000

iv) The total production in 4 years = _____ (1)

(A) 70000 (B) 65000 (C) 75000 (D) 75500

v) General formula for the production in the n^{th} year a_n = _____ (1)

(A) $12500 + 2500n$ (B) $15000 + 2500n$ (C) $17500 + 2500n$ (D) $12500 - 2500n$

PART- B

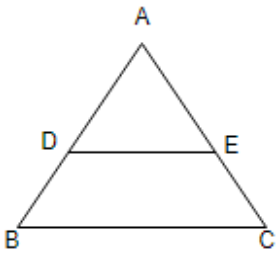
All questions are compulsory. In case of internal choices, attempt any one.

21 a) The q^{th} term of the AP $\frac{1}{p}, \frac{1+p}{p}, \frac{1+2p}{p}$ ... ... is_____ (2)

OR

b) If the sum of first m terms of an AP is $2m^2 + 3m$, find its second term.

22 In ΔABC, D and E are points on the sides AB and AC respectively, such that DE || BC. If $AD = x, DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, Find the value of x. (2)



23 a) Find the coordinates of a point A, where AB is the diameter of a circle whose centre is $O(2, -3)$ and B is $(1, 4)$. (2)

OR

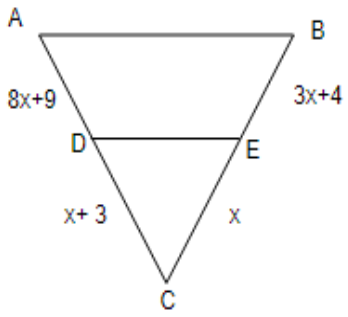
b) Find the ratio in which the line segment joining the points (6, 4) and (1, –7) is divided by *x*-axis.

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

25 If $tan\ \theta = \frac{8}{7}$, evaluate : $\frac{(1+sin\theta)(1-sin\theta)}{(1+cos\theta)(1-cos\theta)}$ (2)

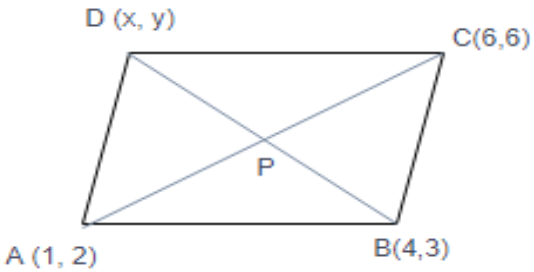
26 If $\alpha\ and\ \beta$ are the zeroes of the polynomial $x^2 - 5x + 4$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$. (2)

27 What value(s) of x will make DE || AB in the given figure? Given that $AD = 8x + 9, CD = x + 3, CE = x \text{ and } EB = 3x + 4$. (3)



28 Is 68 a term of the A.P. 7, 10, 13,16,…….. ? Justify your answer. (3)

29 If $A(1, 2), B(4, 3) \text{ and } C(6, 6)$ are the three vertices of a parallelogram $ABCD$, find the coordinates of the fourth vertex D. (3)



30 a) Prove that : $\frac{cosA}{1+sinA} + \frac{1+sinA}{cosA} = 2\,secA$. (3)

OR

b) If $A = 60° \text{ and } B = 30°$, verify that $sin(A - B) = sin\,A\,cos\,B - cos\,A\,sin\,B$.

31 Show that: $5 - 2\sqrt{3}$ is an irrational number. (3)

32 a) There are some students in the two examination halls A and B. To make the number of students equal in each hall, 10 students are sent from A to B. But if 20 students are sent from B to A, the number of students in A becomes double the number of students in B. Find the number of students in the two halls. (3)

OR

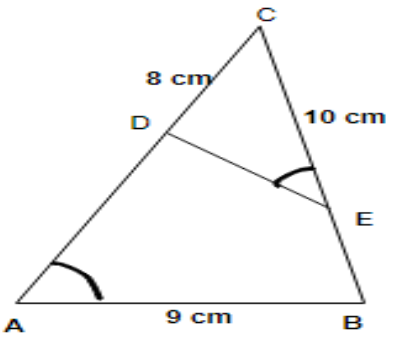
b) Solve for $x \text{ and } y$ by the method of elimination: $2x - y = 5$; $3x - 5y = 4$.

33 A 2-digit number is such that product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number. (3)

34 a) State and prove Basic Proportionality Theorem (Thales Theorem) (5)

OR

b) In the figure, if $\angle A = \angle CED, AB = 9\ cm, AD = 7\ cm, CD = 8\ cm \text{ and } CE = 10\ cm$. Find DE.



35 Sum of the first 14 terms of an A.P. is 1505 and its first term is 10. Find its 25^{th} term. (5)

36 Solve the equations graphically: $2x + y = 2$; $2y - x = 4$. What is the area of the triangle formed by the two lines and the line $y = 0$? (5)