विद्या सर्वार्थ साधिका

# ANANDALAYA

## PERIODIC TEST – 2

## Class : X

Subject: Mathematics
Date : 27/09/2019

M.M: 60
Time: $2\frac{1}{2}$ Hours

**General Instructions:**

i) All questions are compulsory.
ii) This question paper contains 29 questions.
iii) Questions 1 – 14 in Section A are very short-answer type questions carrying 1 mark each.
iv) Questions 15 – 18 in Section B are short-answer type questions carrying 2 marks each.
v) Questions 19 – 24 in Section C are long-answer-I type questions carrying 3 marks each.
vi) Questions 25 – 29 in Section D is long-answer-II type questions carrying 4 marks.

**SECTION-A**

1. The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, the other number is_____. (1)
(a) 70 (b) 72 (c) 75 (d) 81

2. The surface area of a sphere is 616 $cm^2$ , its radius is _____. (1)
(a) 49 $cm$ (b) 5 $cm$ (c) 7 $cm$ (d) 8 $cm$

3. If $\alpha$ $and$ $\beta$ are zeros of the quadratic polynomial $x^2 - 3kx + k^2$ , the value of $k$ if $\alpha^2 + \beta^2 = \frac{7}{4}$ (1)
is_____.
(a) $\pm\frac{1}{2}$ (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) $\pm\frac{1}{4}$

4. A fair coin is tossed thrice. The probability of getting at least one head is _____. (1)
(a) $\frac{1}{2}$ (b) $\frac{7}{8}$ (c) $\frac{1}{8}$ (d) $\frac{3}{8}$

5. For what value of $c$ will the following system of equations have infinite number of solutions? (1)
$2x + (c-2)y = c$ , $6x + (2c-1)y = 2c + 5$.
(a) 7 (b) $\pm 5$ (c) 5 (d) 3

6. If $\Delta ABC \sim \Delta QRP$ , $\frac{ar(ABC)}{ar(QRP)} = \frac{9}{4}$ , $AB = 18\ cm$ $and$ $BC = 15\ cm$ $then$ $PR =$ _____. (1)
(a) 10 $cm$ (b) 12 $cm$ (c) $\frac{20}{3}$ $cm$ (d) 8 $cm$

7. The nature of roots of the quadratic equation $4x^2 + 4\sqrt{3}x + 3 = 0$ is _____. (1)
(a) real and equal roots (b) real and distinct roots
(c) no real roots (d) none of these.

8. Point P divides the line segment joining the points A (2, –5) and B (5, 2) in the ratio 2: 3. Name the quadrant in which P lies. (1)

OR

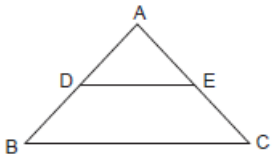
The coordinates of one end point of a diameter of a circle are (4, –1) and the coordinates of the centre are (1, –3). Find the coordinates of the other end of the diameter.

9. If 1 is a zero of the polynomial $p(x) = ax^2 - 3(a-1) - 1$, then the value of $a =$ _____. (1)

10. A ticket is drawn at random from a bag containing tickets numbered from 1 to 40. Find the probability that the selected ticket has a number which is a multiple of 5. (1)

11. Write whether the following pair of linear equations is consistent or not. (1)
$\frac{4}{3}x + 2y = 8$ , $2x + 3y = 12$

12. In ΔABC, D and E are points on sides AB and AC respectively such that $DE \,||\, BC$ and $AD : DB = 3 : 1$ If $EA = 6.6\ cm$ then find AC. (1)




13. For what value of *k* does $(k - 12)\ x^2 + 2\ (k - 12)\ x + 2 = 0$ have equal roots? (1)

14. Three cubes each of 5 cm edge are joined end to end. Find the surface area of the resulting cuboid. (1)

OR

A sphere of maximum volume is cut out from a solid hemisphere of radius 7 cm. What is the ratio of the volume of the hemisphere to that of the cut out sphere?

## SECTION -B

15. Two alarm clocks ring their alarms at regular intervals of 50 seconds and 48 seconds if they first beep together at 12 noon, at what time will they beep again for the first time? (2)

OR

Determine the values of $p$ and $q$ so that the prime factorization of 2520 is expressible as $2^3 \times 3^p \times q \times 7$.

16. If the sum of the zeroes of the quadratic polynomial $ky^2 + 2y - 3k$ is equal to twice their product, find the value of *k*. (2)

OR

If $(x + a)$ is a factor of two polynomials $x^2 + px + q$ and $x^2 + mx + n$ , then prove that $a = \frac{n-q}{m-p}$.

17. Solve the following system of equations by elimination method. (2)
$x + y = a - b$ ; $ax - by = a^2 + b^2$

18. If $\alpha\ and\ \beta$ are roots of $ax^2 + bx + b = 0$, then find the value of $\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} + \sqrt{\frac{b}{a}}$. (2)

## SECTION-C

19. Show that only one of the numbers *n*, *n* + 2 and *n* + 4 is divisible by 3. (3)

OR

Use Euclid's algorithm to find the HCF of 4052 and 12576.

20. If α and β are zeroes of $3x^2 - 6x + 4$, then find the value of : $\left(\frac{\alpha}{\beta} + \frac{\beta}{\alpha}\right) + 2\left(\frac{1}{\alpha} + \frac{1}{\beta}\right) + 3\ \alpha\ \beta$ . (3)

21. A bag contains 12 balls out of which $x$ are white. (3)
(*i*) If one ball is drawn at random, what is the probability that it will be a white ball?
(*ii*) If 6 more white balls are put in the bag, the probability of drawing a white ball will be double than that in (*i*). Find *x*.

22. AD is an altitude of an equilateral triangle ABC. On AD as base, another equilateral triangle ADE is constructed. Prove that area (Δ ADE) : area (Δ ABC) = 3 : 4 (3)

OR

In a right angle triangle ABC, right angled at B , AD and CE are two medians drawn from A and C respectively. If AC = 5 cm and AD = $\frac{3}{2}\sqrt{5}$ , find the length of CE.

23. A rectangular sheet of paper 30 cm × 18 cm can be transformed into the curved surface of a right circular cylinder in two ways either by rolling the paper along its length or by rolling it along its breadth. Find the ratio of the volumes of the two cylinders thus formed. (3)

OR

Solid spheres of diameter 6 cm are dropped into a cylindrical beaker containing some water and are fully submerged. If the diameter of the beaker is 18 cm and the water rises by 40 cm, find the number of solid spheres dropped in the water.

24. The three vertices of a parallelogram ABCD are A(3, –4), B(–1, –3) and C(–6, 2). Find the coordinates of vertex D. (3)

**SECTION-D**

25. Draw the graphs of the following equations: $x + y = 5$, $x - y = 5$. (4)
(i) Find the solution of the equations from the graph.
(ii) Shade the triangular region formed by the lines and the *y*-axis.

26. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides. (4)

OR

State and prove converse of Pythagoras Theorem.

27. Solve the following for *x* : $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$ (4)

OR

Some students planned a picnic. The total budget for food was ₹ 2,000. But 5 students failed to attend the picnic and thus the cost of food for each member increased by ₹ 20. How many students attended the picnic and how much did each student pay for the food?

28. A bucket open at the top is of the form of a frustum of a cone. The diameters of its upper and lower circular end are 40 cm and 20 cm respectively. If total 17600 $cm^3$ of water can be filled in the bucket, find its total surface area. [Use $\pi = \frac{22}{7}$ ] (4)

29. Draw a circle of radius 3 cm. Take two points A and B on one of its extended diameter each at a distance of 6 cm from its centre. Draw tangents to the circle from these two points A and B. Write the steps of construction. (4)