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PAPER 5
CLASS 10
MID TERM EXAMINATION

General Instructions:
Read the following instructions carefully and strictly follow them.

1. This question paper contains 38 questions. All questions are compulsory.
2. This question paper is divided into five sections – A, B, C, D and E.
3. In Section – A, question numbers 1 to 18 are multiple choice questions (MCQs) and question numbers 19 and 20 are Assertion – Reason based questions of 1 mark each.
4. In Section – B, question numbers 21 to 25 are very short answer (VSA) type of questions, carrying 2 marks each.
5. In Section – C, question numbers 26 to 31 are short answer (SA) type questions, carrying 3 marks each.
6. In Section – D, question numbers 32 to 35 are long answer (LA) type questions, carrying 5 marks each.
7. In Section – E, question numbers 36 to 38 are case study based questions carrying 4 marks each with sub – parts of values 1, 1 and 2 respectively.
8. There is no overall choice.
9. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.
10. Use of calculator is not allowed.

Section – A

This section comprises multiple choice question (MCQs) of 1 mark each.

1. The LCM of two numbers is 1200. Which of the following cannot be their HCF?

a. 600 b. 500 c. 400 d. 200

2. If the LCM of a and 18 is 36 and the HCF of a and 18 is 2, then the value of a is

a. 4 b. 3 c. 2 d. 1

3. If one zero of the quadratic polynomial $ax^2 + bx + c, a \neq 0$ is 0, then the other zero is

a. $\frac{c}{a}$ b. $\frac{a}{b}$ c. $-\frac{a}{b}$ d. $-\frac{b}{a}$

4. If the quadratic polynomial $x^2 + kx + k$ has equal zeroes, then k cannot be
a. 0
b. an even integer
c. a positive integer
d. an odd integer
5. The pair of equations $x = 2$ and $x = 5$ has
a. no solution
b. infinitely many solutions
c. unique solution
d. none of these
6. The area of a trapezium is 1400 cm^2 and its altitude is 50 cm. Find the two bases, if the number of cms in each base is an integer divisible by 9. The number of solutions to this problem are:
a. 1 b. 2 c. 0 d. none of these
7. In a quadratic equation with rational coefficients, $2 + \sqrt{5}$ is one root, the other root will be
a. $5 + \sqrt{2}$ b. $\sqrt{5} + \sqrt{2}$ c. $2 - \sqrt{5}$ d. $\sqrt{2} - \sqrt{5}$
8. Who gave the quadratic formula to solve a quadratic equation?
a. Brahamgupta
b. Bhaskara II
c. Sridharacharya
d. Al – Khwarizmi
9. The famous mathematician associated with finding the sum of first 100 natural numbers is
a. Pythagoras b. Newton c. Gauss d. Euclid
10. If the sum of n terms of an A.P. is $3n^2 + 5n$, then which of its terms is 164?
a. 26th b. 27th c. 28th d. none of these
11. If 11 times the 11th term of an A.P. is equal to 7 times its 7th term, then its 18th term will be:
a. 7 b. 11 c. 18 d. 0
12. The perimeters of two similar triangles are 24 cm and 18 cm respectively. If one side of the first is 8 cm, then the corresponding side of the other triangle is:
a. 3 cm b. 6 cm c. 12 cm d. 7.5 cm
13. In a ΔABC, XY || BC. If AX = 3 cm, XB = 1.5 cm and AC = 6 cm, then AY : YC is:
a. 2 : 3 b. 1 : 3 c. 1 : 2 d. 2 : 1
14. A circle drawn with origin as centre passes through $\left(\frac{13}{2}, 0\right)$. The point which does not lie in the interior of the circle is

a. $\left(-\frac{3}{4}, 1\right)$ b. $\left(2, \frac{7}{3}\right)$ c. $\left(5, -\frac{1}{2}\right)$ d. $\left(-6, \frac{5}{2}\right)$

15. The point which lies on the perpendicular bisector of the line segment joining the points $A(-2, -5)$ and $B(2, 5)$ is

a. $(0, 0)$ b. $(0, 2)$ B. $(2, 0)$ d. $(-2, 0)$

16. A line segment is of length 10 units. If the coordinates of its one end are $(2, -3)$ and the abscissa of the other end is 10, then its ordinate is

a. $9, 6$ b. $9, -6$ c. $-3, 9$ d. $3, -9$

17. Assume that an umbrella is a flat circle of radius 40 cm. If the umbrella has 8 ribs, then the area of the cloth between two consecutive ribs is:

a. $160\pi\ cm^2$ b. $180\pi\ cm^2$ c. $200\pi\ cm^2$ d. $240\pi\ cm^2$

18. The area of a sector with central angle $x°$ of a circle with radius $4r$ is:

a. $\frac{4\pi x}{360°}$ b. $\frac{2\pi x r^2}{45°}$ c. $\frac{\pi r^2 x}{360°}$ d. $\frac{2\pi r x}{360°}$

Directions: In question numbers 19 and 20, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct option.

19. Statement A (Assertion): Two cubes each of volume 125 cm^3 are joined end to end to form a cuboid so that the surface area of the resulting cuboid is 250 cm^2.

Statement B (Reason): If n cubes each of volume a^3 cubic units are joined end to end to form a cuboid, then the surface area of the resulting cuboid is $2(2n + 1)a^2$ square units.

a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
b. Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
c. Assertion (A) is true but reason (R) is false.
d. Assertion (A) is false but reason (R) is true.

20. Statement A (Assertion): The maximum volume of a cone that can be carved out of a solid hemisphere of radius r is $\frac{1}{3}\pi r^3$.

Statement B (Reason): For a cone of radius r and height h, volume is given by $\pi r^2 h$.

a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
b. Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
c. Assertion (A) is true but reason (R) is false.
d. Assertion (A) is false but reason (R) is true.

Section – B

This section comprises of very short answer type questions (VSA) of 2 marks each.

21. Determine the set of values of p for which the quadratic equation $2x^2 + px + 3 = 0$ has real roots.
22. Find the value of a and b such that $11, a, b, 2$ are in A.P.
23. ABC is an isosceles triangle with AB = AC and D is a point on AC such that $BC^2 = AC \times CD$, prove that BD = BC.
24. Find the ratio in which the point (11, 15) divides the line segment joining the points $(15, 5)$ and $(9, 20)$.
25. Determine the ratio of the volume of a cube to that of a sphere which will exactly fit inside the cube.

Section – C

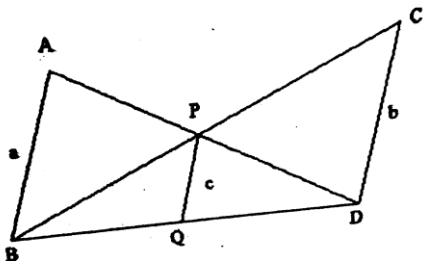
This section comprises of short answer type questions (SA) of 3 marks each.

26. A mason has to fit a bathroom with square tiles of largest possible size. The size of the bathroom is 10 ft. by 8 ft. What would be the size in inches of the tile required that has to be cut and how many such tiles are required?
27. Solve the equations $1.25x + 1.1y = 1896,\ \ 1.1x + 1.25y = 1770$
28. Find three numbers in A.P. whose sum is 27 and whose product is 585.
29. Show that the points $(2a, 4a), (2a, 6a)$ and $\left(2a + \sqrt{3}a, 5a\right)$ form an equilateral triangle.
30. Find the area swept by the minute hand of a clock in ten minutes, if the length of the minute hand is 14 cm.
31. A semi – circular sheet of metal diameter 28 cm is bent and an open conical cup is made. Find the capacity of the cup.

Section – D

This section comprises of long answer type questions (LA) of 5 marks each.

32. A takes 3 hours more than B to walk 30 km. But, if A doubles his pace, he is ahead of B by $\frac{3}{2}$ hours. Find their speed of walking.
33. If the ratio of the roots of $ax^2 + bx + b = 0$ is $c : d$, prove that $\sqrt{\frac{c}{d}} + \sqrt{\frac{d}{c}} + \sqrt{\frac{b}{a}} = 0$.
34. In the given figure, AB || PQ || CD. AB = a, CD = b, PQ = c. Prove that $\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$.

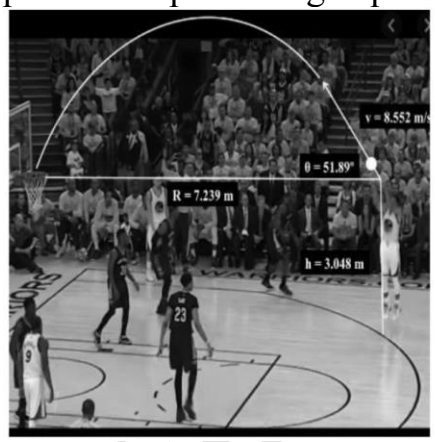


35. The interior of a building is in the form of a cylinder of diameter 4.3 m and height 3.5 m surmounted by a cone whose vertical angle is a right angle. Find the area of the surface and the volume of the building.

Section – E

This section comprises of 3 case study based questions of 4 marks each.

36. Basketball and soccer are played with a spherical ball. Even though an athlete dribbles the ball in both the sports, a basketball player uses his hands, and a soccer player uses his feet. Usually, soccer is played outdoors on a large field and basketball is played indoor on a court made out of wood. The projectile (path traced) of soccer ball and basketball are in the form of parabola representing a quadratic polynomial.

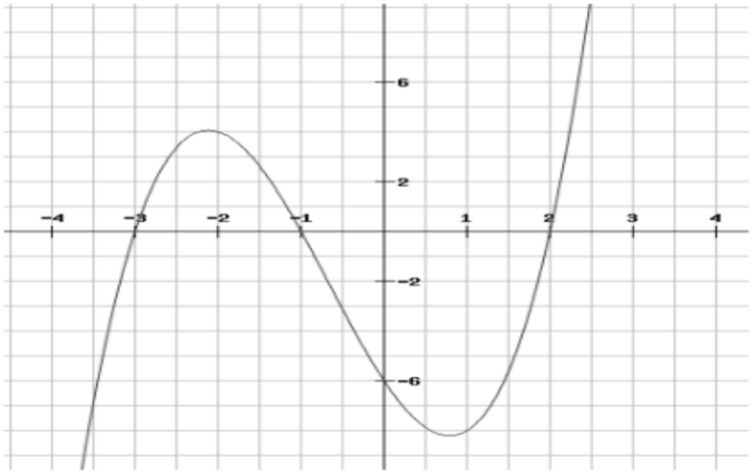


Answer the following questions:

(i) What is the shape of the path traced shown in the figure?

(ii) The graph of the parabola opens upwards if _____ for $ax^2 + bx + c$.

(iii) Write the three zeroes from the graph.



37. Dipesh bought 3 notebooks and 2 pens for ₹ 80. Lokesh also bought the same type of notebooks and pens as Dipesh. He paid ₹ 110 for 4 notebooks and 3 pens.

Answer the following questions:

(i) Let the cost of one notebook be x and that of pen by y. Write the linear equations for the given conditions.

(ii) What is the exact cost of each notebook?

(iii) What is the total cost if they will purchase the same type of 15 notebooks and 12 pens?

38. The school auditorium was to be constructed to accommodate at least 1500 people. The chairs are to be placed in concentric circular arrangement in such a way that each succeeding circular row has 10 seats more than the previous one.

Answer the following questions:

(i) If the first circular row has 30 seats, how many seats will be there in the 10^{th} row?

(ii) For 1500 seats in the auditorium, how many rows need to be there?

(iii) If there were 17 rows in the auditorium, how many seats will be there in the middle row?