

SECTION A

Q1-Q20 are multiple choice questions. Select the most appropriate answer from the given options.

Q1. The value of $0.\overline{2}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$ is? [1]

- (a) $\frac{1}{5}$ (b) $\frac{2}{9}$ (c) $\frac{2}{5}$ (d) $\frac{1}{8}$

Q2. Which of the following can be a term of a polynomial?

- (a) $\frac{3}{x}$ (b) $2x$ (c) \sqrt{x} (d) $x^{\sqrt{x}}$

Q3. The number of dimensions a solid has [1]

- (a) 0 (b) 1 (c) 2 (d) 3

Q4. Angles of a triangle are in the ratio 2:4:3. The smallest angle of the triangle is? [1]

- (a) 60° (b) 40° (c) 80° (d) 20°

Q5. D, E and F are the mid-points of sides BC, CA and AB respectively of $\triangle ABC$. Then $\triangle DEF$ is congruent to triangle [1]

- (a) ABC (b) AEF (c) BFD, DCE (d) AFE, FBD, EDC

Q6. The point whose ordinate is 4 and which lies on Y-axis is [1]

- (a) (0,4) (b) (4,0) (c) (4,4) (d) (4,3)

Q7. The base of a right triangle is 8cm and hypotenuse is 10cm. Its area is equal to [1]

- (a) 48cm^2 (b) 40cm^2 (c) 24cm^2 (d) 80cm^2

Q8. A linear equation in two variable has, [1]

- (a) no solution (c) only two solutions
(b) only one solution (d) Infinitely many solutions

Q9. Consecutive angles of a parallelogram are [1]

- (a) equal (b) supplementary (c) complementary (d) none of these

Q10. In Figure 1, O is the centre of the circle having radius 5cm. AB and AC are two chords such that $AB=AC=6\text{cm}$. If OA meets BC at M, then $OM=$ [1]

- (a) 3.6cm (b) 1.4cm (c) 2cm (d) 3cm

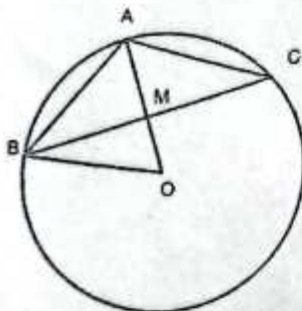


Figure 1: Q10

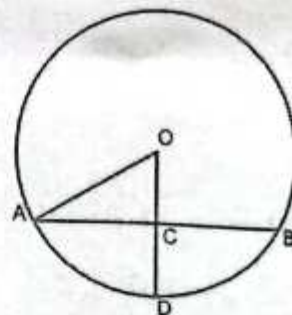


Figure 2: Q11

Q11. In given Figure 2, if O is the centre of the circle, $AB=8\text{cm}$, $OA=5\text{cm}$ and $OD \perp AB$, then CD is equal to [1]

- (a) 3cm (b) 2cm (c) 4cm (d) 5cm

Q12. The region between a chord and either of its corresponding arcs is called [1]

- (a) an arc (b) a sector (c) a segment (d) none of these

- Q13. If diagonal of a cyclic quadrilateral are the diameters of the circle through the vertices of a quadrilateral, then quadrilateral is a [1]
 (a) parallelogram (b) square (c) rectangle (d) trapezium
- Q14. The diameter of a sphere whose surface area is 346.5cm^2 is [1]
 (a) 5.25cm (b) 5.75cm (c) 11.5cm (d) 10.5cm
- Q15. The radius of hemispherical balloon increases from 6cm to 12cm as air is being pumped into it. The ratios of the surface areas of the balloon in the two cases is [1]
 (a) 1:4 (b) 1:3 (c) 2:3 (d) 2:1
- Q16. A primary data is always taken [1]
 (a) from annual declaration of the government (c) from the old office files
 (b) personally or through appointed investigators for a specific purpose (d) from elderly persons through their experiences in life
- Q17. If the mean of n observations $x_1, x_2, x_3, \dots, x_n$ is \bar{x} , then $\sum_{i=1}^n (x_i - \bar{x})$ is equal to [1]
 (a) 1 (b) -1 (c) 0 (d) none of these
- Q18. \sqrt{x} is a polynomial known as a [1]
 (a) linear polynomial (c) constant polynomial
 (b) quadratic polynomial (d) none of these
- Q19. Assertion: The curved surface area of a cylinder of height 14cm is 88cm^2 . The diameter of the cylinder is 2cm.
 Reason: Using the formula πrl [1]
 (a) Both Assertion and Reason are true and Reason is correct explanation of Assertion
 (b) Both Assertion and Reason are true but Reason is not correct explanation of Assertion
 (c) Assertion is true but Reason is false
 (d) Assertion is false but Reason is true
- Q20. Assertion: Number of zeroes of the Zero Polynomial is finite
 Reason: The degree of Zero Polynomial is not defined [1]
 (a) Both Assertion and Reason are true and Reason is correct explanation of Assertion
 (b) Both Assertion and Reason are true but Reason is not correct explanation of Assertion
 (c) Assertion is true but Reason is false
 (d) Assertion is false but Reason is true

SECTION B

Q21. Find the remainder when $x^3 - ax^2 + 6x - a$ is divided by $x - a$. [2]

Q22. Factorise: $6x^2 + 5x - 6$ [2]

(or)

Rationalise $\frac{1}{\sqrt{4} - \sqrt{3}}$

Q23. In the given Figure 3, if $AB \parallel CD$, $EF \perp CD$ and $\angle GED = 126^\circ$, find $\angle AGE$, $\angle GEF$ and $\angle FGE$ [2]

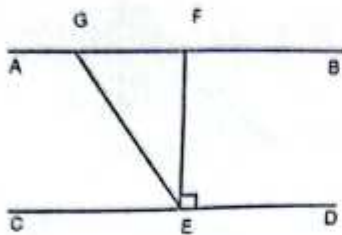


Figure 3: Q23

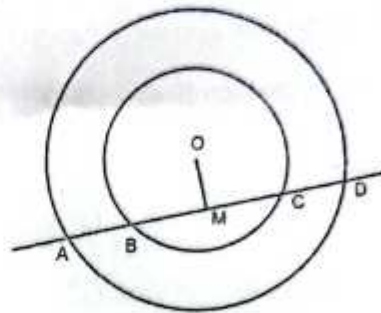


Figure 4: Q24

Q24. If a line intersects two concentric circles (circles with same centre) with centre O at A, B, C and D. prove that $AB = CD$. [2]

Q25. A right triangle ABC with sides 5cm, 12cm and 13cm is revolved about the side 12cm. Find the volume of the solid so obtained. [2]

(or)

Find the area of a triangle, two sides of which are 17cm and 11cm and the perimeter is 43cm.

SECTION C

Q26. Expand $\left[\frac{1}{4}a - \frac{1}{2}b + 1\right]^2$ by using suitable identity. [3]

Q27. It is given that $\angle XYZ = 64^\circ$ and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects $\angle ZYP$, find $\angle XYQ$ and reflex $\angle QYP$. [3]

Q28. There is a slide in a park. One of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the wall are 15m, 11m and 6m, find the area painted in colour. [3]

(or)

ABCD is a rectangle and P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rhombus.

Q29. If the non-parallel sides of a trapezium are equal, prove that it is cyclic. [3]

Q30. The sides of a triangular plot are in the ratio 3:5:7 and its perimeter is 300m. Find its area. [3]

(or)

Show that the angles of an equilateral triangle are 60° each

Q31. A cylindrical pillar is 50cm in diameter and 3.5m in height. Find the cost of painting the curved surface area of the pillar at the rate of Rs 12.50 per m^2 . [3]

SECTION D

Q32. A hemispherical tank is made up of an iron sheet 1cm thick. If the inner radius is 1m then find the volume of the iron used to make the tank [5]

(or)

The diameter of the moon is approximately one-fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?

Q33. (a) The following observations have been arranged in ascending order

29, 32, 48, 50, x , $x + 2$, 72, 78, 84, 95

If the median of the data is 63, find the value of x .

(b) Find the median and mode of 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14 and 18.

[5]

Q34. ABCD is a rectangle and P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rhombus. [5]

(or)

In a parallelogram ABCD, E and F are the mid-points of sides AB and CD respectively (see in Figure 5). Show that the line segment AF and EC trisect the diagonal BD

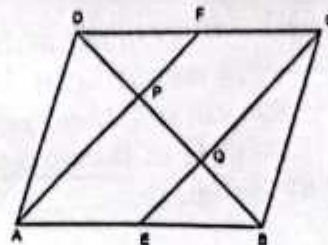


Figure 5: Q34

Q35. (a) A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.

(b) In Figure 6, $\angle PQR = 100^\circ$, where P, Q and R are points on a circle with centre O. Find $\angle OPR$.

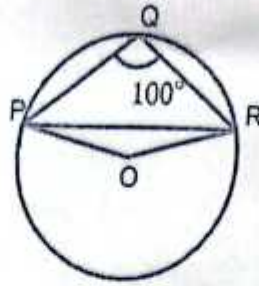


Figure 6: Q35 (b)

[5]

SECTION E

Q36. **CASE STUDY- I** Rainwater harvesting system is a technology that collects and stores rainwater for human use. Huzaif decided to do rainwater harvesting. He collected rainwater in the underground tank at the rate $30\text{cm}^2/\text{sec}$.

(a) What will be the equation formed if volume of water collected in x -seconds is taken as $y\text{cm}^3$. [1]

- (a) $30x = y$ (b) $x = 30y$ (c) $30 - x = y$ (d) $30 + y = x$

(b) What is the type of solution of the equation formed? [1]

- (a) a unique solution (c) infinitely many solutions
(b) only two solutions (d) no solution

(c) How much water will be collected in 60 seconds [2]

- (a) 1500cm^3 (b) 2cm^3 (c) 1800cm^3 (d) 1cm^3

(or)

How much time will it take to collect 900cm^3 of water

- (a) 20 seconds (b) 50 seconds (c) 40 seconds (d) 30 seconds

Q37. **CASE STUDY-II** There is a square park ABCD in the middle of Saket colony in Delhi.

Four children Deepak, Ashok, Arjun and Deepa went to play with their balls. The colour of the ball of Ashok, Deepak, Arjun and Deepa are red, blue, yellow and green respectively. All four children roll their ball from centre point O in the direction of XOY, X'OY, X'OY' and XOY'. Their balls stopped as shown in the image.

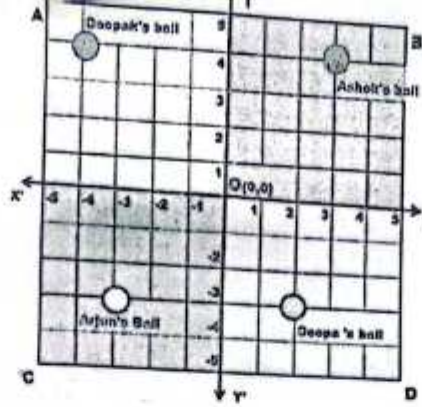


Figure 7: Q37

Answer the following questions:

(a) What are the coordinates of the ball of Ashok? [1]

- (a) (4,3) (b) (3,4) (c) (4,4) (d) (3,3)

(b) What are the coordinates of the ball of Deepa? [1]

- (a) (2,-3) (b) (3,2) (c) (2,3) (d) (2,2)

(c) What is the ordinates of the ball of Arjun? [2]

- (a) -3 (b) 3 (c) 4 (d) 2

(or)

What is the point $O(0,0)$ called?

- (a) y -axis (c) x -axis
 (b) ordinate (d) origin

Q38. CASE STUDY-III BSE stands for a disease called Bovine Spongiform Encephalopathy.

"Bovine" means that the disease affects cows, "spongiform" refers to the way the brain from a sick cow looks spongy under a microscope, and "encephalopathy" indicates that it is a disease of the brain. This disease is commonly called "mad cow disease."

A farmer has a field ABCD formed by two pair of parallel roads as shown below in which $l \parallel m$ and $p \parallel q$. His four cows are suffering from BSE. Thus, he tied them at four corners of the field ABCD.

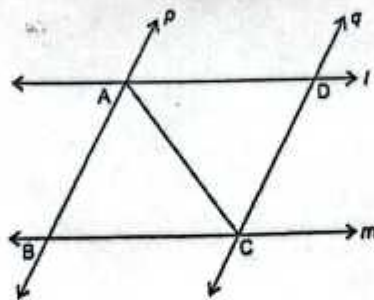


Figure 8: Q38

(a) If $\angle BAC = 30^\circ$, find $\angle ACD$ [1]

- (a) 20° (b) 30° (c) 60° (d) 90°

(b) $\angle ABC + \angle BCD = 180^\circ$ as [1]

- (a) corresponding angles are supplementary
(b) alternate interior angles are supplementary
(c) alternate exterior angles are supplementary
(d) angles on the same side of transversal are supplementary

(c) If cow at C and cow at D is 2km apart, then what is the distance between cor at A and cow at B [2]

- (a) 1km (b) 2km (c) 3km (d) 4km

(or)

If $\angle B = 45^\circ$, then $\angle D =$

- (a) 40° (b) 45° (c) 50° (d) 55°