

SAMPLE PAPER

TIME : 3 HRS.

MAX. MARKS : 80

GENERAL INSTRUCTIONS :

- ▶ All questions are compulsory.
- ▶ The question paper contains two parts A and B.
- ▶ Both Part-A and Part-B have internal choices.
- ▶ Part-A consist of two Sections - (I) and (II).

Section-(I) has 16 questions of 1 mark each. Internal choices is provided in 5 questions.

Section-(II) has 4 questions on case study. Each case study has 5 case - based subparts out of which 4 has to be attempted carrying 1 mark for each subpart.

- ▶ Part-B consist of three Sections - (III), (IV) and (V).

Section-(III) has 6 questions of 2 marks each. Internal choices is provided in 2 questions.

Section-(IV) has 7 questions of 3 marks each. Internal choices is provided in 2 questions.

Section-(V) has 3 questions of 5 marks each. Internal choices is provided in 1 question.

PART-A**SECTION-I**

1. Explain why $11 \times 13 \times 15 \times 17 + 17$ is a composite number.

OR

If two positive integers A and B can be expressed as $A = b^2$ and $B = a^3b$, where a, b, are prime numbers, then find LCM (A, B).

2. If α and β are the zeroes of the polynomial $4x^2 + 3x + 7$, then find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.
3. For what value of k, will the system of linear equations $x + 2y = 5$ and $3x + ky - 15 = 0$ has unique solution ?
4. The sum of the digits of a two digit number is 12. The number obtained by interchanging the two digits exceeds the given number by 18. Form a linear equation to represent the condition.
5. Which term of the A.P. 92, 88, 84, 80,.....is 0 ?

OR

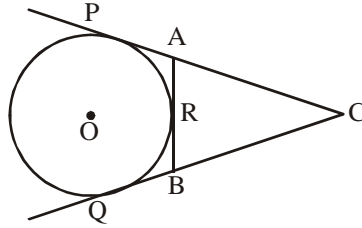
Find the next term of the A.P. $\sqrt{27}, \sqrt{48}, \sqrt{75}, \dots\dots$

6. Find the values of k for which the following quadratic equation has two equal roots.
 $2x^2 + kx + 3 = 0$
7. Find the roots of the quadratic equation $6x^2 - x - 2 = 0$.

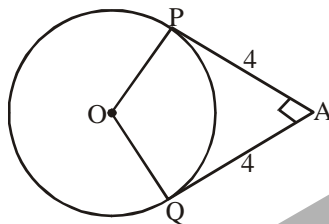
OR

If $r = 3$ is a root of quadratic equation $kr^2 - kr - 3 = 0$, find the value of k.

8. In given figure, CP, CQ are tangents to a circle with centre O. ARB is another tangent touching the circle at R. If CP = 11 cm, BC = 7 cm. Find the length of BR.

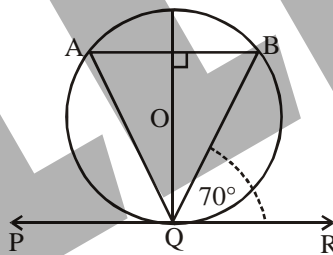


9. In given figure (not to scale), the pair of tangents AP and AQ, drawn from an external point A to a circle with centre O, are perpendicular to each other and length of each tangent is 4 cm, then find the radius of the circle.

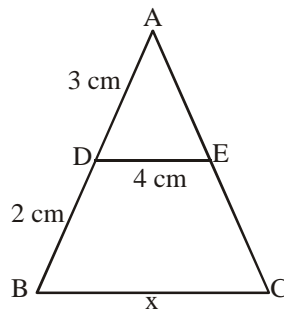


OR

In given figure, PQR is the tangent to a circle at Q whose centre is O. AB is a chord parallel to PR and $\angle BQR = 70^\circ$ then find $\angle OQB$.



10. In the figure given below, if $DE \parallel BC$, then find x.



11. To divide the line segment AB in the ratio of 2 : 3, first a ray AX is drawn such that angle BAX is an acute angle and then at equal distance, points are marked on the ray AX, then find the minimum number of these points to be marked.
12. If $\cos x = \cos 60^\circ \cos 30^\circ + \sin 60^\circ \sin 30^\circ$, then find the value of x ($0 \leq x \leq 90^\circ$).
13. If $\cos\theta = \frac{1}{2}$, then find the value of $\cos\theta[\cos\theta - \sec\theta]$.

14. Find the area of circle that can be inscribed in a square of side 6 cm.
15. A solid iron in the form of a cuboid of dimensions 49 cm x 33 cm x 24 cm is melted to form a solid sphere. Find the radius of sphere.
16. The probability of getting a bad egg from a lot of 400 eggs is 0.035. Find the number of bad eggs in the lot.

OR

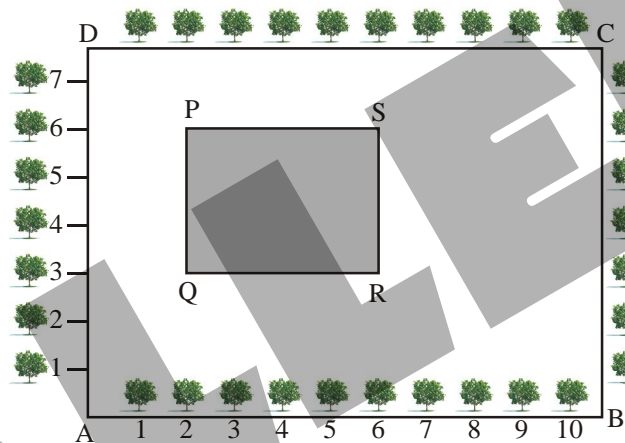
In a throw of two dice, find the probability of getting a sum of 10.

SECTION-II

17. Case study Based -1

Tree Plantation to Control Pollution

The class X students of a secondary school in Kota have been allotted a rectangular plot of land for this gardening activity.



Sapling of Rose are planted on the boundary at a distance of 1 m from each other. There is a rectangular gracy lawn in the plot as shown in above figure.

The students sowing seeds of flowering plants on the remaining area of the plot.

- (a) Find the coordinates of point Q and S are
 - (i) (2, 3), (6, 6)
 - (ii) (3, 2), (6, 6)
 - (iii) (2, 3), (5, 5)
 - (iv) None of these
- (b) Find the distance between the vertices Q and S.
 - (i) 3
 - (ii) 5
 - (iii) 6
 - (iv) 7
- (c) Find the width of rectangle PQRS.
 - (i) 3
 - (ii) 4
 - (iii) 2
 - (iv) 5
- (d) If the point G divides the line QR in the ratio 1 : 2, then the coordinate of G is
 - (i) (10, 3)
 - (ii) $\left(\frac{10}{3}, 3\right)$
 - (iii) $\left(3, \frac{10}{3}\right)$
 - (iv) None of these
- (e) Find the area of the rectangular field PQRS.
 - (i) 8 sq. units
 - (ii) 10 sq. units
 - (iii) 12 sq. units
 - (iv) 14 sq. units

18. Case study Based -2

Beehive

A beehive is an enclosed cell structure in which some honeybee species of the subgenus *Apis* live and raise their young. Each cell is in the form of regular hexagonal shape. In a regular hexagon, there are six edges of equal lengths. Taking O as centre and join all the vertices from the centre such that $OA = OB = OC = OD = OE = OF$.

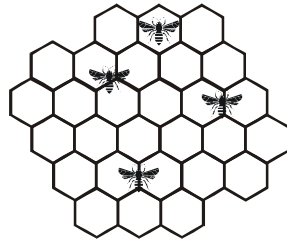


Fig.1

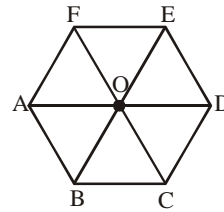


Fig.2

Similarity of triangle

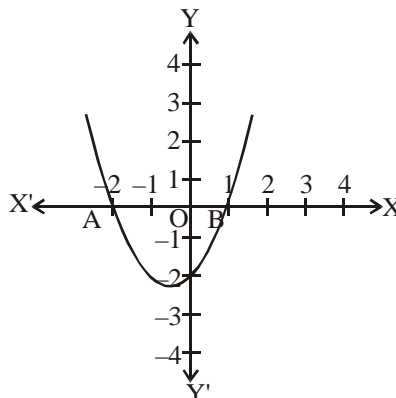
Two triangles are said to be similar, if their all corresponding angles are equal and all corresponding sides are proportional.

- Find the number of equilateral triangle in the given figure 2.
 - 6
 - 4
 - 3
 - 8
- If area of two triangles are equal, then it is always
 - Similar
 - Congruent
 - Both similar and congruent
 - None of the above
- How many triangles are similar in the given figure?
 - 3
 - 4
 - 6
 - 0
- Which of the following is not used for proving two triangles similar.
 - SSS
 - AA
 - SAS
 - SSA
- Find the area of the hexagon, if each edge is 'a' unit.
 - $2\sqrt{3}a^2$
 - $3\sqrt{2}a^2$
 - $\sqrt{3}a^2$
 - $\frac{3\sqrt{3}}{2}a^2$

19. Case study Based -3

Storm in Assam

Few months ago, heavy storm comes out in Assam. Due to this storm thousand of trees breaks and electric pole bent out (or break). Some of the electric poles bent into the shape of parabola which is shown in figure.



- (a) Suppose the quadratic polynomial for given curve is $ax^2 + bx + c$, then always a is
 (i) > 0 (ii) < 0 (iii) ≥ 0 (iv) ≤ 0
- (b) Find the zeroes of the given curve.
 (i) 2 and -1 (ii) -2 and 1
 (iii) -2 and -1 (iv) None of the above
- (c) The polynomial expression of given curve is
 (i) $x^2 - x + 2$ (ii) $x^2 + x - 2$ (iii) $x^2 + x - 2$ (iv) None of these
- (d) If $x = 2$, then find the value polynomial.
 (i) 4 (ii) 3 (iii) 2 (iv) -4
- (e) If we move the parabola right side of one unit, then find its polynomial expression.
 (i) $x^2 - 3x + 2$ (ii) $x^2 + x + 2$ (iii) $x^2 + x - 2$ (iv) $x^2 - x - 2$

20. Case study Based -4

Collection of Weight Data

Now a days, most of the population is suffered from increase of weight. The basic reason behind that is due to laziness, eating more junk food and less physical exercise. The central board of education give instruction to all the school that collect the weight data of each student.



During the medical check up of 35 students of a class, their weight were recorded as follows.

Weight (in kg)	Number of students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

- (a) Find the median class of the given data.
 (i) 44 – 46 (ii) 46 – 48 (iii) 48 – 50 (iv) None of these
- (b) Calculate the median weight of the given data.
 (i) 46.5 (ii) 47.5 (iii) 46 (iv) 47
- (c) Find the mean of the given data
 (i) 45 (ii) 45.8 (iii) 46.2 (iv) 46.8
- (d) Find the modal class of the given data.
 (i) 46 – 48 (ii) 44 – 46 (iii) 48 – 50 (iv) 50 – 52
- (e) For the above data, which one is greater among median and mean
 (i) Median (ii) Mean (iii) Both are equal (iv) None of these

PART-B

SECTION-III

21. Find the LCM of 72, 80 and 120 using the fundamental theorem of arithmetic.
22. If the point A(4, 3) and B(x, 5) are on the circle with centre O(2, 3). Find the value of x.
- OR**
- Three consecutive vertices of a parallelogram ABCD are A(1, 2), B(1, 0) and C(4, 0). Find the fourth vertex D.
23. Find the zeroes of the polynomial $x^2 + x - 6$. Also verify the relationship between the coefficients and zeroes of the polynomials.
24. Draw a pair of tangents to a circle of radius 3.5 cm which are perpendicular to each other.
25. Prove that : $\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} = 2 \sec A$

OR

If $\sqrt{3} \tan \theta = 3 \sin \theta$, find the value of $\sin^2 \theta - \cos^2 \theta$.

26. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

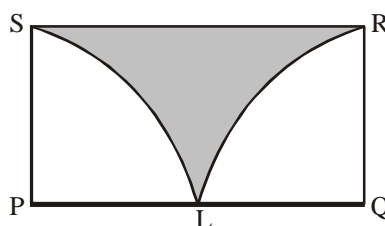
SECTION-IV

27. Prove that $3 - \sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is irrational.
28. Find the value of x : $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$, a, b, x ≠ 0

OR

Solve the equation for x : $\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{x}$

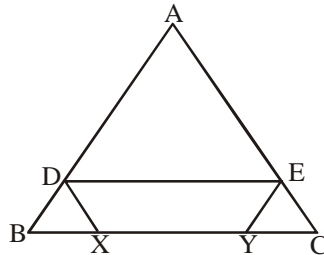
29. RS is a rectangle in which length is two times the breadth and L is mid point of PQ. With P and Q as centres, draw two quadrants as shown in fig. 5. Find the ratio of the area of rectangle PQRS to the area of shaded portion.



30. In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3} BC$. Prove that $9AD^2 = 7AB^2$.

OR

In given figure $\triangle ABC$, X and Y are two points lying on the side BC such that $BX = CY$. If $DX \parallel AC$ and $YE \parallel AB$, then prove that $DE \parallel BC$.



31. Find the median of the following frequency distribution :

Classes :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency :	7	8	20	8	7

32. The angle of elevation of the top of a tower at a point on the ground is 45° . After going 40 m towards the foot of the tower, the angle of elevation of the top of tower changes to 60° . Find the height of the tower. (Use $\sqrt{3} = 1.73$)
33. Calculate the mode of the following data :

Classes	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	5	10	18	30	20	12	5

SECTION-V

34. An aircraft is flying at a constant height with a speed of 360 km/hour. From a point on the ground, the angle of elevation at an instant was observed to be 45° . After 20 seconds, the angle of elevation was observed to be 30° . Determine the height at which the aircraft is flying, (use $\sqrt{3} = 1.732$)

OR

A boy 2 m tall is standing at some distance from a 30 m tall building. The angle of elevation from his eyes of the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.

35. An iron pillar has some part in the form of a right circular cylinder and the remaining in the form of a right circular cone. The radius of the base of each of the cone and the cylinder is 8 cm. The cylindrical part is 240 cm high and conical part is 36 cm high. Find the weight of the pillar if 1 cu cm of iron weighs 7.5 grams.
36. A man travels 600 km partly by train and partly by car. It takes 8 hours and 40 minutes if he travels 320 km by train and the rest by car. It would take 30 minutes more if he travels 200 km by train and the rest by car. Find the speed of the train and the car separately.