

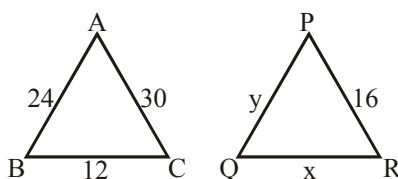
SAMPLE PAPER - 2
TIME : 3 HRS.
MAX. MARKS : 80
GENERAL INSTRUCTIONS :

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1, and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION-A

Section A consists of 20 questions of 1 mark each.

1. If α, β are zeroes of polynomial $2y^2 + 7y + 5$, value of $\alpha + \beta + \alpha\beta$ is:
 (a) 0 (b) -1 (c) 1 (d) None of these
2. If $x = a$; $y = b$ is solution of pair of equations $x - y = 2$ and $x + y = 4$ then a and b are:
 (a) (3, 1) (b) (1, 3) (c) (0, 1) (d) (-1, 2)
3. Values of 'k' for which roots of equation $x^2 + 4x + k = 0$ are real is:
 (a) $k \geq 4$ (b) $k \leq 4$ (c) $k = 0$ (d) $k = 4$
4. In the given figure, $\triangle ABC \sim \triangle PRQ$, then the value of x and y are:



- (a) (8, 12) (b) (10, 20) (c) (8, 20) (d) None of these
5. If a tower of 30 m height casts a shadow $10\sqrt{3}$ m long on the ground, then angle of elevation of the sun is:
 (a) 60° (b) 30° (c) 45° (d) 90°
6. Volume and surface area of a solid hemisphere are numerically equal. Diameter of hemisphere is:
 (a) 3 units (b) $\frac{9}{2}$ units (c) $\frac{3}{2}$ units (d) 9 units
7. If mean and median are 10.5 and 9.6 respectively then mode is:
 (a) 7.8 (b) 3.6 (c) 3.9 (d) 8.4

8. The probability of selecting a rotten apple randomly from a heap of 900 apples is 0.18, then number of rotten apples is:
 (a) 170 (b) 162 (c) 180 (d) 150
9. If $x = -\frac{1}{2}$ is a solution of quadratic equation $3x^2 + 2kx - 3 = 0$, value of k is:
 (a) $-\frac{9}{4}$ (b) $-\frac{9}{2}$ (c) $\frac{15}{4}$ (d) $-\frac{15}{4}$
10. If $k + 1 = \sec^2\theta(1 + \sin\theta)(1 - \sin\theta)$, then the value of k is:
 (a) 0 (b) 1 (c) 2 (d) 3
11. If the quadratic equation $px^2 - 2\sqrt{5} px + 15 = 0$ has two equal roots, then find the value of p is:
 (a) 0 (b) 1 (c) 2 (d) 3
12. If $a \cos\theta + b \sin\theta = 4$ and $a \sin\theta - b \cos\theta = 3$, then $a^2 + b^2 = ?$
 (a) 7 (b) 12 (c) 25 (d) None of these
13. A pendulum swings through an angle of 30° and describes an arc 8.8 cm in length. The length of the pendulum is:
 (a) 15 cm (b) 16 cm (c) 15.5 cm (d) 16.8 cm
14. Which of the following can not be the probability of an event?
 (a) 0 (b) $\frac{1}{5}$ (c) $\frac{5}{4}$ (d) 1
15. The probability of guessing the correct answer to a certain test question is $\frac{x}{12}$. If the probability of not guessing the correct answer to this question is $\frac{2}{3}$, then $x = ?$
 (a) 2 (b) 3 (c) 4 (d) 6
16. Determine the upper limit of the modal class of the following frequency distribution:
- | Class | 0-5 | 6-11 | 12-17 | 18-23 | 24-29 |
|-----------|-----|------|-------|-------|-------|
| Frequency | 13 | 10 | 15 | 8 | 11 |
- (a) 16 (b) 19.5 (c) 18 (d) 17.5
17. If $x \tan 60^\circ \cos 60^\circ = \sin 60^\circ \cot 60^\circ$, then $x = ?$
 (a) $\cos 30^\circ$ (b) $\tan 30^\circ$ (c) $\sin 30^\circ$ (d) $\cot 30^\circ$
18. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Then, the length of PQ is:
 (a) $\sqrt{119}$ cm (b) 16 cm (c) 15 cm (d) $\sqrt{211}$ cm
19. **Assertion (A) :** Two similar triangles are always congruent.
Reason (R) : Two similar triangles are said to be congruent if their areas are equal.
 (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 but 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. **Assertion (A) :** If the value of mode and mean is 60 and 66 respectively, then the value of median is 64.

Reason (R) : Median = Mode + 2 Mean.

- (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 but 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

Section B consists of 5 questions of 2 marks each.

21. Find how many integers between 200 and 500 are divisible by 8.

OR

Find the sum of first 8 multiples of 16.

22. Two different dice are tossed together. Find the probability that the product of the two numbers on the top of the dice is 6.
 23. A rectangular sheet of paper $40 \text{ cm} \times 22 \text{ cm}$ is rolled to form a hollow cylinder of height 40 cm. Find the radius of cylinder.
 24. Show that 6^n can never end with digit 0 for any natural number n .

OR

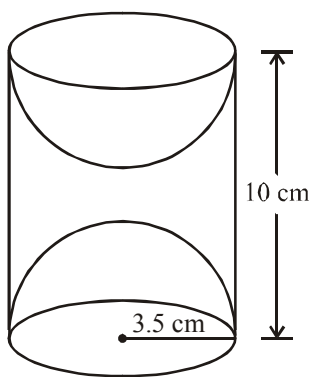
Find the HCF and LCM of 90 and 144 by the method of prime factorization.

25. Find a relation between x and y such that the point $P(x, y)$ is equidistant from the points $A(-5, 3)$ and $B(7, 2)$.

SECTION-C

Section C consists of 6 questions of 3 marks each.

26. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in fig. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article.



OR

A heap of rice is in the form of a cone of base diameter 24 m and height 3.5 m. Find the volume of the rice. How much canvas cloth is required to just cover the heap?

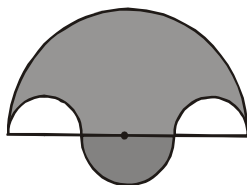
27. The table below shows the salaries of 280 persons:

Salary (In thousand ₹)	Number of Persons
5 – 10	49
10 – 15	133
15 – 20	63
20 – 25	15
25 – 30	6
30 – 35	7
35 – 40	4
40 – 45	2
45 – 50	1

Calculate the median salary of the data.

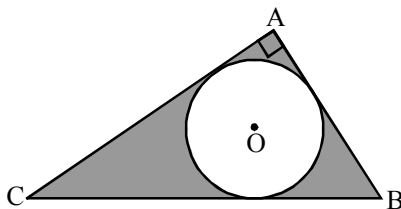
28. In the given figure, the boundary of shaded region consists of four semicircular arcs, two smallest being equal. If diameter of the largest is 14 cm and that of the smallest is 3.5 cm, calculate the area of

the shaded region. $\left[\text{Use } \pi = \frac{22}{7} \right]$



OR

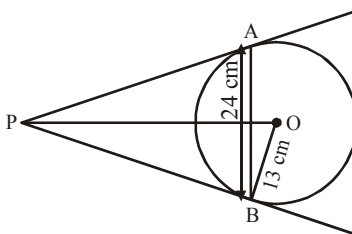
In the given figure, ABC is a right triangle right angled at A. Find the area of shaded region if AB = 6 cm, BC = 10 cm and O is the centre of the incircle of $\triangle ABC$. [Take $\pi = 3.14$]



29. A sum of Rs.700 is to be used to give seven cash prizes to students of school for their overall academic performance. If each prize is Rs.20 less than its preceding prize, find the value of each of the prizes.

30. Prove the following : $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$

31. In the given figure, AB is a chord of length 24 cm (see figure). The tangents at A and B intersect at point P. If the radius of circle is 13 cm. Find the length of PA.



SECTION-D

Section D consists of 4 questions of 5 marks each.

32. ABC is triangle in which $AB = AC$ and D is a point on AC such that $BC^2 = AC \times CD$. Prove that $BD = BC$.
33. A train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/h from its usual speed. Find the usual speed of the train.

OR

Solve for x : $\frac{1}{(a+b+x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$, $[a \neq 0, b \neq 0, x \neq -(a+b)]$.

34. The angle of elevation of a cloud from a point 60 m above the surface of the water of a lake is 30° and the angle of depression of its shadow from the same point in water of lake is 60° . Find the height of the cloud from the surface of water.
35. Represent the following pair of equations graphically and write the coordinates of points where the lines intersect y-axis : $x + 3y = 6$; $2x - 3y = 12$.

OR

The sum of the numerator and the denominator of a fraction is 4 more than twice the numerator. If 3 is added to each of the numerator and denominator, their ratio becomes 2 : 3. Find the fraction.

SECTION-E

Section E consists of 3 questions of 4 marks each.

36. Case Study-1

To raise social awareness about hazards of smoking, a school decided to start 'No smoking' campaign. 10 students are asked to prepare campaign banners in the shape of a triangle. The vertices of one of the triangle are $P(-3, 4)$, $Q(3, 4)$ and $R(-2, -1)$. S, T and U are the midpoints of PQ, QR and PR respectively.



Based on this information, answer the following questions :

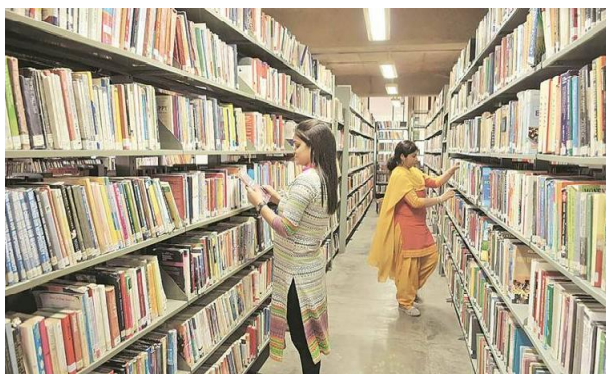
- (i) If S be the mid-point of line joining P and Q, then find the coordinates of S.
- (ii) If T be the mid-point of line joining R and Q, then find the coordinates of T.
- (iii) Find the coordinates of centroid of ΔPQR . Also find the coordinates of U.

OR

Find the coordinates of centroid of ΔSTU .

37. Case Study-2

To enhance the reading skills of grade X students, the school nominates you and two of your friends to set up a library class. There are two sections-section A and section B of grade X. There are 32 students in section A and 36 students in section B.



- (i) Express 32 and 36 as product of its primes.
- (ii) What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of Section A or Section B?
- (iii) If the product of two positive integers is equal to the product of their HCF and LCM. Using above relationship: find HCF(32, 36).

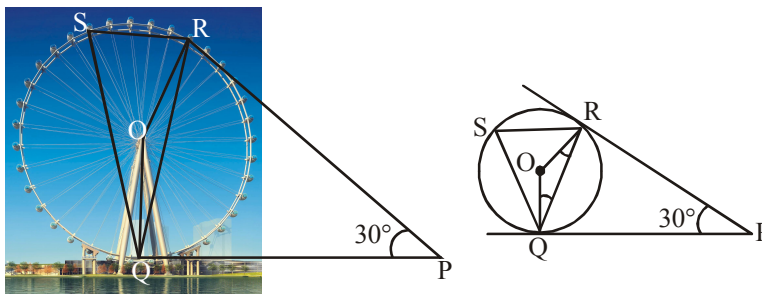
OR

If p and q are positive integers such that $p = ab^2$ and $q = a^2b$, where a, b are prime numbers, then find LCM(p, q) and HCF(p, q).

38. Case Study-3

A Ferris wheel (or a big wheel in the United Kingdom) is an amusement ride consisting of a rotating upright wheel with multiple passenger-carrying components (commonly referred to as passenger cars, cabins, tubs, capsules, gondolas, or pods) attached to the rim in such a way that as the wheel turns, they are kept upright, usually by gravity.

After taking a ride in Ferris wheel, Aarti came out from the crowd and was observing her friends who were enjoying the ride. She was curious about the different angles and measures that the wheel will form. She forms the figure as given below.



- (i) In the given figure, find $\angle ROQ$.
- (ii) Find $\angle QRO$.
- (iii) Find $\angle RQP$.

OR

If $SR \parallel PQ$, then find $\angle SRO$.