Sample Question Paper 4

Section 'A'

Question numbers 1 to 10 carry 1 mark each

1. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$; x, y are prime numbers, then HCF (a, b) is :

(a) xy. **(b)** xy^2.

(c) x^3y^3. **(d)** x^2y^2. **1**

2. The pair of equations $x = a$ and $y = b$ graphically represents lines which are :

(a) parallel **(b)** intersecting at (b, a)

(c) coincident **(d)** intersecting at (a, b) **1**

3. Which of the following is not a quadratic equation?

(a) $2(x-1)^2 = 4x^2 - 2x + 1$ **(b)** $2x - x^2 = x^2 + 5$

(c) $\left(\sqrt{2}x + \sqrt{3}\right)^2 + x^2 = 3x^2 - 5x$ **(d)** $(x^2 + 2x)^2 = x^4 + 3 + 4x^3$ **1**

OR

The sum of first five positive integers divisible by 6 is :

(a) 180 **(b)** 90

(c) 45 **(d)** 30

4. The distance between the points A (0, 6) and B (0, –2) is :

(a) 6 **(b)** 8

(c) 4 **(d)** 2 **1**

5. Sides of two similar triangles are in the ratio 4 : 9. Areas of these triangles are in the ratio :

(a) 2 : 3 **(b)** 4 : 9

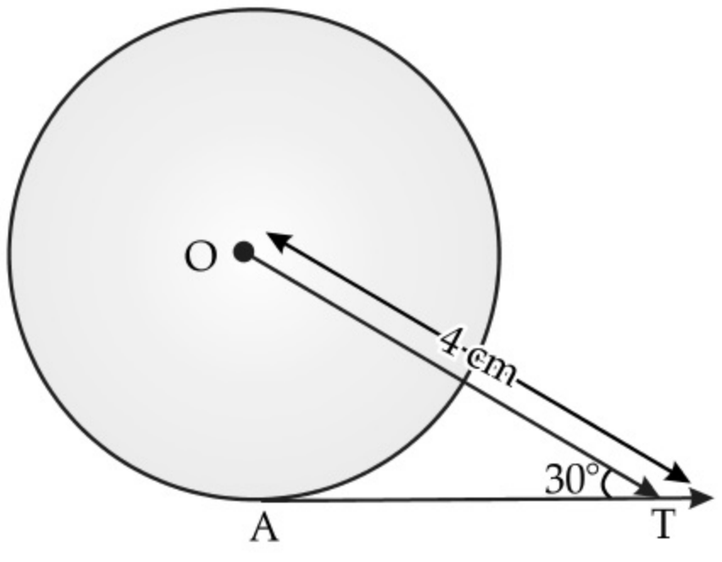
(c) 81 : 16 **(d)** 16 : 81 **1**

OR

In the given figure, AT is a tangent to the circle with centre 'O' such that $OT = 4$ cm and $\angle OTA = 30°$. Then AT is equal to :

(a) 4 cm **(b)** 2 cm

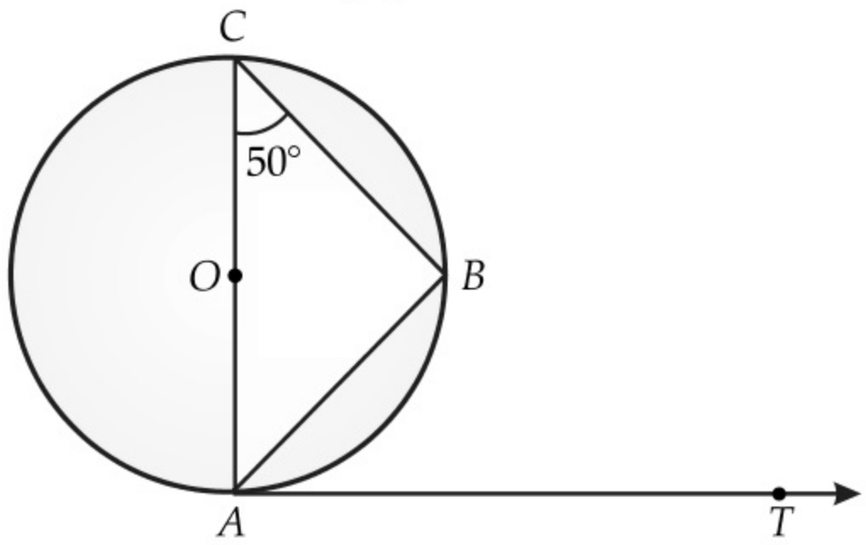
(c) $2\sqrt{3}$ cm **(d)** $4\sqrt{3}$ cm



6. In the given figure, AB is a chord of the circle and AOC is its diameter, such that $\angle ACB = 50°$. If AT is the tangent to the circle at the point A, then $\angle BAT$ is equal to :

(a) 65° **(b)** 60°

(c) 50° **(d)** 40°



1

AI **7.** If $4 \tan \theta = 3$, then $\left(\frac{4 \sin \theta - \cos \theta}{4 \sin \theta + \cos \theta}\right)$ is equal to :

(a) $\frac{1}{3}$ **(b)** $\frac{1}{3}$

(c) $\frac{1}{2}$ **(d)** $\frac{3}{4}$

1

8. The area of the square that can be inscribed in a circle of radius 8 cm is :

(a) 256 cm^2 **(b)** 128 cm^2

(c) $64\sqrt{2}$ cm^2 **(d)** 64 cm^2 **1**

9. The surface areas of two spheres are in the ratio 16 : 9. The ratio of their volumes is :

(a) 64 : 27 **(b)** 16 : 9

(c) 4 : 3 **(d)** $16^3 : 9^3$ **1**

10. The probability of getting an even number, when a die is thrown once, is :

(a) $\frac{1}{3}$ **(b)** $\frac{1}{3}$

(c) $\frac{5}{6}$ **(d)** $\frac{5}{6}$ **1**

Question numbers 11 to 20 carry 1 mark each

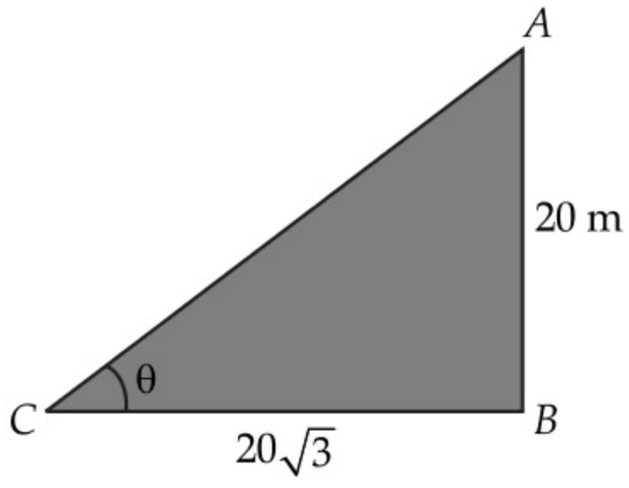
11. Which central tendency is obtained by the abscissa of point of intersection of less than type and more than type ogives ? **1**

AI **12.** The slant height of a bucket is 26 cm. The diameter of upper and lower circular ends are 36 cm and 16 cm. Find the height of the bucket. **1**

OR

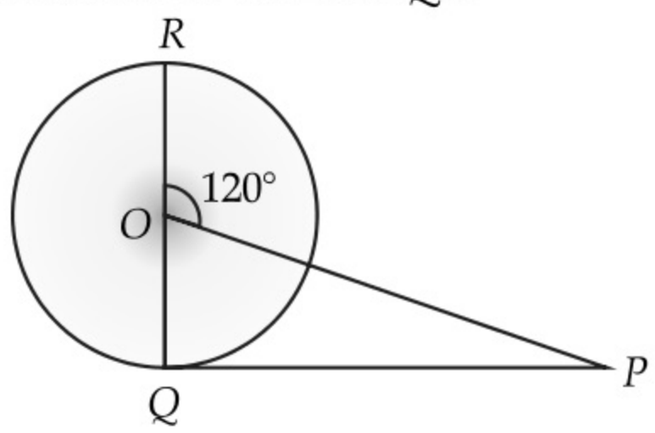
If the circumferences of two concentric circles forming a ring are 88 cm and 66 cm respectively. Find the width of the ring.

13. In figure, a tower AB is 20 m high and BC, its shadow on the ground, is $20\sqrt{3}$ m long. Find the Sun's altitude.



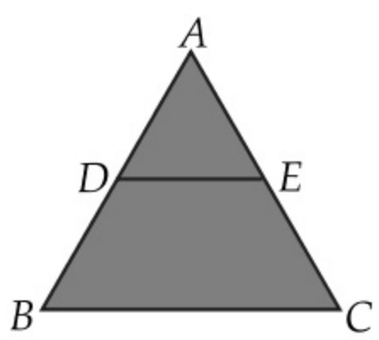
1

14. PQ is a tangent drawn from an external point P to a circle with centre O and QOR is the diameter of the circle. If $\angle POR = 120°$, What is the measure of $\angle OPQ$?



1

15. In given figure, $DE \,||\, BC$. If $AD = 3$ cm, $DB = 4$ cm and $AE = 6$ cm, then find EC.



1

16. If the point $(0, 0)$, $(1, 2)$ and (x, y) are collinear, then find x. **1**

17. Find the sum of first 16 terms of the A.P. 10, 6, 2,..... . **1**

18. If $x = \left(-\frac{1}{2}\right)$, is a solution of the quadratic equation $3x^2 + 2kx - 3 = 0$, find the value of k. **1**

19. If α and β are the roots of $ax^2 - bx + c = 0$, where $(a \neq 0)$, then calculate $\alpha + \beta$. **1**

AI **20.** If the *HCF* of 65 and 117 is expressible in the form $65m - 117$, find the value of m : **1**

Section 'B'

Question numbers 21 to 26 carry 2 marks each

21. Find the smallest natural number by which 1,200 should be multiplied so that the square root of the product is a rational number. **2**

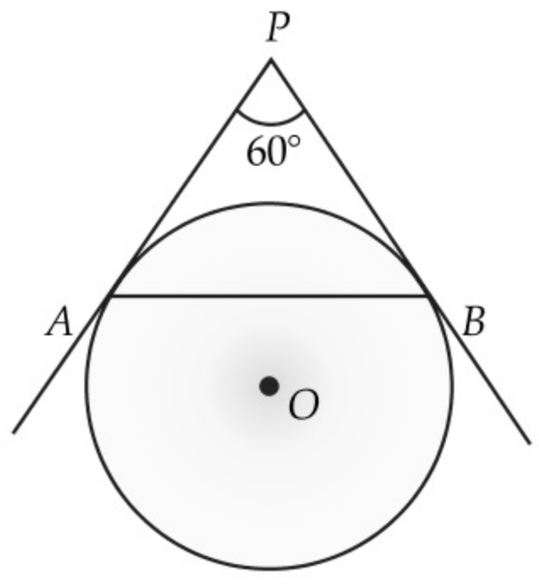
22. Find the quadratic polynomial whose sum and product of the zeroes are $\frac{21}{8}$ and $\frac{5}{16}$ respectively. **2**

OR

A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle of 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

23. Find the coordinates of the point P which divides the join of $A(-2, 5)$ and $B(3, -5)$ in the ratio 2 : 3. **2**

24. In Fig., AP and BP are tangents to a circle with centre O, such that $AP = 5$ cm and $\angle APB = 60°$. Find the length of chord AB.



2

25. If the perimeter of a protractor is 72 cm, calculate its area. $\left(\text{Use } \pi = \frac{22}{7}\right)$ **2**

OR

If the total surface area of a solid hemisphere is 462 cm^2, find its volume. [Take $\pi = \frac{22}{7}$]

26. Find the mean of the data using an empirical formula when it is given that mode is 50.5 and median is 45.5. **2**

Section 'C'

Question numbers 27 to 34 carry 3 marks each

27. A bag contains cards numbered 1 to 49. Find the probability that the number on the drawn card is :

(i) an odd number

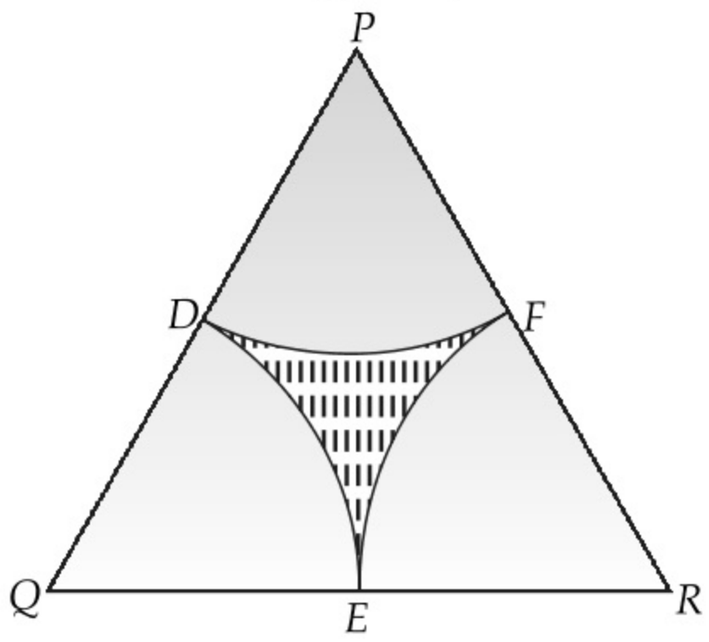
(ii) a multiple of 5

(iii) Even prime **3**

28. A right circular cone of radius 3 cm, has a curved surface area of 47.1 cm^2. Find the volume of the cone. (Use $\pi = 3.14$) **3**

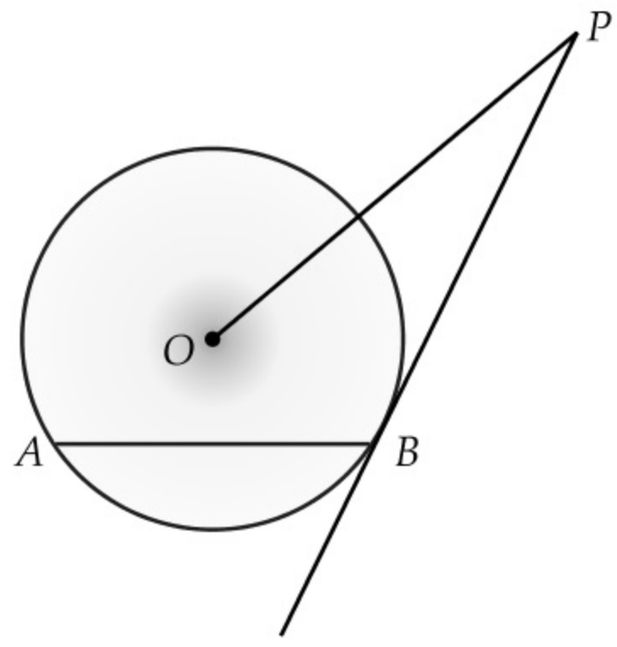
OR

In the given figure, ΔPQR is an equilateral triangle of side 8 cm and D, E, F are centres of circular arcs, each of radius 4 cm. Find the area of shaded region. (Use $\pi = 3.14$ and $\sqrt{3} = 1.732$)



29. Evaluate : $\frac{\cos^2(45^\circ+\theta)+\cos^2(45^\circ-\theta)}{\tan(60^\circ+\theta)\tan(30^\circ-\theta)} + \text{cosec}(75^\circ+\theta) - \sec(15^\circ-\theta)$ **3**

30. AB is a chord of circle with centre O. At B, a tangent PB is drawn such that its length is 24 cm. The distance of P from the centre is 26 cm. If the chord AB is 16 cm, find its distance from the centre.



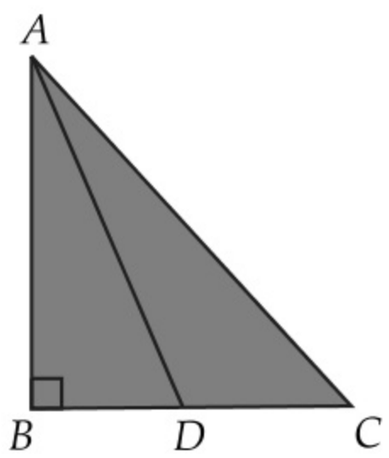
3

OR

For what value of p will the following system of equations have no solution ?

$$(2p-1)x + (p-1)y = 2p+1;\ y + 3x - 1 = 0.$$

AI **31.** In the given figure, ABC is a right angled triangle at $\angle B = 90^\circ$. D is the mid-point of BC. Show that $AC^2 = AD^2 + 3CD^2$.



3

32. If the points $A(-2, 1)$, $B(a, b)$ and $C(4, 1)$ are collinear and $a - b = 1$, find a and b. **3**

33. Find the sum of n terms of the series

$$\left(4-\frac{1}{n}\right)+\left(4-\frac{2}{n}\right)+\left(4-\frac{3}{n}\right)+.....$$ **3**

OR

If the roots of the equation $(a^2 + b^2)\, x^2 - 2\,(ac + bd)\, x + (c^2 + d^2) = 0$ are equal, prove that $\frac{a}{b} = \frac{c}{d}$.

34. Prove that $\sqrt{2}$ is an irrational number. **3**

Section 'D'

Question numbers 35 to 40 carry 4 marks each

35. Solve graphically the pair of linear equations :

$3x - 4y + 3 = 0$ and $3x + 4y - 21 = 0$.

Find the co-ordinates of the vertices of the triangular region formed by these lines and x-axis. Also, calculate the area of this triangle. **4**

OR

AI Given, Solve for x : $\left(\frac{2x}{x-5}\right)^2 + 5\left(\frac{2x}{x-5}\right) - 24 = 0, x \neq 5$

36. If the p^{th} term of an *A.P.* is $\frac{1}{q}$ and q^{th} term is $\frac{1}{p}$. Prove that the sum of first pq term of the *A.P.* is $\left[\frac{pq+1}{2}\right]$. **4**

37. The three vertices of a parallelogram $ABCD$ are $A(3, -4)$, $B(-1, -3)$ and $C(-6, 2)$. Find the co-ordinates of vertex D and find the area of $ABCD$. **4**

OR

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

38. a, b and c are the sides of a right triangle, where c is the hypotenuse. A circle, of radius r, touches the sides of the triangle. Prove that $r = \frac{a+b-c}{2}$. **4**

OR

AI Construct a triangle ABC with $BC = 7$ cm, $\angle B = 60°$ and $AB = 6$ cm. Construct another triangle whose sides are $\left(\frac{3}{4}\right)$ times of the corresponding sides of ΔABC.

39. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 60 m high, find the height of the building. **4**

40. The height of a cone is 30 cm. From its topside a small cone is cut by a plane parallel to its base. If volume of smaller cone is $\frac{1}{27}$ of the cone then at what height it is cut from the base ? **4**

■■■