CBSE MATHEMATICS SAMPLE MOCK TEST PAPER - II

**Time Allowed : 3 Hours**   **Maximum Marks : 80**

I. *All questions are compulsory.*
II. *The question paper consists of **40** questions divided into four sections **A, B, C** and **D**.*
III. *Section **A** contains **20** objective questions of **1** mark each. Section **B** contains **6** questions of **2** marks each. Section **C** contains **8** questions of **3** marks each. Section **D** contains **6** questions of **4** marks each.*
IV. *There is no overall choice. However, an internal choice has been provided in **2** questions of section **A**, **2** questions of section **B**, **3** questions of section **C** and **3** questions of section **D**. You have to attempt only one of the alternatives in all such questions.*
V. *Use of **calculators** is not permitted.*
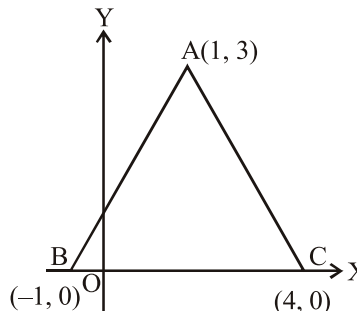

SECTION - A

(Q. 1 – Q. 10) Multiple choice type questions. Select the correct option.

1. The horizontal distance between two towers is 140 m. The angle of elevation of the top of the first tower when seen from the top of the second tower is 30°. If the height of the second tower is 60 m, find the height of the first tower.
 (a)   140.83 m   (b)   150 m   (c)   153.4 m   (d)   166 m

2. What is the value of k if $(k + 2)$, $(4k – 6)$ and $(3k – 2)$ are three consecutive terms of an A.P.?
 (a) $k = –3$ (b) $k = 2$ (c) $k = –2$ (d) $k = 3$

3. In the figure, PQ is tangent at a point R of the circle with centre O. If $\angle TRQ = 30°$, find $\angle PRS$.
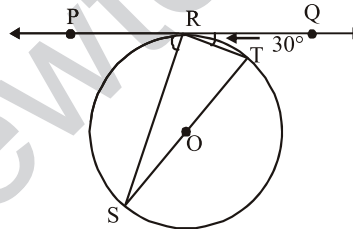

 (a)   50°   (b)   90°   (c)   110°   (d)   60°

4. In what ratio is the line segment joining the points $(3, 5)$ & $(–4, 2)$ divided by y–axis?
 (a) $3 : 2$ (b) $3 : 4$ (c) $2 : 3$ (d) $4 : 3$

5. In the adjoining figure, the area of the triangle ABC is
 (a)   15 sq. units   (b)   10 sq. units   (c)   7.5 sq. units   (d)   2.5 sq. units

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6. A right–angled triangle ABC, where $\angle B = 90°$, is rotated about BC. If BC = 16 cm and AC = 20 cm, find the volume of the right circular cone traced out by the triangle.
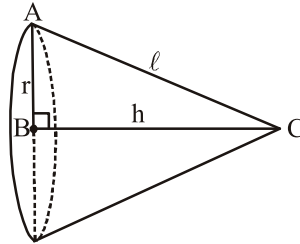
    (a) $2413\ cm^3$ (b) $2311\ cm^3$ (c) $1254\ cm^3$ (d) $1725\ cm^3$

7. To divide a line segment AB in the ratio 2 : 5, first a ray AX is drawn, so that $\angle BAX$ is an acute angle and then at equal distance points are marked on the ray AX such that the minimum number of these point is

    (a)   2   (b)   5   (c)   4   (d)   7

8. In ΔABC, $\angle B = 90°$ and D is the midpoint of BC. Then

    (a) $AC^2 = AD^2 + 3CD^2$ (b) $AC^2 + AD^2 = CD^2$

    (c) $3AC^2 = AD^2 + CD^2$ (d) $AD^2 = CD^2 = 3AC^2$

9. The figure given shows a rectangle with a semicircle and 2 identical quadrants inside it.
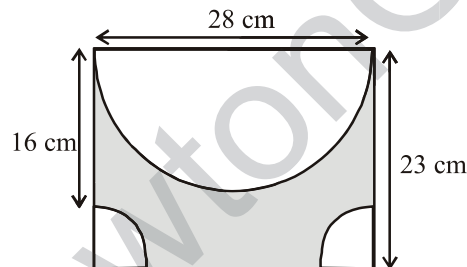
    What is the shaded area of the figure? (Use $\pi = \dfrac{22}{7}$)

    (a) $363\ cm^2$ (b) $259\ cm^2$ (c) $305\ cm^2$ (d) $216\ cm^2$

10. If $\left(\dfrac{a}{3}, 4\right)$ is the midpoint of the line segment joining a(–6, 5) and B(–2, 3), then what is the value of 'a'?

    (a)   –4   (b)   –12   (c)   12   (d)   –6

(Q. 11 – Q. 15) Fill in the blanks.

11. If $x = 1$ is a common root of $ax^2 + ax + 3 = 0$ and $x^2 + x + b = 0$, then ab is _____ .

OR

    If $ax^2 + bx + c = 0$ has equal roots, then the value of c is _____ .

12. _____ of two positive integers a and b is the largest positive integer that divides both a and b.

13. If $a \cos \theta - b \sin \theta = c$, then the value of $a \sin \theta + b \cos \theta$ is _____ .

14. The _____ of an object viewed, is the angle formed by the line of sight with the horizontal when it is below the horizontal level, i.e., the case when we lower our head to look at the object.

15. If $3\sin \theta + 5\cos \theta = 5$, then the value of $5\sin \theta - 3\cos \theta$ is _____ .

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(Q. 16 – Q. 20) Answer the following questions.

16. In the given figure, CP and CQ are tangents to a circle wih centre O. ARB is another tangent touching the cirlce at R. If CP = 11 cm and BC = 7 cm, then find the length of BR.
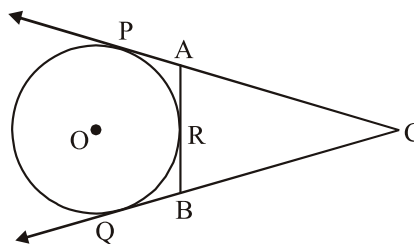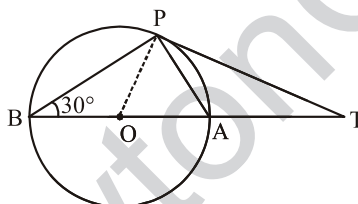

17. In what ratio does the point (–2, 3) divide the line–segment joining the points (–3, 5) and (4, –9) ?

18. Find the radius of the circle inscribed in a square of side 10cm.

<div align="center">**OR**</div>

Find the circumference of a circle whose area is $121\ \pi m^2$.

19. In figure, BOA is a diameter of a circle and the tangent at a point P meets BA extended at T. If $\angle$ PBO = 30°, then what is the measure of $\angle$ PTA ?

20. The circular ends of a bucket are of radii 35 cm. and 14 cm. and the height of the bucket is 40 cm. Find the volume of the bucket.

<div align="center">

SECTION - B

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

<div align="center">**OR**</div>

Find the least number that is divisible by all the numbers from 1 to 10 (both inclusive)

22. Find the ratio in which the line segment joining the points A (3, –3) and B (–2, 7) is divided by x-axis. Also find the coordinates of the point of division.

23. Which type of equations $x + 2y = 4$ and $2x + y = 5$ will be?

<div align="center">**OR**</div>

For what value of k, the equations 3x – y + 8 = 0 and 6x – ky = –16 represent coincident lines?

24. Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5.

25. A bag contains 15 white and some black balls. If the probability of drawing a black ball from the bag is thrice that of drawing a white ball, find the number of black balls in the bag.

26. Find the probability that in a family of 3 children, there will be at least one boy.

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SECTION - C

27. If the H.C.F of 210 and 55 is expressible in the form $210 \times 5 + 55y$, find y.

28. If the polynomial $f(x) = 3x^4 + 3x^3 - 11x^2 - 5x + 10$ is completely divisible by $3x^2 - 5$, find all its zeroes.

29. Following frequency distribution shows the daily expenditure on milk of 30 households in a locality:

Daily expenditure on milk (in ₹)	$0-30$	$30-60$	$60-90$	$90-120$	$120-150$
Number of households	5	6	9	6	4

Find the mode for the above data.

30. Solve the system of equations:
$a(x + y) + b(x - y) = a^2 - ab + b^2$
$a(x + y) - b(x - y) = a^2 + ab + b^2$

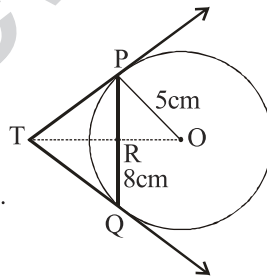31. ΔABC is right-angled at A. $DEFG$ is a square as shown in the figure. Prove that $DE^2 = BD \times EC$.

OR
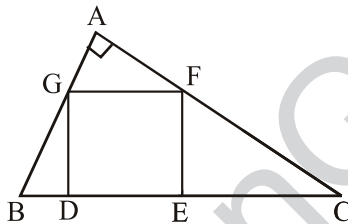
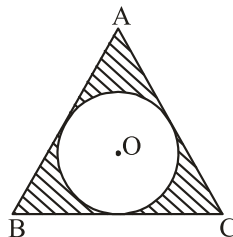In ΔABC, D is the midpoint of BC and AE $\perp$ BC. If AC > AB, show that

$$AB^2 = AD^2 - BC \cdot DE + \frac{1}{4}BC^2$$

32. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T (see Fig.). Find the length of TP.

33. In fig., a circle is inscribed in an equilateral triangle ABC of side 12 cm. Find the radius of inscribed circle and the area of the shaded region.

[Use $\pi = 3.14$ and $\sqrt{3} = 1.73$]

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34. A conical vessel, with base radius 5 cm and height 24 cm, is full of water. This water is emptied into a cylindrical vessel of base radius 10 cm. Find the height to which the water will rise in the cylindrical vessel. (Use $\pi = \dfrac{22}{7}$]

OR

A sphere of diameter 12 cm, is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by $3\dfrac{5}{9}$ cm. Find the diameter of the cylindrical vessel.

SECTION - D

35. The pth term of an A.P. is a and qth term is b. Prove that the sum of its $(p+q)$ terms is $\dfrac{p+q}{2}\left\{a+b+\dfrac{a-b}{p-q}\right\}$

36. A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of hill as 30°. Find the distance of the hill from the ship and the height of the hill.

OR

The angle of elevation of a bird from a point 50 metres above a lake is 30° and the angle of depression of its reflection in the lake is 60°. Find the height of the bird above the lake.

37. For the following frequency distribution, find the value of f_1 and f_2, if mean is given to be 50,

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	f_1	28	f_2	24	19	120

OR

The following distribution gives the daily income of 50 workers of a factory.

Daily income (in ₹)	Number of workers
100-120	12
120-140	14
140-160	8
160-180	6
180-200	10

Convert the distribution above to a less than type cummulative frequency distribution and draw its ogive.

38. Sove for x : $\dfrac{1}{x+1} + \dfrac{3}{5x+1} = \dfrac{5}{x+4}, x \neq -1, -\dfrac{1}{5}, -4$

OR

Two water taps together can fill a tank in $9\dfrac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

39. Solve $\dfrac{\cos^2\theta - 3\cos\theta + 2}{\sin^2\theta} = 1; (\theta < 90°)$

40. Draw a circle of radius 2.5 cm. From a point P, 6 cm apart from the centre of the circle, draw two tangents to the circle.

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