

SET - B

MT EDUCARE LTD.

QUEST - II (Semi Prelim II) (2017-18)

Portion : Quadratic Equations, Arithmetic progression, Statistics, Circle, Constructions
Areas Related to circles and Surface Areas and Volumes

CBSE - X

Roll No.

Code No. 31/1

Series RLH

- Please check that this question paper contains 6 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 30 questions.
- Please write down the serial number of the question before attempting it.

MATHEMATICS

Time allowed : 3 hours

Maximum Marks : 80

General Instructions:

- i) **All questions are compulsory.**
- ii) The question paper consists of 30 questions divided in four sections: A, B, C and D.
- iii) Section **A** contains 6 questions of 1 mark each,
Section **B** contains 6 questions of 2 marks each,
Section **C** contains 10 questions of 3 marks each,
Section **D** contains 8 questions of 4 marks each.
- iv) There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- v) Use of **calculator** is not permitted.

SECTION - A

Question number 1 to 6 carry 1 marks each.

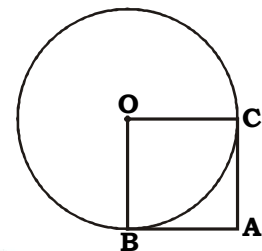
- It is given that 'a' is the first term, 'd' the common difference and a_n the n^{th} term of the AP :
 $a = -18, \quad d = ?, \quad n = 10, \quad a_n = 0$
- From a point Q, the length of the tangent to a circle is 24 cm and the distance of Q from the centre is 25 cm. The radius of the circle is _____.
 (A) 7 cm (B) 12 cm (C) 15 cm (D) 24.5 cm
- The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.
- Check whether the following is quadratic equation : $(x + 1)^2 = 2(x - 3)$
- Curved surface area of a hemisphere is $905\frac{1}{7} \text{ cm}^2$. What is its volume.
- If $a = 17, \Sigma fidi = 108, \Sigma fi = 100$ then find mean.

SECTION - B

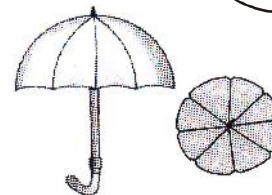
Question number 7 to 12 carry 2 marks each.

- Represent the following situation in the form of quadratic equation :
 Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. We would like to find Rohan's present age.
- Draw a tangent at any point 'M' on the circle of radius 2.9 and Centre 'O'.
- Which term of the AP 3, 8, 13, 18, is 78?

- O is the centre of circle. AB and AC are tangents drawn from A and seg $BA \perp$ seg CA. Prove that $\square BACO$ is a square.



- An umbrella has 8 ribs which are equally spaced. Assuming umbrella to be a flat circle of radius 45 cm, find the area between the two consecutive ribs of the umbrella.



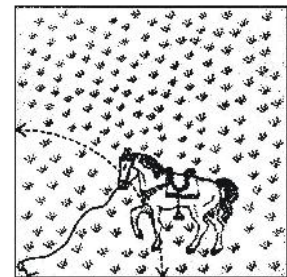
12. A 20 m deep well with diameter 7m is dug and the earth from digging is evenly spread out to form a platform 22m by 14m. Find the height of the platform.

SECTION - C

Question numbers 13 to 22 carry 3 marks each.

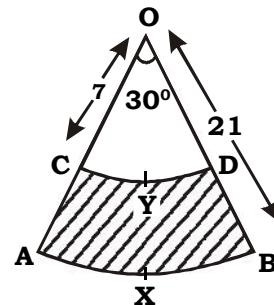
13. If the sum of m terms of an A. P. is the same as the sum of its n terms, show that the sum of its $(m + n)$ terms is zero.
14. Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.
15. Find the roots of the following quadratic equation given, by applying the quadratic formula.
 $2x^2 - 7x + 3 = 0$

16. A Horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find (i) the area of that part of the field in which the horse can graze. (ii) the increase in the grazing area if the rope were 10 m long instead of 5m. (Use $\pi = 3.14$)



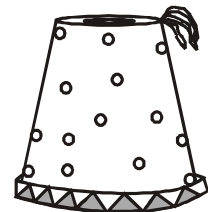
OR

16. AB and CD are respectively arcs of two concentric circles of radii 21cm and 7cm and centre O. If $\angle AOB = 30^\circ$, find the area of the shaded region.



17. Prove that the parallelogram circumscribing a circle is a rhombus.

18. A fez, the cap used by the Turks, is shaped like the frustum of a cone. If its radius on the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm, find the area of material used for making it.



OR

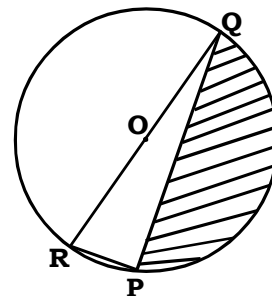
18. The slant height of a frustum of a cone is 4cm and the perimeters (circumference) of its circular ends are 18cm and 6cm. Find the curved surface area of the frustum.

19. If the median of the distribution given below is 28.5, find the values of x and y .

Class interval	Frequency
0 – 10	5
10 – 20	x
20 – 30	20
30 – 40	15
40 – 50	y
50 – 60	5
Total	60

20. In a class test, the sum of Shefali's mark in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.

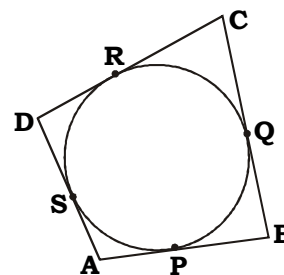
21. Find the area of the shaded region, if $PQ = 24$ cm, $PR = 7$ cm and O is the centre of the circle.



22. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

OR

22. A quadrilateral ABCD is drawn to circumscribe a circle as shown in the figure. Prove that : $AB + CD = AD + BC$.



SECTION - D

Question numbers 23 to 30 carry 4 marks each.

23. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.
24. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

25. If the sum of the first n terms of an AP is $4n - n^2$, what is the first term (that is S_1) ? What is the sum of the first two terms ? What is the second term ? Similarly, find the 3rd, the 10th and the n^{th} terms.
26. Two water taps together can fill a tank in $9\frac{3}{8}$ 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.

OR

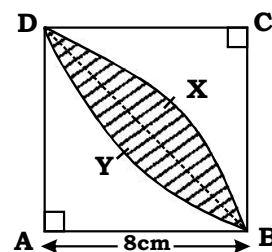
26. Solve : $3\left(\frac{7x+1}{5x-3}\right) - 4\left(\frac{5x-3}{7x+1}\right) = 11, x \neq \frac{3}{5}, \frac{-1}{7}$
27. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.

OR

27. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m to form an embankment. Find the height of the embankment.
28. Draw a ΔABC with $BC = 7$ cm, $\angle B = 45^\circ$, $\angle A = 105^\circ$. Then construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of ΔABC .
29. The wheels of a car are of diameter 80 cm each. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour ?

OR

29. Calculate the area of the designed region in the adjoining figure, common between the two quadrants of circles of radius 8 cm each.



30. The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield (in kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
Number of farms	2	8	12	24	38	16

Change the distribution to a more than type distribution, and draw its ogive.