

**MT EDUCARE LTD.****QUEST - II (Semi Prelim II)  
(2018-19)**

**Portion :** Real Numbers, Coordinate Geometry, Trigonometry (Introduction and Application), Areas Related to Circles, Surface Areas and Volumes, Statistics, Probability

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**CBSE - X**Roll No. 

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Code No. **30/1****Series RLH**

- Please check that this question paper contains 7 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 two questions of 1 mark each, two questions of 2 marks each, 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 mark each.**

1. Write whether  $\frac{2\sqrt{45}+3\sqrt{20}}{2\sqrt{5}}$  on simplification given an irrational or rational number.
2. Find the perpendicular distance of A(5, 12) from Y axis.
3. If  $A + B = 90^\circ$  and  $\sec A = \frac{5}{3}$  then find the value of  $\operatorname{cosec} B$ .
4. In a basket, there are 10 tomatoes. The weight of each of these tomatoes in grams is as follows: 60, 70, 90, 95, 50, 65, 70, 80, 85, 95. Find the median of the weights of tomatoes.

**OR**

The wickets taken by a bowler in 10 cricket matches are as follows:  
2, 6, 4, 5, 0, 2, 1, 3, 2, 3. Find the mode of the data.

5. Find the probability that a leap year chosen at random has 53 Mondays.
6. The circumferences of two concentric circles are 88 cm and 66 cm respectively. Find the width of the ring formed by them.

**OR**

The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having an area equal to the sum of the areas of the two circles.

**SECTION - B****Question number 7 to 12 carry 2 marks each**

7. A(7, -3), B(5, 3) and C(3, -1) are the vertices of  $\triangle ABC$ . Find the length of the median drawn from A.
8. Evaluate:  $\frac{\sin^2 22^\circ + \sin^2 68^\circ}{\cos^2 22^\circ + \cos^2 68^\circ} + \sin^2 63^\circ + \cos 63^\circ \sin 27^\circ$ .

**OR**

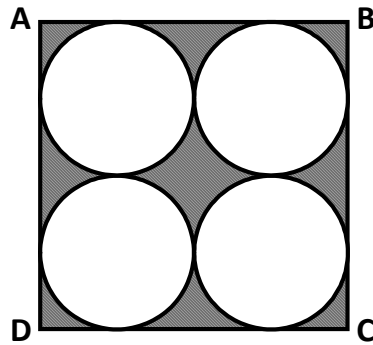
If  $\sin \theta = \frac{a}{b}$  then find the value of  $\cos \theta$ .

9. Metallic spheres of radii 6 cm, 8 cm and 10 cm respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere.
10. A card is drawn at random from a well shuffled deck of 52 cards. Find the probability of getting neither a red card nor a queen.

**OR**

Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is a prime number.

11. In the adjoining figure, ABCD is a square of side 14 cm. Four circles touching each other externally are inscribed in the square. Find the area of the shaded region.



12. Find the unknown entries  $a$ ,  $b$ ,  $c$ ,  $d$ ,  $e$ ,  $f$  in the following distribution of heights of students in a class:

Height (in cm)	Frequency	Cumulative Frequency
150 – 155	12	$a$
155 – 160	$b$	25
160 – 165	10	$c$
165 – 170	$d$	43
170 – 175	$e$	48
175 – 180	2	$f$

## SECTION - C

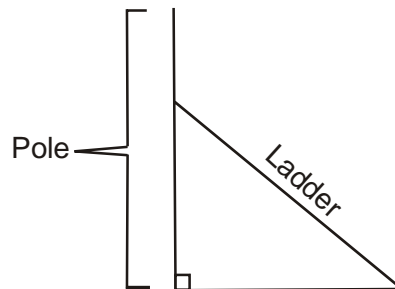
**Question numbers 13 to 22 carry 3 marks each.**

13. Can the number  $6^n$ , where  $n$  is a natural number, end with digit 5? Give reasons.

**OR**

Find the LCM and HCF of 12, 72 and 120 using fundamental theorem of arithmetic. Also show that  $\text{HCF} \times \text{LCM}$  is not equal to the product of three given numbers.

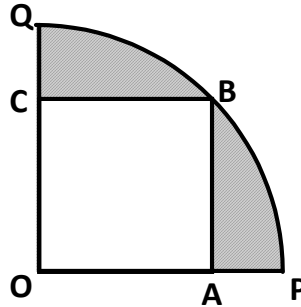
14. If  $A(-5, 7)$ ,  $B(-4, -5)$ ,  $C(-1, -6)$ ,  $D(4, 5)$  are the vertices of a quadrilateral ABCD, find its area.
15. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding segment of the circle. ( $\pi = 3.14$ )
16. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.
17. An electrician has to repair an electric fault on a pole of height 5 m. She needs to reach a point 1.3 m below the top of the pole to undertake the repair work. What should be the length of the ladder that she should use which, when inclined at an angle of  $60^\circ$  to the horizontal, would enable her to reach the required position? Also, how far from the foot of the pole should she place the foot of the ladder? ( $\sqrt{3} = 1.732$ )



18. The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one number is 280, then find the other number.
19. Find 'P' if the mean of the given data is 15.45.

<b>Class</b>	00 – 06	06 – 12	12 – 18	18 – 24	24 – 30
<b>Frequency</b>	6	8	P	9	7

20. In the adjoining figure, a square OABC of side 20 cm is inscribed in a quadrant OPBQ. Find the area of the shaded region. ( $\pi = 3.14$ )



21. Express the trigonometric ratios of  $\angle A$  in terms of  $\sec A$ .

**OR**

In  $\Delta PQR$ , right angled at Q,  $QR = 9$  cm and  $PR - PQ = 1$  cm. Determine the value of  $\sin R + \cos R$ .

22. A game consist of tossing a coin 3 times. Write all the possible outcomes for this. Ramesh will win the game if all tosses show the same result and loses otherwise. Find the probability that Ramesh will lose the game.

**OR**

Two digit numbers are formed from the digits 0, 1, 2, 3, 4 where repetition of the digits is allowed. Find the probability that:

- the number is composite,
- the number is multiple of 7.

**SECTION - D**

**Question numbers 23 to 30 carry 4 marks each.**

23. Show that square of an odd positive integer can be of the form  $6q + 1$  or  $6q + 3$  for some integer  $q$ .
24. Do the points whose coordinates are  $(3, 2)$ ,  $(-2, -3)$  and  $(2, 3)$  form a triangle? If so, name the type of triangle formed.

**OR**

Name the type of quadrilateral formed, if any, by the points whose coordinates are  $(-3, 5)$ ,  $(3, 1)$ ,  $(0, 3)$ ,  $(-1, -4)$ . Give reasons for your answer.

25. Prove that  $\frac{\sin A - \cos A + 1}{\sin A + \cos A - 1} = \frac{1}{\sec A - \tan A}$ .

26. If  $a \sin \theta + b \cos \theta = c$  then prove that  $a \cos \theta - b \sin \theta = \sqrt{a^2 + b^2 - c^2}$ .

**OR**

In an acute angled  $\triangle ABC$ , if  $\tan (A + B - C) = 1$  and  $\sec (B + C - A) = 2$ , find the values of A, B and C.

27. A metallic right circular cone 20 cm high and whose vertical angle is  $60^\circ$  is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter  $\frac{1}{16}$  cm, find the length of the wire.

28. The angle of elevation of a cloud from a point 60 m above a lake measures  $30^\circ$  and the angle of depression of the reflection of cloud in the lake measures  $60^\circ$ . Find the height of the cloud from the lake surface.

**OR**

The angle of elevation of a jet plane from a point A on the ground measures  $60^\circ$ . After a flight of 30 seconds, the angle of elevation measures  $30^\circ$ . If the jet plane is flying at a constant height of  $3600\sqrt{3}$  m. Find the speed of the jet plane. ( $\sqrt{3} = 1.732$ )

29. In the adjoining figure, an athletic track 14 m wide consists of two straight sections 120 m long joining semicircular ends whose inner radius is 35 m. Calculate the area of the track.

Write the importance of sports in one's life.



30. During a medical check-up of 35 students of a class, their weights were recorded as follows:

Weight (in kg)	Number of students
Less than 38	00
Less than 40	03
Less than 42	05
Less than 44	09
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Draw a less than type ogive for the given data. Hence obtain the median weight from the graph.

**OR**

The median of the following data is 525. Find the values of  $x$  and  $y$  if the total frequency is 100.

Class Interval	Frequency
000 – 100	02
100 – 200	05
200 – 300	$x$
300 – 400	12
400 – 500	17
500 – 600	20
600 – 700	$y$
700 – 800	09
800 – 900	07
900 – 1000	04

*All the Best* 👍