

SET - A

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

CBSE - X

Roll No.

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Code No. 30/1

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 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. Express 2120 as a product of its prime factors.
2. Find the abscissa of the point which divides the join of the points having coordinates $(-1, 7)$ and $(4, -3)$ in the ratio 2:3.
3. If $\cos (40 + x)^\circ = \sin 30^\circ$ then find the value of x .

OR

3. Express $\operatorname{cosec} 48^\circ + \tan 88^\circ$ in terms of trigonometric ratios of angles between 0° and 45° .
4. Find mode of the data, using an empirical relation when it is given that mean and median are 10.5 and 9.6 respectively.
5. Find the area of a ring whose outer and inner radii are respectively 20 cm and 15 cm.
6. In a group of 3 students, the probability of 2 students not having the same birthday is 0.992. What is the probability that the 2 students have the same birthday?

OR

6. A letter of English alphabet is chosen at random. Determine the probability that the chosen letter is a consonant.

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

7. Find the linear equation between x and y such that $P(x, y)$ is equidistant from the points $A(1, 4)$ and $B(-1, 2)$.

OR

Find the ratio in which the point $P(-1, 6)$ lying on the line segment joining $A(-3, 10)$ and $B(6, -8)$ divides it.

8. If $\sin (A - B) = \frac{1}{2}$, $\cos (A + B) = \frac{1}{2}$, $0^\circ < A + B \leq 90^\circ$, $A > B$, find A and B .

9. A box contains cards numbered 11 to 123. A card is drawn at random from the box. Find the probability that the number on the drawn card is
- a square number,
 - a multiple of 7.
10. Find the area of quadrant of a circle whose circumference is 22 cm.
11. A cone of height 24 cm and radius of base 6 cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.
12. The following table shows the cumulative frequency distribution of marks of 800 students. Construct a frequency distribution table for the given data:

Marks	Number of students
Below 20	50
Below 40	270
Below 60	570
Below 80	740
Below 100	800

OR

The mean of 20 observations is 50. If each observation is increased by 5, then find the new mean.

SECTION - C

Question numbers 13 to 22 carry 3 marks each.

13. Using Euclid's division algorithm, find the HCF of the numbers 867 and 255.

OR

2002 cartons of Lassi bottles and 2618 cartons of Frooti bottles are to be stacked in a store room. If each stack is of same height and is to contain cartons of same type of bottles, what would be the greatest number of cartons each stack would have?

14. Points A(6, 1), B(8, 2), C(9, 4) and D (p , 3) are the vertices of a parallelogram, taken in order. Find the value of p .

15. Prove that $(\operatorname{cosec} \theta - \cot \theta)^2 = \frac{1 - \cos \theta}{1 + \cos \theta}$.

OR

If $\frac{2\sin A}{3\cos A} = \frac{3}{4}$ then find the values of $\tan A$, $\operatorname{cosec} A$ and $\cos A$.

16. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area.
17. Deepti plays with a car tyre and rolls it down a street. If the diameter of the tyre is 56 cm, how many metres will the tyre go, if it is made to make 400 revolutions?
18. Three cubes of metal whose edges are in the ratio 3 : 4 : 5 are melted and converted into a single cube whose diagonal is $12\sqrt{3}$ cm. Find the edges of the three cubes.
19. Prove that $\sqrt{3}$ is an irrational number.
20. Find the missing frequency (x) of the following distribution, if the mode is 34.5.

Marks Obtained	Number of students
00 – 10	4
10 – 20	8
20 – 30	10
30 – 40	x
40 – 50	8

OR

By changing the following frequency distribution 'to less than type' distribution, draw its ogive.

Classes	00 – 15	15 – 30	30 – 45	45 – 60	60 – 75
Frequency	6	8	10	6	4

27. A chord of a circle of radius 21 cm subtends an angle measuring 120° at the centre. Find the area of the corresponding minor segment. ($\sqrt{3} = 1.732$)

28. If $\operatorname{cosec} \theta + \cot \theta = p$ then prove that $\cos \theta = \frac{p^2 - 1}{p^2 + 1}$.

OR

If $A + B = 90^\circ$ then prove that $\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 B}{\cos^2 A}} = \tan A$.

29. Thirty women were examined in a hospital by a doctor and the number of heart beats per minute were recorded and summarized as follows. Find the mean heart beats per minute for these women, choosing a suitable method.

Number of heart beats per minute	65 – 68	68 – 71	71 – 74	74 – 77	77 – 80	80 – 83	83 – 86
Number of women	2	4	3	8	7	4	2

OR

If median salary of 100 employees of a factory is ₹ 24,800, then find the missing frequencies f_1 and f_2 in the given distribution table:

Salary (in ₹)	Number of employees
10,000 – 15,000	18
15,000 – 20,000	f_1
20,000 – 25,000	f_2
25,000 – 30,000	15
30,000 – 35,000	12
35,000 – 40,000	22

30. A man donates 10 aluminum buckets to an orphanage. The bucket made of aluminum is of height 20 cm and had its upper and lowest ends of radius 36 cm and 21 cm respectively. Find the cost of preparing 10 buckets if the cost of aluminum sheet is ₹ 42 per 100 cm^2 . Write your comments on the act of the man.

All the Best 👍