

Central Board of Secondary Education

(CBSE)

Board Examination - (March)

Series : RTM

Set

A

Code No. - M -041

Roll No.

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Candidates must write the code on the title page of the answer-book.

- Please check that this question paper contains 5 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.

FINAL EXAMINATION

MATHEMATICS

C.B.S.E

Time allowed : 3 hours

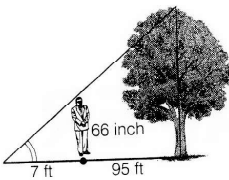
Maximum Marks : 80

General Instructions :

- (a) All the questions are compulsory.
- (b) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
- (c) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
- (d) 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, three 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.
- (e) Use of calculators is not permitted.

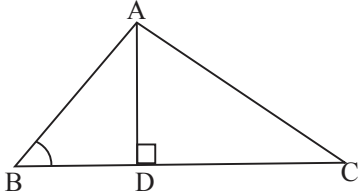
Section - A

Q.Nos. 1 to 20 carry 1 mark each.

1)	Q.No. 1 to 10 are multiple choice questions. Select the most appropriate answer from the given options. If one of the zeroes of the quadratic polynomials $(k - 1)x^2 + kx + 1 = 0$ is -3, then the value of k is (a) $\frac{4}{3}$ (b) $-\frac{4}{3}$ (c) $\frac{2}{3}$ (d) $-\frac{2}{3}$ (1)
2)	If $\sqrt{3} \tan \theta = 1$, then the value of $\sin^2 \theta - \cos^2 \theta$ is (a) $\frac{1}{3}$ (b) $-\frac{1}{3}$ (c) $-\frac{1}{2}$ (d) $\frac{3}{2}$ (1)
3)	The smallest odd composite number is (a) 5 (b) 3 (c) 7 (d) 9 (1)
4)	If a dice is thrown once, there are two possible outcomes : getting a number greater than 4 or less than equal to 4. Therefore, the probability of getting a number greater than 4 is (a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{1}{5}$ (d) $\frac{2}{5}$ (1)
5)	If mode of a data is 45, mean is 27, then the median is (a) 23 (b) 28 (c) 33 (d) 30 (1)
6)	The point $P(1, 2)$ divides the join of $A(-2, 1)$ and $B(7, 4)$ in the ratio : (a) 1 : 2 (b) 2 : 1 (c) 3 : 1 (d) 1 : 3 (1)
7)	In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre, then the length of the arc is (a) 11 cm (b) 24 cm (c) 22 cm (d) 33 cm (1)
8)	If the first three terms of an AP are $x - 1, x + 1, 2x + 3$, then the value of x is (a) 0 (b) 1 (c) 2 (d) 3 (1)
9)	In $\triangle ABC \sim \triangle DEF$ such that $AB = 9.1$ cm and $DE = 6.5$ cm. If the perimeter of $\triangle DEF$ is 25 cm, then what is the perimeter of $\triangle ABC$? (a) 35 cm (b) 28 cm (c) 42 cm (d) 40 cm (1)
10)	Rubal standing in his backyard decides to estimate the height of a tree. He stands such that the tip of his shadow coincides with the tip of the tree's shadow, as shown. Rubal is 66 inch tall. The distance between the tip of the shadow and Rubal is 7 ft. Find the height of the tree to the nearest foot. (a) 80 ft (b) 90 ft (c) 60 ft (d) 70 ft (1)
	
11)	Q.No. 11 to 15 : Fill in the blanks. The centroid of $\triangle PQR$ whose vertices are $P(-8, 0)$, $Q(5,5)$ and $R(-3,-2)$ is _____ (1)
12)	Given positive integers a and b , there exists unique integers q and r satisfying $a = bq + r$, $0 \leq r < b$. This statement is known as _____ (1)
13)	Two tangents, drawn at the end points of diameter of a given circle are always _____ (1)
14)	If $\triangle ABC \sim \triangle PQR$ then $\angle B$ is equal to _____ (1)
15)	$\cos (90^\circ - \theta)$ is equal to _____ (1)

16)	Q.No. 16 to 20 : Answer the following. Three numbers are in the ratio 3 : 4 : 5 and their LCM is 1200. Then find HCF.	(1)
17)	The graph of a polynomial $p(x)$ is shown below. Find the number of zeroes of $p(x)$.	(1)
18)	Parallelogram $PQRS$ has vertices $P(1, 4)$, $Q(7, 11)$, $R(a, 4)$ and $S(1, -3)$. Find the value of a .	(1)
19)	Which term of AP, 21, 18, 15, is -81 ?	(1)
20)	Write the value of k for which the system of equations $x + ky = 0$, $2x - y = 0$ has unique solution.	(1)
Section - B Q.Nos. 21 to 26 carry 2 marks each.		
21)	Solve the pair of linear equation by substitution method : $x + y = 14$, $x - y = 4$.	(2)
22)	Evaluate : $\frac{\sin^2 63^\circ + \sin^2 27^\circ}{\cos^2 17^\circ + \cos^2 73^\circ}$	(2)
OR Evaluate : $\sin 25^\circ \cos 65^\circ + \cos 25^\circ \sin 65^\circ$.		
23)	If fig. $DE \parallel AC$, and $DF \parallel AE$. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$.	(2)
24)	In fig. PT_1 and PT_2 are tangents to the circle drawn from an external point P . CD is a third tangent touching circle at Q . If $PT_2 = 12$ cm and $CQ = 2$ cm. What is the length of PC ?	(2)
25)	A rectangular water tank of base 11 m x 6 m contains water upto a height of 5 m. If the water in the tank is transferred to a cylindrical tank of radius 3.5 m, find the height of the water level in the tank.	(2)
OR How many spherical lead shots each of diameter 4 cm can be made out of a solid cube of lead whose edge measures 44 cm ?		

26)	A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue marbles in the jar. (2)																								
Section - C Q.Nos. 27 to 34 carry 3 marks each																									
27)	Divide the polynomial $p(x)$ by the polynomial $g(x)$ and find the quotient and remainder of the equation : $p(x) = x^4 - 3x^2 + 4x + 5$, $g(x) = x^2 + 1 - x$. (3)																								
28)	The angles of a triangle are x , y and 40° . The difference between the two angles x and y is 30° . Find x and y . OR A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction. (3)																								
29)	Prove that $\sqrt{3} + \sqrt{5}$ is irrational number. (3)																								
30)	Find the Sum of those integers from 1 to 500 which are multiples of 2 as well of 5. OR A contract on construction job specifies a penalty for delay of completion beyond a certain date as follows : ₹ 200 for the first day, ₹250 for the second day, ₹300 for the third day, etc., the penalty for each succeeding day being ₹50 more than for the preceding day. How much money the contractor has to pay as penalty, if he has delayed the work by 30 days ? (3)																								
31)	A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 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. (3)																								
32)	Find the value of 'k' if the points (7, -2), (5, 1), (3, k) are collinear. (3)																								
33)	The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes. (3)																								
34)	Consider the following distribution of daily wages of 50 workers of a factory. <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Daily wages (in ₹)</td> <td>100-120</td> <td>120-140</td> <td>140-160</td> <td>160-180</td> <td>180-200</td> </tr> <tr> <td>Number of workers</td> <td>12</td> <td>14</td> <td>8</td> <td>6</td> <td>10</td> </tr> </tbody> </table> Find the mean daily wages of the workers of the factory. (3)	Daily wages (in ₹)	100-120	120-140	140-160	160-180	180-200	Number of workers	12	14	8	6	10												
Daily wages (in ₹)	100-120	120-140	140-160	160-180	180-200																				
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Section - D Q.Nos. 35 to 40 carry 4 marks each																									
35)	The diagonal of a rectangular field is 30 metres more than the shorter side. If the longer side is 15 metres more than the shorter side, find the sides of the field. (4)																								
36)	The maximum bowling speeds, in km per hour, of 33 players at a cricket coaching centre are given as follows : <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Speed (km / h)</td> <td>85 - 100</td> <td>100-115</td> <td>115-130</td> <td>130-145</td> </tr> <tr> <td>No. of Players</td> <td>11</td> <td>9</td> <td>8</td> <td>5</td> </tr> </tbody> </table> Calculate the median bowling speed. OR The annual rainfall record of a city for 66 days is given in the following table : <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Rainfall (in cm)</td> <td>0 -- 10</td> <td>10 -- 20</td> <td>20 -- 30</td> <td>30 -- 40</td> <td>40 -- 50</td> <td>50 -- 60</td> </tr> <tr> <td>Frequency</td> <td>22</td> <td>10</td> <td>8</td> <td>15</td> <td>5</td> <td>6</td> </tr> </tbody> </table> Calculate median rainfall using ogives type (of more than type and of less than type). (4)	Speed (km / h)	85 - 100	100-115	115-130	130-145	No. of Players	11	9	8	5	Rainfall (in cm)	0 -- 10	10 -- 20	20 -- 30	30 -- 40	40 -- 50	50 -- 60	Frequency	22	10	8	15	5	6
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37)	<p>In fig. ABC is triangle in which $\angle ABC < 90^\circ$, $AD \perp BC$. Prove that $AC^2 = AB^2 + BC^2 - 2BC \times BD$.</p> 
38)	<p>Draw a $\triangle ABC$ with sides $AB = 6$ cm, $BC = 7.5$ cm and $AC = 6.6$ cm. Construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of $\triangle ABC$.</p> <p style="text-align: center;">OR (4)</p> <p>Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.</p>
39)	<p>Prove that $(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$.</p> <p style="text-align: center;">OR (4)</p> <p>Prove that $\sqrt{\sec^2 \theta + \operatorname{cosec}^2 \theta} = \tan \theta + \cot \theta$.</p>
40)	<p>A bucket open at the top is in the form of a frustum of a cone with a capacity of 12308.8 cm^3. The radii of the top and bottom circular ends are 20 cm and 12 cm respectively. Find the height of the bucket and the area of metal sheet used in making the bucket. (4)</p>

~0~0~0~Best of Luck~0~0~0~

