TARGET MATHEMATICS
THE EXCELLENCE KEY
AGYAT GUPTA (M.Sc., M.Phil.)

26 YEARS of quality education

CODE:1401- AG-TS-5   REG.NO:-TMC -D/79/89/36/63

GENERAL INSTRUCTIONS :

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

PRE-BOARD EXAMINATION 2017 -18

MATHEMATICS   CLASS X

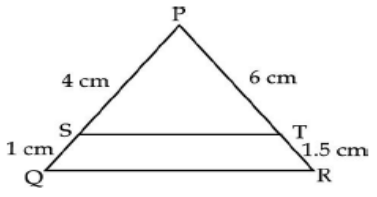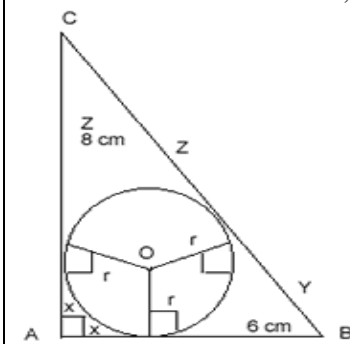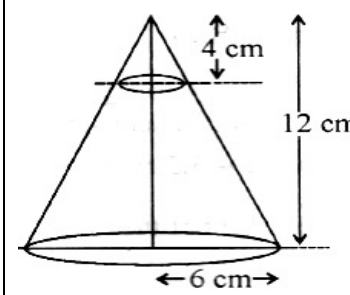| Time : 3 to $3\frac{1}{4}$ Hours	Maximum Marks : 80

SECTION A
Question numbers 1 to 6 carry 1 mark each

Q.1	Determine the roots of the following quadratic equation: $4\sqrt{5}x^2 - 17x + 3\sqrt{5} = 0$.
Q.2	Determine k so that $\frac{2}{3}$, k and $\frac{5}{8}k$ are the three consecutive terms of an AP.
Q.3	The HCF of two numbers is 145 and their LCM is 2175. if one number is 725 , find the other.

Q.4	If D, E are points on the sides AB and AC of ΔABC Such that $AD = 6cm$, $BD = 9\,cm$, $AE = 8\,cm$, $EC = 12\,cm$. Prove that $DE \parallel BC$.
Q.5	If the points A(1,2), B(4,q), C(p,6) and D(3,5) are vertices of a parallelogram ABCD, find the values of p and q.
Q.6	Without using trigonometric tables, prove that: $\frac{\sec^2 35^o - \cot^2 55^o}{\cos ec^2 39^o - \tan^2 51^o} + \sin 61^o \sec 29^o = 2$.

SECTION B
Question numbers 7 to 12 carry 2 marks each

Q.7	In a family, there are three children. Assuming that the chances of a child being a male or female are equal , find the probability that (a) there is one girl in the family (b) there is no male child in the family © there is at least one male child in the family.
Q.8	How many terms of the A.P. $-\ 6\ ,\ -\ \frac{11}{2},\ -\ 5$,..... are needed to give the sum – 25 ? Explain double answer.
Q.9	There are 900 students in a public school in which 180 students comes to school by their own car,225 by their own motor bike and remaining by their bicycle. Find the probability: (i) who come by car ? (ii) who come by motor bike (iii) who come by bicycle (iv) Which mode of transport you will suggest to students and why?
Q.10	Determine the ratio in which the point P (m, 6) divides the join of A(-4, 3) and B(2, 8). Also find the value of m.
Q.11	Check whether 8^n can end with digit zero for any natural number n.
Q.12	Solve : $\frac{x}{a} = \frac{y}{b}$; $ax + by = a^2 + b^2$

SECTION C
Question numbers 13 to 22 carry 3 marks each

Q.13	If $2\cos\theta - \sin\theta = x$ & $\cos\theta - 3\sin\theta = y$. prove that

<table>
<tr>
<td></td>
<td>

$$2x^2 + y^2 - 2xy = 5$$

OR

If $\sec\theta = x + \dfrac{1}{4x}$, then prove that $\sec\theta + \tan\theta = 2x$ or $\dfrac{1}{2x}$.
</td>
</tr>
<tr>
<td>Q.14</td>
<td>

Prove that coordinates of the centroid of a triangle ABC, with vertices $(x_1\ y_1)$, (x_2, y_2) and (x_3, y_3) are given by $\left(\dfrac{x_1 + x_2 + x_3}{3}, \dfrac{y_1 + y_2 + y_3}{3}\right)$.

OR

The base BC of an equilateral triangle ABC lies y-axis .the co-ordinates of the points c are (0,-3) if the origin is the mid- point of the base B, find the co-ordinate of the points A and B and hence find the area of the $\triangle$ ABC.
</td>
</tr>
<tr>
<td>Q.15</td>
<td>Form a pair of linear equations in two variables using the following information and solve it graphically : Five years ago, Sagar was twice as old as Tiru. Ten years later Sagar's age will be ten years more than Tiru's age. Find their present ages. What was the age of Sagar when Tiru was born?</td>
</tr>
<tr>
<td>Q.16</td>
<td>If two zeroes of the polynomial p(x)= $x^4 - 6x^3 - 26x^2 + 138x - 35$ are $2 \pm \sqrt{3}$, find the other zeroes.</td>
</tr>
<tr>
<td>Q.17</td>
<td>If all the sides of a parallelogram touches a circle, show that the parallelogram is a rhombus.</td>
</tr>
<tr>
<td>Q.18</td>
<td>Prove that $n^3 - n$ is divisible by 6.</td>
</tr>
<tr>
<td>Q.19</td>
<td>

In the given figure PS, SQ, PT and TR are 4 cm, 1 cm, 6 cm, and 1.5 cm respectively, prove that ST ‖ QR. Also, find the ratio of $\dfrac{ar(\triangle PST)}{ar(Trap\ QRTS)}$.

OR
</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td>

In the given figure, ABC is right angled triangle with the AB = 6cm and AC = 8cm. A circle with centre O has been inscribed inside the triangle. Calculate the value of r, the radius of the inscribed circle.

</td>
</tr>
<tr>
<td>Q.20</td>
<td>

A vessel is in the form of an inverted cone. Its height is 8cm and the radius of its open top is 5cm. it is filled with water up to the brim. When lead shots, spherical in shape and of diameter 1cm are dropped into the vessel one fourth of water flows out. Find the number of leads shots dropped into the vessel.

OR

In fig. 4, from the top of a solid cone of height 12 cm and base radius 6 cm, a cone of height 4 cm is removed by a plane parallel to the base. Find the total surface area of the remaining solid. (Use $\pi = 22/7$ and $\sqrt{5} = 2.236$)

</td>
</tr>
<tr>
<td>Q.21</td>
<td>

Find the median of the following data

Class	0-10	10-20	20-30	30-40	40-50	Total
Frequency	8	16	36	34	6	100
</td>
</tr>
</table>

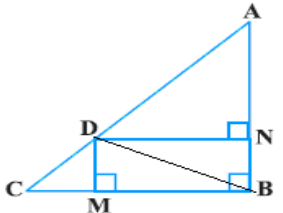| Q.22	An agriculture field is in the form of a rectangle of length 20m width 14m. A 10m deep well of diameter 7m is dug in a corner of the field and the earth taken out of the well is spread evenly over the remaining part of the field. Find the rise in its level.

SECTION D

Question numbers 23 to 30 carry 4 marks each

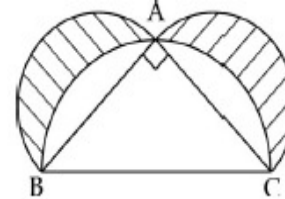| Q.23	Solve for x: $\dfrac{1}{a+b+x} = \dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{x} : a \neq 0, b \neq 0, x \neq 0$. OR If a student had walked 1 km/hr faster, he would have taken 15 minutes less to walk 3 km. Find the rate at which he was walking.
Q.24	Prove that: $(\sin\theta + \sec\theta)^2 + (\cos\theta + \cos ec\,\theta)^2 = (1 + \sec\theta\cos ec\,\theta)^2$.
Q.25	In given Fig. , D is a point on hypotenuse AC of Δ ABC, such that BD$\perp$AC & DM $\perp$ BC and DN$\perp$AB. Prove that : (i) $DM^2 = DN \times MC$ (ii) $DN^2 = DM \times AN$ OR In a triangle, if the square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle. Prove it .
Q.26	The median of the following data is 525. Find the values of x and y, if the total frequency is 100.

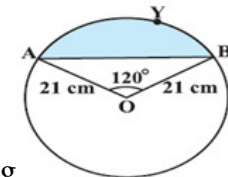| Marks	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
F	2	5	X	12	17	20	Y	9	7	4

Q.27	From an aero plane vertically above a straight horizontal road, the angle of depression of two consecutive kilometer stone on opposite side of aero plane are observed to be α and β. Show that the height of aero plane above the road is $\dfrac{\tan\alpha\tan\beta}{\tan\alpha + \tan\beta}$ kilometer.
Q.28	Find the middle term of the sequence formed by all three-digit numbers which leave a remainder 5 when divided by 7. Also find the sum of all number on both sides of the middle term separately
Q.29	In the above given figure, ABC is a right triangle, right angled at A : semicircles are drawn on AB, BC and AC as diameters. Prove that area of the shaded region is equal to the area of the triangle ABC. OR Find the area of the segment AYB shown in Fig , if radius of the circle is 21 cm and $\angle AOB = 120°$. (Use $\pi = \dfrac{22}{7}$).
Q.30	Draw a circle of radius 3 cm. From a point P, outside the circle draw two tangents to the circle without using the centre of the circle.

****

" THE ENERGY OF THE MIND IS THE ESSENCE OF LIFE "