CODE:2601- AG-TS-4

REG.NO:-TMC -D/79/89/36/63

General Instructions :-

(i) **All** Question are compulsory :

(ii) This question paper contains **40** questions.

(iii) Question **1-20**in **PART-A** areObjective type question carrying **1** mark each.

(iv) Question **21-26**in **PART-B** are sort-answer type question carrying **2** mark each.

(v) Question **27-34**in **PART-C** are long-answer-**I** type question carrying **3** mark each.

(vi) Question **35-40** in **PART-D** are long-answer-**II** type question carrying **4** mark each

(vii) You have to attempt only one lf the alternatives in all such questions.

(viii) Use of calculator is not permitted.

(ix) Please check that this question paper contains 8 printed pages.

(x) 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.

Time : 3 Hours | Maximum Marks : 80

CLASS – X **MATHEMATICS**

PRE-BOARD EXAMINATION 2019 -20

PART – A **(Question 1 to 20 carry 1 mark each.)**

SECTION I : Single correct answer type

This section contain 10 multiple choice question . Each question has four choices (A) , (B) , (C) &(D) out of which **ONLY ONE** is correct .

Q.1 If the least prime factor of a is 3, the least prime factor of b is 7, then the least prime factor of (a+b) is
(a) 2 (b) 3 (c) 5 (d) 11

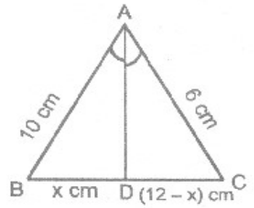
Q.2 The median of the observations 11 , 12 , 14 , 18 , x +2 , x + 4 , 30 , 32 , 35 , 41 .arranged in ascending order is 24 . then the value of x .
(a) 22 (b) 21 (c) 20 (d)none of these

Q.3 Two alarm clocks ring their alarms at regular intervals of 50 seconds and 48 seconds. If they first beep together at 12 noon, at what time will they beep again for the first time ?
(a) 12.20 pm (b) 12.12 pm (c) 12.11 pm (d) none of these

Q.4 The value of k for which the system of equations $3x+5y=0$ and $kx+10y=0$ has a non-zero solution is
(a)0 (b)2 (c)6 (d)8

Q.5 If $\sin\alpha=\frac{1}{2}$ and α is acute, then $(3\cos\alpha-4\cos^3\alpha)$ is equal to
(a) 0 (b) $\frac{1}{2}$ (c) $\frac{1}{6}$ (d) -1

Q.6 In a ΔABC, AD is the bisector of ∠A, meeting side BC at D.If AB = 10

	cm, AC = 6 cm, BC = 12 cm, find BD.  (a) 3.3 (b) 18 (c) 7.5 (d) 1.33
Q.7	The positive value of y for which the distance between the points P(2, -3) and Q(10, y) is 10 units, is (a)2 (B) 4 (C) 3 (D) 1
Q.8	The distance of the point P(2, 3) from the x- axis is (A)2 (B) 3 (C) 11 (D) 5
Q.9	If ΔPQR is right angled at R, then the value of cos (P+Q) is (a) 1 (b) 0 (c) ½ (d) $\sqrt{3}/2$
Q.10	The area of a triangle is 5. Two of its vertices are (2, 1) and (3, -2). The third vertex is (x, y) Where y = x + 3. Then the co – ordinates of the third vertex is (A)$\left(\frac{7}{2},\frac{13}{2}\right)$ or $\left(-\frac{3}{2},\frac{3}{2}\right)$ (B) $\left(-\frac{7}{2},\frac{13}{12}\right)$ or $\left(\frac{3}{2},-\frac{3}{2}\right)$(C) $\left(\frac{1}{2},\frac{3}{2}\right)$(D) $\left(\frac{3}{2},\frac{1}{2}\right)$
(Q11 – Q15) Answer the following questions	
Q.11	Without actual division find whether the rational number $\frac{41}{37500}$ is a terminating or a non-terminating repeating decimal.
Q.12	D and E are respectively the points on the sides AB and AC of a ΔABC such that AB = 12 cm, AD = 8 cm, AE = 12 cm and AC = 18 cm, show that DE || BC.

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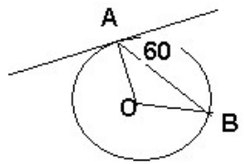
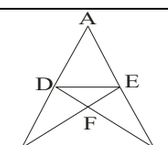
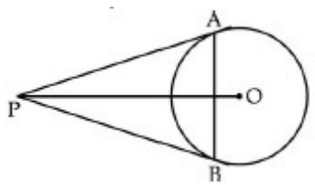
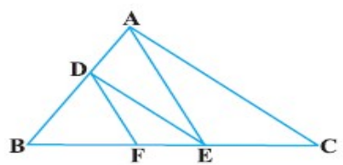
Q.13	The length of a tangent from a point A at a distance of 26 cm from the center of the circle is 10 cm of the radius of the circle is ---------- **OR** In the figure  , if O is the center of the circle, AB is a chord and the tangent at A makes an angle of 60° with AB, then $\angle AOB$ is equal to: (A) 120° (B) 100° (C) 30° (D) 90°
Q.14	Find the value of a, b and c, such that the numbers a, 10, b, c, 31 are in A.P.
Q.15	The zeros of a quadratic equation $x^2 - 7x + k = 0$ are $\alpha and \beta$ such that $\alpha - \beta = 3$.find the value of k.
Fill in the blanks (Q16 – Q20)	
Q.16	The radius of wire is decreased to one –third. If volume remains the same, the length will become ---------times
Q.17	If the roots of $5x^2 - px + 1 = 0$ are real and distinct, then condition for p ---------- **OR** The remainder when $x^4 + x^3 - 2x^2 + x + 1$ is divided by x - 1 is _____.
Q.18	In the given figure  , DE || BC and AD : DB = 5 : 4. Find $\frac{area\,(\Delta DEF)}{area\,(\Delta CFB)}$ =----------

Q.19	If the ratio between the sums of n terms of two AP's is $3n + 8 : 7n + 15$, then the ratio between their 12^{th} terms is ----------
Q.20	A number x is selected from the number 1,2,3 and then a second number y is selected from the number 1,4,9 what is the probability that the product x y of the two numbers will be less than 9 is ----------

PART – B (Question 21 to 26 carry 2 mark each.)

Q.21	Write the decimal number $2.44\bar{8}$ in the form $\frac{p}{q}$ in the simplest form.
Q.22	In the given figure, PA and PB are two tangents drawn to a circle with center O and radius r. if OP = 2r, show that ΔAPB is equilateral. 
Q.23	State and prove Converse of Pythagoreans Theorem . **OR** In Fig.  , DE || AC and DF || AE. Prove that $\frac{BF}{EF} = \frac{BE}{EC}$.
Q.24	A boy is standing on the ground and flying a kite with 100 m of string at an elevation of 30^0. Another boy is standing on the roof of a 10 m high building and is flying his kite at an elevation of 45^0. Both the boys are on opposite sides of both the kites. Find the length of the string that the second boy must have so that the two kites meet.

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Q.25	Two dice are thrown simultaneously at the same time. Find the probability of getting different number on both the dice. **OR** A bag contains 6 red ball and some blue balls. If probability of drawing A blue ball from the bag is twice that of a red ball. Find the number of Blue ball in the bag.
Q.26	A rectangular sheet of paper of dimensions 44cm× 18cm is rolled along its length and a cylinder is formed. Find the volume of the cylinder so formed (use $\pi = \frac{22}{7}$)

PART – C (Question 27 to 34 carry 3 mark each.)

Q.27	Find the least number that is divisible by all the numbers between 1 and 10 (both inclusive). **OR** A,B and C start cycling around a circular path in the same direction at the same time. Circumference of the path is 1980m. if the speed of A is 330m/min, speed of B is 198m/min and that of C is 220m/min and they start from same point, then after what time they will be together at the starting point?
Q.28	Find the middle term of the sequence formed by all three-digit numbers which leave a remainder 3, when divided by 4. Also find the sum of all numbers on both sides of the middle term separately.
Q.29	2 men and 7 boys can do a piece of work in 4 days. The same work is done in 3 days by 4 men and 4 boys. How long would it take one man and one boy to do it? **OR** For which value(s)of λ , do the pair of linear equations $\lambda x + y = \lambda^2$ and $x + \lambda y = 1$ have (1)no solution?(2)infinitely many solutions? (3) a unique solution?
Q.30	The zeros of a quadratic polynomial $p(x) = 2x^2 + x + m$ are α & β .Find

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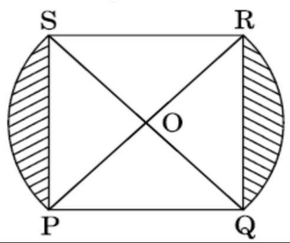
	the value of m if $\alpha^2 + \beta^2 + \alpha\beta = \frac{13}{4}$.
Q.31	Prove that the points A(4, 3), B(6, 4), C(5, -6) and D(3, -7) in that order are the vertices of a parallelogram. Also prove that diagonal of parallelogram divides the triangle of equal area.
Q.32	If $\sec\theta = x + \frac{1}{4x}$, then prove that $\sec\theta + \tan\theta = 2x$ or $\frac{1}{2x}$. **OR** Evaluate : $\frac{\sec^2 54^0 - \cot^2 36^0}{\text{cosec}^2 57^0 - \tan^2 33^0} + 2\sin^2 38^0 \sec^2 52^0 - \sin^2 45^0 + \frac{2}{\sqrt{3}}\tan 17^0 \tan 60^0 \tan 73^0$
Q.33	In figure 5, PQRS is a square lawn with side PQ = 42 metres. Two circular flower beds are there on the sides PS and QR with centre at O, the intersection of its diagonals. Find the total area of the two flower beds (shaded parts). 
Q.34	The mean of the following frequency distribution is 57.6 and the sum of the observation is 50. Find the missing frequency f_1 and f_2.

Cl	0-20	20-40	40-60	60-80	80-100	100-120
F	7	f_1	12	f_2	8	5

PART – D (Question 35 to 40 carry 4 mark each.)

Q.35	Draw a circle of radius 4 cm. Take a point P outside the circle. Without using the centre of the circle, draw two tangents to the circle from point P.
Q.36	Prove that opposite sides of a quadrilateral circumscribing a circle subtend

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	supplementary angles at the center. **OR** O is any point inside a rectangle ABCD.Prove that $OB^2 + OD^2 = OA^2 + OC^2$
Q.37	Swati can row her boat at a speed of 5 km/h in still water. If it takes her 1 hour more to row the boat 5.25 km upstream than to return downstream, find the speed of the stream. **OR** Find the value of p for which the following equation has two equal roots : $(p-12)x^2 + 2(p-12)x + 2 = 0$.
Q.38	A right angled triangle whose sides are 3cm ,4cm 5cm is revolved about the longest side find surface area of obtained (use π=22/7) . **OR** A hemispherical tank of radius $1\frac{3}{4}$ is full of water. It is connected with a pipe which empties it at the rate of 7 liters per second. How much time will it take to empty the tank completely ?
Q.39	The angles of depression of the top and bottom of an 8 m tall building from the top of a multistoreyed building are 30° and 45 °respectively. Find the height of the multi-storeyed building and the distance between the two buildings.
Q.40	The following table gives the height of 40 trees in meters : Change the above distribution to less than type distribution and draw its ogive. Hence obtain the median value.

CI	0-8	8-16	16-24	24-32	32-40	40-48
No. of trees	3	7	13	9	8	2

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	शिक्षा की जड़ कडवी है, पर उसके फल मीठे हैं.