CODE:0501- AG-TS-1   REG.NO:-TMC -D/79/89/36/63

CLASS – X **MATHEMATICS**

PRE-BOARD EXAMINATION 2019 -20
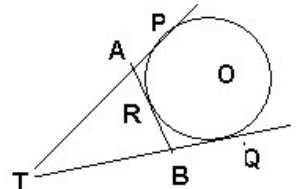
PART – A (Question 1 to 20 carry 1 mark each.)

General Instructions :-

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

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

(iii) Question **1-20** in **PART-A** are Objective 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.

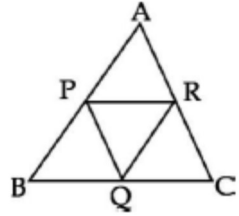Time : 3 Hours   Maximum Marks : 80

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 HCF of two consecutive even numbers is:
(A) 0   (B) 1   (C) 4   (D) 2

Q.2 Which measure of central tendency is given by the x co-ordinate of the point of intersection of the more than Ogive and less than Ogive.
(A) Mean (B) Median (C) Mode (D) All the above

Q.3 If HCF of 65 and 117 is expressible in the form of 65m-117, then the value of m is: (A) 4   (B) 2 (C) 1 (D) 3

Q.4 If $47x + 31y = 63$; $31x + 47y = 15$ then
(a) $x = 2, y = 1$ (b) $x = 2, y = -1$ (c) $x = 1, y = 2$ (d) $x = -1, y = 2$

Q.5 In the given Fig. $\angle BAC = 90°$ and AD $\perp$ BC. Then,
(a) BD. CD $= BC^2$ (b) AB. AC $= BC^2$
(c) BD. CD $= AD^2$ (d) AB. AC $= AD^2$.   .

Q.6 $\sin(60 + \theta) - \cos(30^0 - \theta)$ is equal to
(a) $2\cos\theta$ (b) $2\sin\theta$ (c) 0 (d) 1

Q.7 The coordinates of the middle points of the sides of a triangle are (4, 2), (3, 3) and (2,2), then the coordinates of its centroid are
(a) (3, 7/3) (b) (3, 3)   (c) (4,3)   (d) none of these

Q.8 The value of x for which AB = BC, where A(6, -1), B(1, 3) and C(x, 8),

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is

(A)   (A)3   (B) -3   (C) 5   (D) -5

Q.9 If $\cot\theta = \dfrac{7}{8}$ then the value of $\dfrac{(1+\cos\theta)}{(1-\sin\theta)}\dfrac{(1-\cos\theta)}{(1+\sin\theta)}$ is :

(a) $\dfrac{49}{64}$ (b) $\dfrac{8}{7}$ (c) $\dfrac{64}{49}$ (d) $\dfrac{7}{8}$

Q.10 If the points (k, 2k), (3k, 3k) and (3, 1) are collinear, then k

(A) $-\dfrac{1}{3}$ (B) $\dfrac{1}{3}$ (C) $-\dfrac{2}{3}$ (D) $\dfrac{2}{3}$

(Q11 – Q15) Answer the following questions

Q.11 If h, s, V be the height, curved surface area and the volume of a cone respectively, then $\left(3\pi V h^3 - s^2 h^2 + 9V^2\right)$ is equal to ------------

Q.12 Discriminant of the quadratic equation $2x^2 + x - 8 = 0$ is -------------

OR

On dividing $3x^3 - 2x^2 + 5x - 5$ by a polynomial p(x), the quotient and remainder are $x^2 - x + 2$ and -7 respectively. Then p(x)=----------.

Q.13 ABC is a triangle. PQ is a line segment intersecting AB in p and AC in Q such that PQ // BC and divides $A(\triangle APQ) = 2A(PQCB)$. Then, BP : AB is --------

Q.14 Let S_n denote the sum of n terms of an AP whose first term is a. if the common difference d is given by $d = S_n - KS_{n-1} + S_{n-2}$, then k = ------------

Q.15 The probability that a leap year should have exactly 52 Tuesday is -------

Fill in the blanks (Q16 – Q20)

Q.16 Check whether 4^n can end with digit zero for any natural number n.

Q.17 In $\triangle ABC, D$ and E are the point on the side AB and AC respectively such that $DE \parallel BC$. If $AD = 6x - 7, DB = 4x - 3, AE = 3x - 3$ and $EC = 2x - 1$, then find the value of x.

Q.18

In the given T are three tangents TP, TQ and AB are respectively drawn at the point P, Q and R to a circle. The semi - perimeter of $\triangle TAB$ is equal to

(A) 3 TA   (B) TP   (C) 4 AB   (D) 2 TQ

OR

PT is a tangent to a circle whose center is O. IF PT = a units and radius is r units then, how far are P from O?

$\sqrt{a^2 + r^2}$ (B) $\sqrt{a^2 - r^2}$ (C) $\sqrt{r^2 - a^2}$ (D) $\sqrt{2x}$

Q.19 Is 184 a term of the sequence 3, 7, 11 …… ?

Q.20 If the equation $kx^2 - 5x + k = 0$ has real roots, find the value of k.

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

Q.21 Jasleen goes to big bazaar every 64 days and harpreet goes to the same every 72 days. They meet each other one day. How many days later will they meet each other again?

Q.22 The radi of two concentric circles are 13 cm and 8 cm . AB is a diameter of the bigger circle . BD is tangent to the smaller circle touching it at D . Find the length of AD .

Q.23 In figure, P, Q and R are respectively the mid – points of sides AB, BC and CA of $\triangle ABC$. Show that $ar\,(PBQR) = \dfrac{1}{2}ar\,(\triangle ABC)$

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OR

The areas of two similar triangles are $49\,cm^2$ and $64\,cm^2$ respectively. If the difference of the corresponding altitudes is 10 cm, then find the lengths of altitudes (in centimeters).

Q.24	The angle of elevation of the top of a hill at the foot of a tower is 60 and the angle of elevation of the top of the tower from the foot of the hill is 30. If the tower is 50 m high, find the height of the hill.
Q.25	Cards marked with numbers 13, 14, 15 …... 60 are placed in a box and mixed thoroughly. Once card is drawn at random from the box. Find the probability that the sum of digits on the card drawn is 5. **OR** A letter is chosen from the word **'EQUATION'**. What is the probability that it is a consonant ?
Q.26	A rectangular sheet of paper of dimensions 44cm×16cm is rolled along its length to form a cylinder of height 16cm. find the volume of the cylinder .

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

Q.27	Find the HCF of 81 and 237 and express it as a linear combination of 81 and 237 . Also prove that this is not unique. **OR** An army contingent of 616 members is to march behind and army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?
Q.28	The ratio of the sum of m and n of an A.P. is $m^2 : n^2$. Show that the

ratio of the mth and nth terms is (2m-1): (2n-1) .

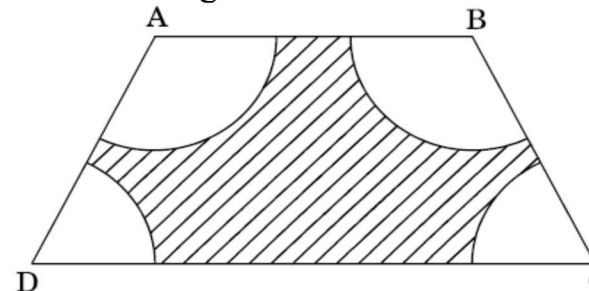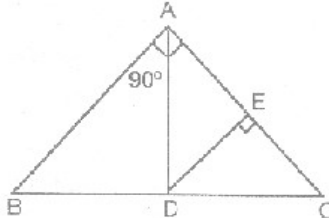| Q.29	The ages of two friends Ani and Biju differ by 3years. Ani's father Dhatam is twice as old as Ani and Biju is twice as old as his sister Cathy. The ages of Cathy and Dharam differ by 30 years. Find the ages of Ani and Bijy. **OR** In a Δ ABC, $\angle$ A= x^{0,} $\angle$ B=(3x-2^0) , $\angle C = y°$ Also , $\angle C - \angle B = 9°$ Find the three angles.
Q.30	Find the value of a and b such that $x^4 + x^3 + 8x^2 + ax + b$ is divisible by $x^2 + 1$ give the remainder 3x + 5 .
Q.31	If the point P(x,y) is equidistant from the points A(3,6) and B(-3,4) prove that 3x + y - 5 = 0.
Q.32	Prove that : $\dfrac{\tan A}{1-\cot A} + \dfrac{\cot A}{1-\tan A} = 1+ \sec A \; cosec A$. **OR** If tan A + sin A = m and tan A – sin A = n, prove that (m²– n²)² = 16mn.
Q.33	In Figure 3, ABCD is a trapezium with AB ∥ DC, AB = 18 cm, DC = 32 cm and the distance between AB and DC is 14 cm. If arcs of equal radii 7 cm have been drawn, with centers A, B, C and D, then find the area of the shaded region.
Q.34	Find the mode of the following distribution of marks obtained by 50 students.

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	4	8	10	20	8

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

Q.35 | Draw a circle of radius 6 cm from a point 10 cm away from the center , construct the pair of tangent to the circle and measure their length .

Q.36

n given fig. ∠BAC = 90⁰, AD is its bisector. IF DE⊥AC, prove that DE × (AB + AC) = AB × AC.

OR

ABC is a triangle in which AB = AC and D is a point on AC such that BC² = AC × CD. Prove that BD = BC.

Q.37 | A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete the total journey, what is its original average speed ?

OR

Solve $x^2 - \left(\sqrt{3}+1\right)x + \sqrt{3} = 0$ by the method of completing the square.

Q.38 | A semicircular thin sheet of metal of diameter 28cm is bent and an open conical cup is made. Find the capacity of the cup.

OR

Water in a canal, 30 dm wide and 12 dm deep, is flowing with a speed of 10 km/hr. How much area will it irrigate in 30 minutes if 8 cm of standing water is required from irrigation.

Q.39 | From the top of a tower the angle of depression of an object on the horizontal ground is found to be 60°. On descending 20 m vertically downwards from the top of the tower, the angle of depression of the object is found to be 30°. Find the height of the tower.

Q.40 | If the median of the distribution given below is 28.5, find the values of x and y.

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	x	20	15	y	5	60

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