VAGDEVI VILAS SCHOOL, MARATHAHALLI
PRE-BOARD EXAMINATION – II (2020)
MATHEMATICS
CLASS – X

MAXIMUM MARKS: 80 **DURATION : 3 HOURS**

DATE: 06 – 02 – 2020

General Instructions:

a) All questions are compulsory
b) The question paper consists of 40 questions divided into four section A, B, C & D.
c) Section A comprises of 20 questions of 1 marks 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 question of 4 marks each.
d) There is no overall choice. However internal choices have been provided in two question of 1 mark each, two question of 2 marks each, three questions of 3 marks each and 3 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

1. The decimal expansion of $\frac{6}{15}$ will terminate after:
   a. one decimal place b. two decimal places
   c. will not terminate d. three decimal places
2. The area of the triangle formed by the intersection of the lines x = y ; x = 6 and y = 0 is:
   a. 36 sq. units b. 18 sq. units c. 9 sq. units d. 72 sq. units
3. The distance of the point (4,7) from the x – axis is :
   a. 4 b. 7 c. 11 d. $\sqrt{65}$
4. In the adjoining figure if AD = $7\sqrt{3}$m, the BC is equal to :
   a. 14 m b. 27 m c. 28 m d. 29 m

5. The coordinates of the fourth vertex of a rectangle formed by the points (0,0); (2,0); (0,3) are :
   a. (3,0) b. (0,2) c.(2,3) d. (3,2)
6. Which of the following will surely be a factor of the product of two consecutive positive integers?
   a. – 1 b. 2 c. 3 d. – 2
7. The ratio in which the x-axis divides the line segment joining (3,6) and (12,-3) is
   a. 2 : 1 b. 1 : 2 c. – 2 : 1 d. 1 : – 2
8. The height of the tower is 100m. When the angle of elevation of sun is 30°, then shadow of the tower is.
   a. $100\sqrt{3}$ m b. 100m c. $100(\sqrt{3}-1)$ d. $\frac{100}{\sqrt{3}}$
9. To divide a line segment AB in the ratio 5 : 7, first a ray AX is drawn so that angle BAX is an acute angle and then at equal distance points are marked on the ray AX such that the minimum numbers of these points is :
   a. 5 b. 7 c. 14 d. 12

10. The area of the square that can be inscribed in a circle of radius 8 cm is (in cm)

a. 256 b. 128 c. $64\sqrt{2}$ d. 64

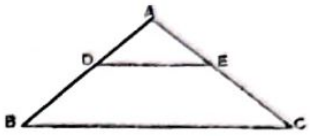
(Q.11 – 15) Fill up the blanks:

11. If the discriminant of the equation $6x^2 + bx + 2 = 0$ is 1, then the value of 'b' is _____

OR

If the roots of the equation $12x^2 + mx + 5 = 0$ are real and different then m is equal to

12. The ratio of the total surface area of a solid hemisphere to the square of its radius in terms of π is _____
13. The 10^{th} term of the sequence $\sqrt{2}, \sqrt{8}, \sqrt{18}, \ldots$ is _____
14. The probability of getting a sum of 9, when two dice are thrown simultaneously is _____
15. In the adjoining figure ΔABC, DE is parallel to BC, DB = 7.2cm, AE = 1.8cm and EC = 5.4 cm. The length of AD is ____ cm



(Q.16- 20) Answer the following:

16. The tops of two poles of height 16 m and 10 m are connected by a wire of length l metres if the wire makes an angle of 30° with the horizontal, then find l.

17. Two tangents to a circle of radius 3 cm and centre O from a point P, 8 cm away from O is to be constructed. Find the radius of the circle whose centre is at the mid-point of OP.

OR

From a point P, which is at a distance of 13 cm from the centre O of a circle of radius 5 cm, the pair of tangents PQ and PR are drawn to the circle. Find the area of the quadrilateral PQOR.

18. If 'n' is a natural number then what will be in the units place of the $(6^n - 5^n)$?

19. What is the sum of first 10 multiples of 2?

20. If the system of equations: $3x + y = 1\,;(2k-1)x + (k-1)y = 2k + 1$, is inconsistent then find 'k'.

SECTION B

21. Which term of the A.P. 45, 41, 37, 33,..... is the first negative term ?

22. What is the probability that there are 53 Wednesdays in a leap year ?

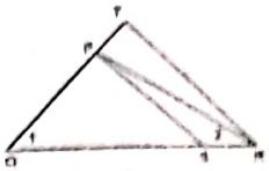
OR

Find the probability of getting a red face card from a well shuffled pack of 52 cards.

23. If the perimeter of a semi-circular protractor is 36 cm, find its diameter. (use $\pi = \frac{22}{7}$)

24. Three cubes of a metal whose edges are in the ratio 3 : 4 : 5 are melted and converted into a single cube whose edge is 12cm. Find the edges of the three cubes.

25. In the given figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Show that $\Delta PQS \sim \Delta TQR$



OR

ABC is an isosceles triangle with AB =AC. If the circle of Δ ABC touches sides, AB, BC and CA at D, E, and F respectively, prove that E bisects BC.

26. A pole 5m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point A on the ground in 60° and the angle of depression of the point A from the top of the tower is 45°. Find the height of the tower.

SECTION C

27. Divide $30x^4 + 11x^3 - 82x^2 - 12x + 48$ *by* $3x^2 + 2x - 4$ and verify the result by division algorithm.

28. Prove that $4 + \sqrt{2}$ is irrational.

OR

Find the greatest number of 6 digits exactly divisible by 24, 15 and 36.

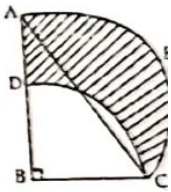
29. In what ratio does y – axis divide the join of (– 2 , 1) and (4, 5)? Find the coordinates of the point of intersection.

30. A sailor goes 8 km downstream in 40 minutes and returns in 1 hour. Determine the speed of the sailor in still water and the speed of the current.

OR

Points A and B are 90 km apart from each other on a highway. A car starts from point A and another from point B at the same time. If they go in the same direction they meet in 9 hours and if they go in the opposite direction they meet in $\frac{9}{7}$ hours. Find their speeds.

31. In the given figure, find the area of the shaded region and also its perimeter, if the lengths of AB and BC (in cm) is 28 and 21 respectively and BCD is a quadrant of a circle. AEC is a semicircle on AC as diameter. (use $\pi = \frac{22}{7}$)



32 Find the acute angle θ, when $\frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} = \frac{1-\sqrt{3}}{1+\sqrt{3}}$.

OR

Prove that : $\frac{\sin\theta}{\cot\theta + \operatorname{cosec}\theta} = 2 + \frac{\sin\theta}{\cot\theta - \operatorname{cosec}\theta}$

33. The angle of elevation of the top of a tower from two points at distances a and b metres from the base and in the same straight line with it are complementary. Prove that the height of the tower is $\sqrt{ab}$ metres

OR

Two men on the same side of the tower and in the same straight line with its base notice the angle of elevation of the top of the tower to be 30° and 60°. If the height of the tower is 150 m, find the distance between the two men.

34. Find the missing frequencies in the following distribution table if N = 100 and median is equal to 32.

Marks Obtained	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Number of Students	10	?	25	30	?	10

SECTION D

35. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

36. Construct an isosceles triangle whose base is 8 cm and altitude is 4 cm. and then another triangle whose sides are $\frac{3}{2}$ times the corresponding sides of the isosceles triangle.

OR

Draw a circle of radius 6 cm. Draw a tangent to this circle making an angle of 30° with the line passing through the centre.

37. A tent is of the shape of a right circular cylinder up to a height of 3 metres and conical above it. The total height of the tent is 13.5 metres above the ground. Calculate the cost of painting the inner side of the tent at the rate of Rs. 2 per square metre, if the radius of the base is 14 metres.

OR

A solid is in the form of a right circular cylinder with hemispherical ends. The total height of the solid is 19 cm and the diameter of the cylinder and the hemispheres is 7 cm. Find the volume and total surface area of the solid.

38. From the top of a light house, angles of depression of two ships are 45° and 60°. The ships are on opposite side of the light house and in line with its foot. If the distance between the ships is 400 m, find the height of the light house. (Use $\sqrt{3} = 1.732$)

39. A shopkeeper buys a certain number of packets of biscuits for Rs. 80. If he had bought 4 more packets for the same amount, each packet would have cost Re. 1 less. How many packets did he buy?

OR

The difference of two number is 5 and the difference of their reciprocals is $\frac{1}{10}$. Find the numbers.

40. The following table shows the ages of 100 persons of a locality. Represent the below as the less than type frequency distribution and draw an ogive for the same. Identify the median from the graph and also verify by actual calculation.

Age (yrs.)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Number of persons	5	15	20	23	17	11	9