PRE BOARD EXAMINATION-1

(Summative assessment – II, 2013)

MA 2023

MATHEMATICS

Class – X

Time allowed : 3 hours **Maximum Marks : 90**

General Instructions :

(i) All questions are **compulsory**.

(ii) The question paper consists of **34** questions divided into four **sections A, B, C** and **D**. **Section-A** comprises of **10** questions of **1 mark** each, **Section-B** comprises of **8** questions of **2 marks** each, **Section-C** comprises of **10** questions of **3 marks** each and **Section-D** comprises of **6** questions of **4 marks** each.

(iii) Question numbers **1** to **10** in **Section-A** are multiple choice questions where you are to select one correct option out of the given four.

(iv) There is no overall choice. However, internal choices have been provided in **1** question of **two marks**, **3** questions of **three marks** each and **2** questions of **four marks** each. You have to attempt only one of the alternatives in all such questions.

(v) Use of calculator is not permitted.

(vi) Value Based questions 10Marks

SECTION–A / खण्ड–अ

Question numbers 1 to 10 carry 1 mark each. For each of the questions 1-10 four alternative choices have been provided of which only one is correct. You have to select the correct choice.

1. The value of k for which roots of the quadratic equation $kx^2+2x+3=0$ are equal is :

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

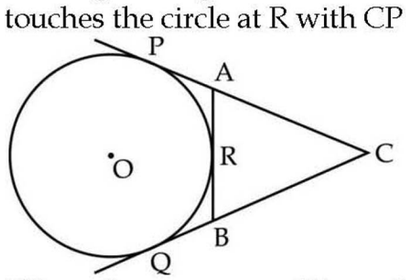
2. The sum of first five positive integers divisible by 6 is :

(A) 180 (B) 90 (C) 45 (D) 30

3. If PA and PB are two tangents from a point P to a circle with centre O and are inclined to each other at an angle of 80°, then $\angle POA$ is equal to :

(A) 50° (B) 60° (C) 70° (D) 80°

4. In the given fig., CP and CQ are tangents to a circle with centre O and line segment AB touches the circle at R with CP = 11 cm, AR = 3 cm, BC = 7 cm, then BR is equal to :



(A) 4 cm (B) 3 cm (C) 5 cm (D) 10 cm

5. Two tangents QA and QB are drawn to the circle with centre O such that $\angle AQB = 60°$ with AQ = 3 cm, then OQ is equal to :

(A) $\sqrt{3}$ cm (B) $\sqrt{3}/2$ cm (C) 6 cm (D) $2\sqrt{3}$ cm

6. To draw two tangents to a circle, which are inclined at an angle of 60°, the perpendiculars are to be drawn at the ends of two radii which are at an angle of :

(A) 60° (B) 120° (C) 90° (D) 75°

7. Two cubes each of volume 8 cm^3 are joined end to end, then the surface area of the resulting cuboid is :

(A) 80 cm^2 (B) 64 cm^2 (C) 40 cm^2 (D) 8 cm^2

8. If the radius of a circle is doubled, its area becomes :
(A) 2 times (B) 4 times (C) 8 times (D) 16 times

9. The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height $10\sqrt{3}$ m is :
(A) 45° (B) 60° (C) 30° (D) 90°

10. The probability of getting 53 Fridays in a leap year is :
(A) $\frac{1}{7}$ (B) $\frac{2}{7}$ (C) $\frac{4}{7}$ (D) $\frac{5}{7}$

SECTION-B

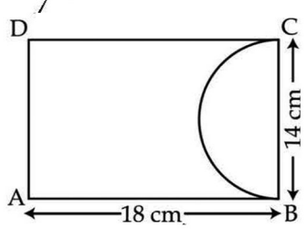
Question numbers 11 to 18 carry 2 marks each.

11. Find the roots of the following quadratic equation $x^2 - \frac{x}{5} + \frac{1}{100} = 0$

12. If $k+1$, $3k$ and $4k+2$ be any three consecutive terms of an A.P., find the value of k.

13. If PA and PB are two tangents drawn from a point P to a circle with centre O touching it at A and B, prove that OP is the perpendicular bisector of AB.

14. A paper in the form of a rectangle ABCD in which AB = 18 cm and BC = 14 cm. A semicircle with BC diameter is cut off. Find the area of the remaining portion. (Use $\pi = \frac{22}{7}$)



15. A Cuboidal metal plate of 1 cm thickness, 9 cm breadth and 81 cm length is melted into a cube, then find the total surface area of the cube.

16. Find the value of a, if the points P(1, 5), Q(a, 1) and R(4, 11) are collinear.

17. If A and B are $(-2, -2)$ and $(2, -4)$ respectively, find the co-ordinates of P such that $AP = \frac{3}{7}$ AB.

18. Two dice are thrown at the same time. Find the probability of getting an even number on the first die.

OR

A coin is tossed two times. Find the probability of getting at least one tail.

SECTION-C

Question numbers 19 to 28 carry 3 marks each.

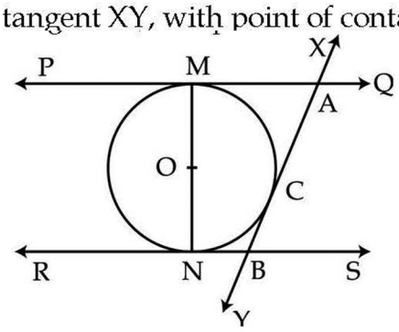
19. Find the roots of the equation $x^2 - 2(a^2 + b^2)x + (a^2 - b^2)^2 = 0$

OR

Divide 29 into two parts so that the sum of the squares of the two parts is 425.

20. Find the sum of all two digit natural numbers which when divided by 3 yield 1 as remainder.

21. In the fig., PQ and RS are two parallel tangents to a circle with centre O and another tangent XY, with point of contact C intersects PQ at A and RS at B. Prove that $\angle AOB = 90°$.

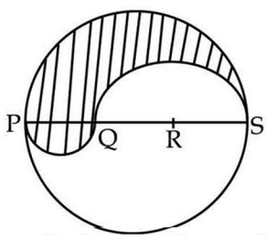


OR

If all the sides of a parallelogram touch a circle, then prove that the parallelogram is a rhombus.

22. Draw a ΔABC with sides $BC = 6$ cm, $AB = 5$ cm, $\angle ABC = 60°$. Construct a $\Delta AB'C'$ such that each side of $\Delta AB'C'$ is $\frac{3}{4}$ of the corresponding sides of ΔABC.

23. In the fig., PQRS is a diameter of a circle of radius 6 cm, such that the lengths PQ, QR and RS are equal. Semicircles are drawn on PQ and QS as diameters. Find the area of the shaded region. (Use $\pi = \frac{22}{7}$)



24. A metallic sphere of radius 10.5 cm is melted and then recast into small cones, each of radius 3.5 cm and height 3 cm. Find how many cones are obtained ?

OR

A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area. (Use $\pi = 3.14$)

25. The angles of elevation of the top of a tower from two points at a distance of a and b (a > b) metres away from the base of the tower and in the same straight line with it are 30° and 60° respectively. Find the height of the tower.

26. The line segment joining the points (3, −4) and (1, 2) is trisected at the points P and Q. If the co-ordinates of P and Q are (p, −2) and $\left(\frac{5}{3}, q\right)$ respectively, find the values of p and q.

27. The base BC of an equilateral triangle ABC lies on y-axis. The co-ordinates of the point C are (0, −3). If the origin is the mid-point of the base BC, find the co-ordinates of the points A and B and hence find the area of the ΔABC.

28. One card is drawn at random from a well shuffled deck of 52 cards. Find the probability of getting :

(i)	a king of red colour	(ii)	a face card
(iii)	a red face card	(iv)	the jack of hearts
(v)	a spade	(vi)	a queen of diamonds

SECTION-D

Question numbers 29 to 34 carry 4 marks each.

29. A motorboat whose speed is 18 km/hr in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

There are three consecutive positive integers such that the sum of the square of the first and the product of the other two is 154. Find the integers.

30. A man started working in a firm in 1995 at an annual salary of Rs. 5000 and received Rs. 200 raise each year. In which year did his income reach at Rs 7000 ?

31. Prove that the lengths of tangents drawn from an external point to a circle are equal.

32. A 20 m deep well with diameter 7 m is dug and the earth dug out is evenly spread out to form a platform of size $22\text{ m} \times 14\text{ m}$. Find the height of the platform.

OR

A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in his field which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/hr, in how much time will the tank be filled ?

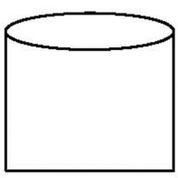
33. If the radii of the circular ends of a conical bucket (in the shape of frustum of cone) which is 45 cm high are 28 cm and 7 cm. Find the capacity of the bucket and its surface area. (Use $\pi = \frac{22}{7}$)

34. The angles of depression of the top a 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.

VALUE BASED QUESTIONS 2 X5=10M

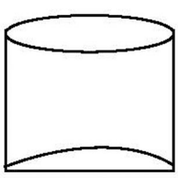
35 I. Ram asks the labour to dig a well upto a depth of 10 metre. Labour charges Rs. 150 for first metre and Rs. 50 for each subsequent metres. As labour was uneducated, he claims Rs. 550 for the whole work. What should be the actual amount to be paid to the labours? What value of Ram is depicted in the question if he pays Rs. 600 to the labour? 2m

II. Ramesh, a juice seller has set up his juice shop. He has three types of glasses of inner diameter 5 cm to serve the customers. The height of the glasses is 10 cm.(use π =3.14)



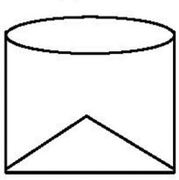
Type A

- A glass with a plane bottom.



Type B

- A glass with hemispherical raised bottom.



Type C

- A glass with conical raised bottom of height 1.5 cm.

He decided to serve the customer in "A" type of glasses.

1. Find the volume of glass of type A. 2m
2. Which glass has the minimum capacity? 2m
3. Which mathematical concept is used in above problem? 2m
4. By choosing a glass of type A, which value is depicted by juice seller Ramesh? 2m