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 **8** questions 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 **10** questions of **4 marks** each.

(iii)   Question numbers **1** to **8** 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.

(v)   Use of calculator is not permitted.
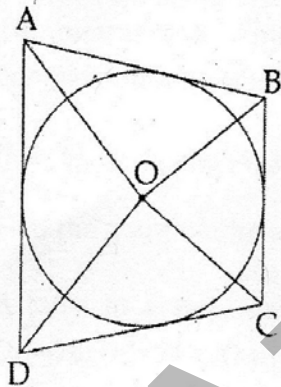
SECTION-A

Question numbers **1** to **8** carry one mark each. For each question, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

1. The next term of the sequence $\sqrt{3}$, $\sqrt{12}$, $\sqrt{27}$, ... is :   1

   (a) $\sqrt{48}$ (b) $\sqrt{108}$ (c) $\sqrt{56}$ (d) $\sqrt{72}$

2. In the figure, if $\angle AOB = 125^0$, then $\angle COD$ is equal to :   1

   (A) 62.5^0 (B) 55^0

   (C) 45^0 (D) 35^0

3. (a)   9   (b)   10   (c)   11   (d)   7   1

   To divide a line segment PQ internally in the ratio 3 : 7, first PX is drawn so that $\angle QPX$ is an acute angle and then points at equal distances are marked on ray PX such that minimum number of these points is :

   (a)   9   (b)   10   (c)   11   (d)   7

4   A person walking along a straight road towards a hill observes at two points, distance $\sqrt{3}$ km apart,   1
the angles of elevation of the top of the hill to be 30^0 and 60^0. The height of the hill is :

(a) $\dfrac{3}{2}$ km   (b) $\sqrt{\dfrac{2}{3}}$ km

(c) $\dfrac{\sqrt{3}+1}{2}$ km   (d) $\sqrt{3}$ km

5   A bag contains three green marbles, four blue marbles and two orange marbles. If a marble is picked   1
at random, then the probability that it is not an orange marble is :

(a) $\dfrac{1}{4}$ (b) $\dfrac{1}{3}$ (c) $\dfrac{4}{9}$ (d) $\cdot$ $\dfrac{7}{9}$

6   An arrow pointer is spinned which is placed on a fixed circular plate with numbers from 1 to 15   1
marked on it at equal distances. If the pointer is equally likely to rest at any number, then what is the
probability that it will rest at a multiple of 3 ?

(a) $\dfrac{1}{5}$ (b) $\dfrac{4}{15}$ (c) $\dfrac{1}{15}$ (d) $\dfrac{1}{3}$

7   If the three vertices of an equilateral triangle are $(0,0)$, $(3, \sqrt{3})$ and $(0, x)$, then the value of x is   1

(A) $2\sqrt{3}$ (B) $3\sqrt{3}$

(C) $3\sqrt{2}$ (D) $\sqrt{3}$

8   Perimeter of a semicircular region of radius r is :   1

(a) $2\pi r$ (b) πr (c) $2\pi r + 2r$ (d) $\pi r + 2r$

SECTION-B

Question numbers **9** to **14** carry two marks each.
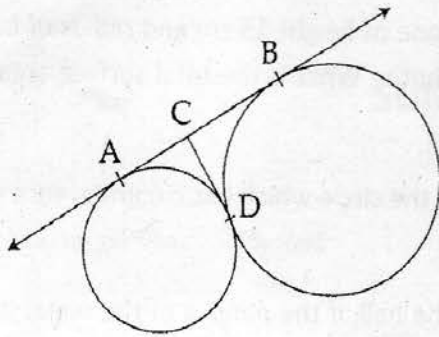
9   Solve for $x : x^2 - px + pq - qx = 0$ 2

10   If $x=2$ and $x=3$ are solutions of the equation $3x^2 - 2mx + 2n = 0$, then find the values of m and n.   2

11   If a letter is chosen at random from the English alphabets find the probability that the letter is :   2

(a)   A vowel   (b)   A consonant

12   AB and CD are common tangents to two circles which touch each other at D as shown in the   2
figure. If AB=6 cm, find CD.

13   An integer is chosen from –10 to 10. Find the probability that the integer so chosen is divisible   2
by 3.

14   Find the area of sector of a circle whose radius is 6 cm and the length of the corresponding arc is 12   2
cm.

SECTION-C

Question numbers **15** to **24** carry three marks each.

15   The sum of first 7 terms of an AP is 10 and that of next 7 terms is 17. Find the progression.   3

16   The perimeter of a rectangular plot is 62 m and its area 228 sq m. Find the dimension of the plot.   3

17   The perimeter of $\triangle ABC$ is 12 cm and its sides are in the ratio 3 : 4 : 5. Draw the $\triangle ABC$, then construct   3
another triangle A'BC' similar to $\triangle ABC$ such that $BC' = \frac{4}{3} BC$.

18   The angles of elevation of the top of a tower from two points at distances   3
10 metres and 5 metres from the base of the tower and in the same straight line with it are
complementary. Find the height of the tower.

19   If (1, 5), (p, 1) and (4, 11) are collinear, find the value of p.   3

20   Find the point on the *x*-axis, which is equidistant from (3, -5) and (-3, 8).   3

21   A table in a restaurant has a top of the shape as shown in the figure, where $\angle AOD = 120^0$ and   3
OA=OB=OC=OD=60 cm.
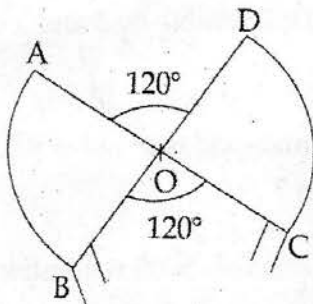
Find the perimeter of the top of the table. (Take $\pi = 3.14$).

22 Using paper-mache, a student made a right circular hollow cone of height 15 cm and radius of base 8 3
cm. He then has to paint this cone from outside and inside both. What is the total surface area that
has to be painted ?

23 The radii of two circles are 19 cm and 9 cm. Find the radius of the circle which has circumference equal 3
to the sum of the circumferences of the two circles.

24 A solid metallic ball has diameter 10 cm. Find the mass of the ball, if the density of the metal is 21 g 3
per cm^3.

SECTION-D

Question numbers **25** to **34** carry four marks each.

25 Determine the positive value of p so that the equations $x^2+px+64=0$ and $x^2-8x+p=0$ will both have real 4
roots.

26 Find the sum of first 30 terms of an AP whose n^{th} term is $2+\frac{1}{2}n$ 4

27 A uniform border on a framed photograph has the same area as the photograph. What are the outside 4
dimensions of the border if the dimensions of the photograph are 25 cm by 20 cm ?

28 If PA and PB are two tangents drawn to a circle with centre O such that $\angle BPA=120^0$, prove that 4
OP=2PB.

29 Construct a triangle similar to $\triangle ABC$ whose sides are 2.5 times that of given $\triangle ABC$, where 4
$\triangle ABC$ has sides 3 cm, 5 cm and 6 cm.

30 A 2 m tall boy is standing at some distance from a 29 m tall building. The angle of elevation, 4
from his eyes of the top of the building increases from 30^0 to 60^0 as the walks towards the
building. Find the distance he walked towards the building.

31 17 cards numbered 1, 2, 3, ……, 16, 17 are put in a box and mixed thoroughly. One person 4
draws a card from the box. Find the probability that the number on the card is :

  A) Odd   B) A prime   C) Divisible by 3   D) Divisible by 3 and 2 both

32 ABCD is a quadrilateral formed by joining the points A(–4, –2), 4
B(–3, –5), C(3, –2) and D(2, 3), in an order. P, Q, R and S are the mid-points of sides AB, BC,
CD and DA respectively. Is the quadrilateral PQRS a parallelogram ?

33 Ramu rides a bicycle having a poster "SAVE EARTH". His bicycle makes 5000 revolutions in 4
moving 11 km. Find diameter of the wheel. What value is depicted by Ramu ?

34 Water is flowing at the rate of 5 km per hour through a pipe of diameter 14 cm into a 4
rectangular tank which is 25 m long and 22 m wide. Find the time in which the level of water
in the tank will rise by 30 cm.