Directorate of Education, GNCT of Delhi
Practice Paper (2023-24)
Class – IX
Mathematics

Time Allowed: 3 Hrs. **Maximum Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 sourced based/Case Based/passage based/integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 2 marks, 2 Questions of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not Stated.

SECTION A

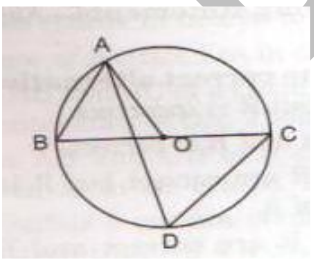
Q 1-20 are multiple choice questions. Each question is of 1 mark.

1. The product of any two irrational numbers is:
a. always an irrational number
b. always a rational number
c. always an integer
d. sometimes rational, sometimes irrational

2. The perimeter of a triangle is 60 cm. If its sides are in the ratio 1:3:2, then its smallest side is
a. 15cm
b. 5 cm
c. 10 cm
d. none of these

3. If (2, 0) is a solution of the linear equation $2x + 3y = k$, then the value of k is:
a. –4
b. 6
c. 5
d. 4

4. In figure, BC is a diameter of the circle and $\angle BAO = 60$. Then $\angle ADC$ is equal to:



a. 30^0
b. 45^0
c. 60^0
d. 120^0

5. The base diameter of a cone is 10.5 cm, and its slant height is 10 cm. The area of a curved Surface is :
a. 150 sq.cm
b. 165 sq.cm
c.177 sq.cm
d. 180 sq.cm

6. If $x + 2$ is the factor of $x^3 - 2ax^2 + 16$, then value of a is:

a. –7 b. 1

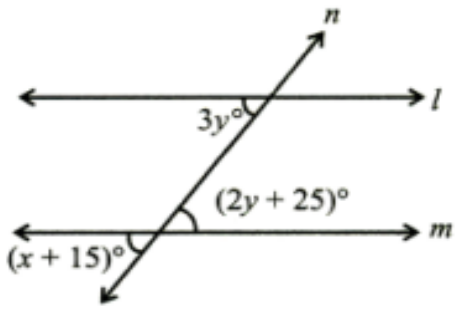
c. – 1 d. 7

7. If the ratio of the radius of two spheres is 1: 4, then the ratio of their volumes will be:

a. 1:5 b. 5:4

c. 5:16 d. 1:64

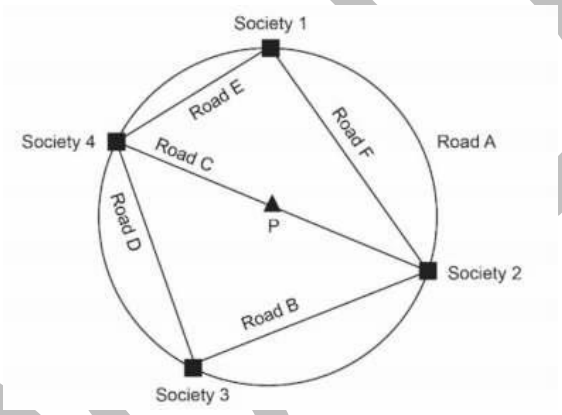
8. In the given figure, if $l \parallel m$, what is the value of x?



a. 60^0 b. 50^0

c. 45^0 d. 30^0

9. Given below is the map giving the position of four housing societies and roads connecting them in a township.



What would be the measure of the sum of angles formed by the straight roads at Society 1 and Society 3?

a. 60° b. 90°

c. 180° d. 360°

10. The edges of a triangular board are 6cm, 8cm, and 10cm.The cost of painting it at the rate 9 paise per cm^2 is:

a. ₹ 2.16 b. ₹ 2.0

c. ₹ 2.48 d.₹ 3.0

11. Which of the following needs a proof?

a. Theorem b. Axiom

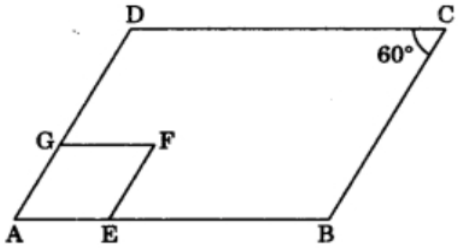
c. Definition d. Postulate

12. For two triangles, if two angles and the included side of one triangle are equal to two

angles and the included side of another triangle, then the congruence rule is

a. SSS
b. ASA
c. SAS
d. None of the above

13. In the following figure ABCD and AEFG are two parallelograms. If ∠C =60°,then ∠AEF is:



a. 90°
b. 80°
c. 120°
d. 60 °

14. $(\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b})$ is:

a. a-b
b.2b
c. 2a
d. $2\sqrt{a}$

15.

This is the picture of an ice-cream cone

The radius of the cone is 4 cm and the height is 15 cm.
An ice-cream seller keeps $1/4^{th}$ of it empty.

What is the volume (in cm^3) of the empty part of the cone?

a. 12π
b. 15π
c. 19π
d. 20π

16. If a linear equation has solutions (–2, 2), (0, 0) and (2, –2), then it is of the form:

a. $y - x = 0$
b. $x + y = 0$
c. $-2x + y = 0$
d. $-x + 2y = 0$

17. Which one of the following is not the graphical representation of statistical data?

a. bar graph
b. histogram
c. frequency polygon
d. tally marks

18. The sides of a triangular flower bed are 5 m, 8 m and 11 m. The area of the flower bed will be:

a. $4\sqrt{21}\ m^2$
b. $5\sqrt{21}\ m^2$
c. $\sqrt{21}\ m^2$
d. $\sqrt{11}\ m^2$

19. Assertion: Parallel lines are those which never intersect each other.

Reason: Parallel lines can be two or more lines.

a. Both Assertion and reason are correct and reason is correct explanation for Assertion.
b. Both Assertion and reason are correct but reason is not correct explanation for Assertion.
c. Assertion is correct but reason is false.
d. Both Assertion and reason are false.

20. Assertion: Degree of non-zero constant polynomial is zero.

Reason: Polynomial having two terms is called binomial.

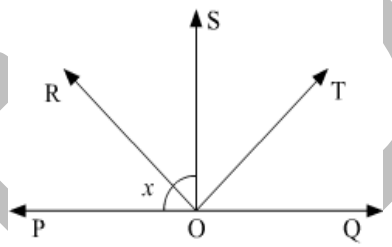
a. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion
b. Both Assertion and Reason are correct and Reason is not the correct explanation for assertion.
c. Assertion is true but the reason is false.
d. Both assertion and reason are false.

SECTION B

Section –B consists of 5 questions of 2 marks each.

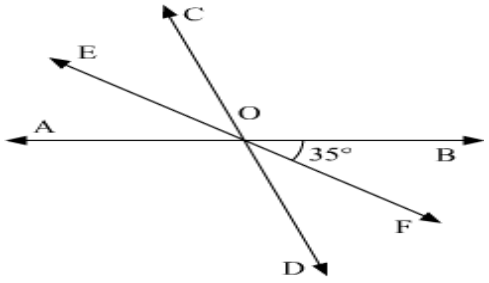
21. The angles of a quadrilateral are in the ratio 3:5:9:13. Find all the angles of the quadrilateral.

22. In the given figure, ray OS stand on a line POQ, Ray OR and ray OT are angle bisectors of ∠POS and ∠SOQ respectively. If ∠POS = *x*, find ∠ROT



OR

AB, CD and EF are three concurrent lines passing through the point O such that OF bisects ∠BOD. If ∠BOF = 35°, find ∠BOC and ∠AOD



23. If a point C lies between two points A and B such that AC = BC, then prove that AC = $\frac{1}{2}$ AB Explain by drawing the figure.

OR

Write Euclid's fifth postulate.

24. Prove that equal chord of a circle subtends equal angles at the centre.

25. The following is the monthly expenditure (Rs.) of ten families of the particular area:

145, 115, 129, 135, 139, 158, 170, 175, 188, 163

Make a frequency distribution table by using the following class interval:

100 – 120, 120 – 140, 140 – 160, 160 – 180, 180 – 200.

SECTION- C

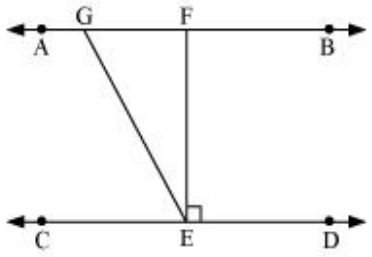
Section –C consists of 6 questions of 3 marks each.

26. Rationalize the denominator: $\frac{1}{9+\sqrt{5}+\sqrt{6}}$

27. It is given that ∠ XYZ = 64° and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects ∠ ZYP, find ∠ XYQ and reflex ∠ QYP

OR

In the given figure, if AB || CD, EF ⊥ CD and ∠ GED = 126°, find ∠ AGE, ∠ GEF and ∠ FGE.



28. The sides of a triangular plot are in the ratio of 3: 5: 7 and its perimeter is 300 m. find its area.

29. A random survey of the number of children of various age groups playing in a park was found as follows:

Age (in years)	Number of children
1-2	5
2-3	3
3-5	6
5-7	12
7-10	9
10-15	10
15-17	4

Draw a histogram to represent the data above.

30. Write three solutions for each of the following equations: 2x + y = 7

31. Simplify: $(x + y + z)^2 – (x – y– z)^2$

OR

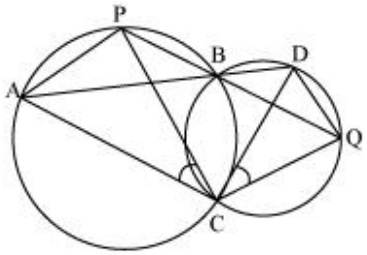
If $x^2 + y^2 = 49$ and $x - y = 3$ then find the value of $x^3 - y^3$

SECTION -D

Section – D consists of 4 questions of 5 marks each.

32. If $a = \frac{\sqrt{7}-\sqrt{6}}{\sqrt{7}+\sqrt{6}}$ and $b = \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}-\sqrt{6}}$, then find the value of $a^2 + b^2 + ab$

33. Two circles intersect at two points B and C. Through B, two-line segments ABD and PBQ are drawn to intersect the circles at A, D and P, Q respectively. Prove that ∠ACP = ∠ QCD.



OR

Prove that- The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.

34. Rahul distributed chocolates on his birthday. He gave 5 chocolates to each child and 20 chocolates to adults. If the number of chocolates is represented by 'x' and total distributed chocolates as 'y'

i) Write in the form of linear equation in two variables
ii) If she distributed 145 chocolates in total, find the number of children.

OR

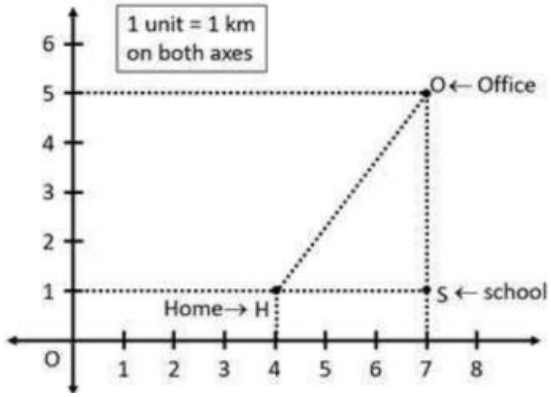
Write $3y = 8x$ in the form of $ax + by = c$. Also find the values of a, b and c and two solutions of the equation. How many solutions of this equation can you find out?

35. Campaigning regarding girl's education was organized by students of class IX. Students made (x-5) rows and (3x-4) columns for the rally. Write the total number of students in the form of a polynomial.

SECTION -E

Case study Based questions are compulsory.

36. Natasha has to reach her office every day at 9:00 am. On the way to her office, she drops her son at school. The location of Natasha's house, her son's school and her office are represented by the map below. Using the details given, answer the following questions.



i) Find the coordinates of Natasha's house. 1

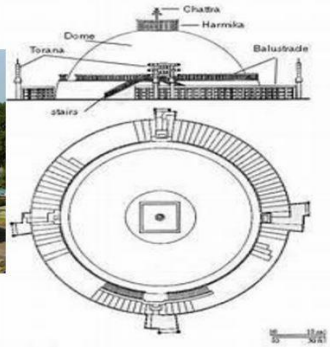
ii) Name the figure formed by joining the coordinates of Natasha's house, her son's school and her office. 1

iii) Which distance is shorter Natasha's house and her son's school or Her son's school and her office? 2

OR

If Natasha has changed her office to a new location that is exactly mid-way of the school and her home the what are the co-ordinates of her new office location.

37. The Great Stupa at Sanchi is one of the oldest stone structures in India, and an important monument of Indian Architecture. It was originally commissioned by the emperor Ashoka in the 3rd century BCE. Its nucleus was a simple hemispherical brick structure built over the relics



of the Buddha. It is a perfect example of combination of solid figures. A big hemispherical dome with a cubical structure mounted on it.

i) What is the area of circle of the base of hemispherical brick structure having radius 14 m? 1

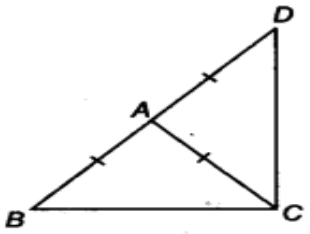
ii) If the radius of hemisphere is doubled then what will be the ratio of surface areas in these two cases. 1

iii) Calculate the volume of the hemispherical dome if the height of the dome is 21 m 2

OR

Find the area of cloth require to cover the hemispherical dome if the radius of its base is 14m

38. There is a garden in a government building in the form of a triangle represented by ΔABC in the figure which is an isosceles triangle in which AB = AC the Side BA is produced to D such that AD = AB (see figure)



i) In ΔADC which two equal angles are equal? 1

ii)If the two sides are equal in a triangle, then what you can say about the opposite angles of these sides. 1

iii) Find ∠BCD 2

OR

Which is complementary pair of angles in the above given figure?