CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-02

Time : 3 Hours **Maximum Marks : 80**

General Instructions :

(i) All questions are compulsory.
(ii) The questions paper consists of 40 questions divided into four sections A, B, C and D.
(iii) Section A comprises of 20 questions of 1 mark 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 questions of 4 marks each.
(iv) There is no overall choice. However, an internal choices have been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of calculators is not permitted.

SECTION A

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

Q1. Set of natural numbers is a subset of [1]

(a) Set of even numbers (b) Set of odd numbers
(c) Set of composite numbers (d) Set of real numbers

Q2. Degree of the polynomial $p(x) = (x+2)(x-2)$ is [1]

(a) 2 (b) 1
(c) 0 (d) 3

Q3. A point lies on negative side of x-axis. Its distance from origin is 10 units. The coordinates of the point are [1]

(a) $(10, 0)$ (b) $(-10, 0)$
(c) $(0, 10)$ (d) $(0, -10)$

Q4. If $(a, 1)$ lies on the graph of $3x - 2y + 4 = 0$, then $a =$ [1]

(a) $\frac{-2}{3}$ (b) $\frac{2}{3}$
(c) $\frac{3}{2}$ (d) $\frac{-3}{2}$

Q5. If a point C lies between two point A and B such that $AC = BC$, then [1]

(a) $AC = AB$ (b) $AC = \frac{1}{2}AB$
(c) $AB = \frac{1}{2}AC$ (d) $AC = \frac{1}{3}AB$

Q6. If $l \parallel m$, then value of x is [1]

(a) 60° (b) 120°
(c) 40° (d) Cannot be determined

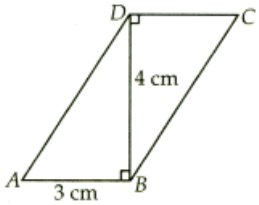
Q7. Which of the following is not a criterion for congruence of triangles? [1]

(a) SSA (b) SAS
(c) ASA (d) SSS

Q8. The angles of a quadrilateral are x°, $(x-10)^\circ$, $(x+30)^\circ$ and $(2x)^\circ$, the smallest angle is equal to [1]

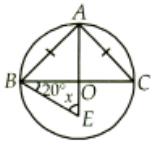
(a) 68° (b) 52°
(c) 58° (d) 47°

Q9. In the adjoining figure, $ABCD$ is a parallelogram. Then its area is equal to [1]



(a) $9\ \text{cm}^2$ (b) $12\ \text{cm}^2$
(c) $15\ \text{cm}^2$ (d) $36\ \text{cm}^2$

Q10. In the given figure, E is any point in the interior of the circle with centre O. Chord $AB = AC$. If $\angle OBE = 20^\circ$, the value of x is [1]



(a) 40° (b) 45°
(c) 50° (d) 70°

(Q.11-Q.15) Fill in the blanks :

Q11. The construction of a $\triangle DEF$ in which $DE = 7\ \text{cm}, \angle D = 75^\circ$ is possible when $(DE - EF)$ is equal to ..... cm. [1]

Q12. The sides of a triangular field are 33 m, 44 m and 55 m. the cost of levelling the field at the rate of ₹ 1.20 per m^2 is ₹ ..... [1]

OR

If height of a triangle is doubled and base in tripled then its area become ..... times.

Q13. The volume of a rectangular solid measuring 1 m by 50 cm by 0.5 m is ..... cm^3. [1]

Q14. The ..... is the most frequently occurring observation. [1]

Q15. Total number of results are called ..... . [1]

(Q.16-Q.20) Answer the following :

Q16. Simplify : $\sqrt[5]{243a^{10}b^5c^{10}}$ [1]

Q17. If $p(x) = x^2 - 2\sqrt{2}\,x + 1$, then find $p(2\sqrt{2})$. [1]

OR

Find the remainder when $x^3 - px^2 + 6x - p$ is divided by $x - p$.

Q18. 'Two intersecting lines cannot be parallel to the same lines' is stated in which form. [1]

Q19. An isosceles right triangle has area $8\ \text{cm}^2$. Find the length of its hypotenuse. [1]

OR

The base of a right triangle is $8\ \text{cm}$ and hypotenuse is $10\ \text{cm}$. What is its area?

Q20. Two coins are tossed simultaneously. List all possible outcomes.

SECTION B

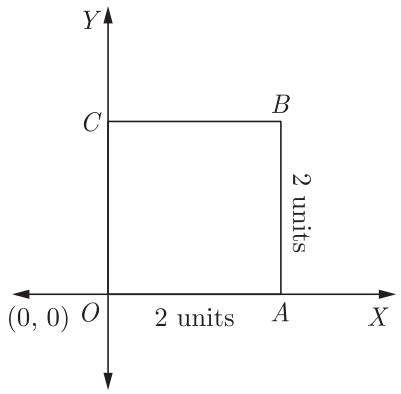
Q21. If $x = \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}-\sqrt{6}}$, then find the value of $\left(x+\frac{1}{x}\right)^2$. [2]

Q22. Find the value of k, for which the polynomial $x^3 - 3x^2 + 3x + k$ has 3 as its zero. [2]

OR

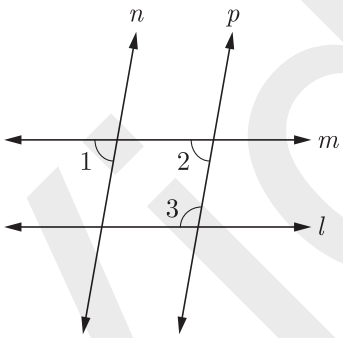
Give the equations of two lines passing through (2, 14). How many more such lines are there, and why ?

Q23. In the figure, O is the origin and $OABC$ is a square of side 2 units. Find the co-ordinates of A, B and C. [2]



Q24. One of the three angles of a triangle is twice the smallest and another is three times the smallest. Find the angles. [2]

Q25. In the given figure, if $l \| m$, $n \| p$ and $\angle 1 = 75^\circ$, then find $\angle 3$. [2]



OR

The medians BE and CF of a ΔABC intersect at G. Prove that $ar(\Delta GBC) = ar(\text{quad } AFGE)$.

Q26. A solid right circular cone of radius 4 cm and height 7 cm is melted to form a sphere. Find the radius of sphere. [2]

OR

The sides of a triangle are in the ratio 3 : 5 : 7 and its perimeter is 300 m. Find its area.

SECTION C

Q27. The points $A(a, b)$ and $B(b, 0)$ lie on the linear equation $y = 8x + 3$.

(i) Find the value of a and b
(ii) Is (2, 0) a solution of $y = 8x + 3$?
(iii) Find two solutions of $y = 8x + 3$ [3]

OR

Draw graphs of $3x + 2y = 0$ and $2x - 3y = 0$ and what is the point of intersection of the two lines representing the above equation.

Q28. The sides of a triangular park are 8 m, 10 m and 6 m respectively. A small circular area of diameter 2 m is to be left out and the remaining area is to be used for growing roses. How much area is used for growing roses ? [Take $\pi = 3.14$] [3]

OR

The area of an isosceles triangle is $8\sqrt{15}$ cm^2. If the base is 8 cm, find the length of each of its equal sides.

Q29. Draw a ΔABC, in which $BC = 4$ cm, $AB = 5$ cm and the median $BE = 3.5$ cm. [3]

Q30. Consider the marks, out of 100, obtained by 51 students of a class in a test, given below. [3]

Marks	Number of students
0-10	5
10-20	10
20-30	4
30-40	6
40-50	7
50-60	3
60-70	2
70-80	2
80-90	3
90-100	9
Total	51

Draw a histogram and frequency polygon for the above data on a same scale.

OR

For a particular year, following is the frequency distribution table of ages (in years) of primary school teachers in a district :

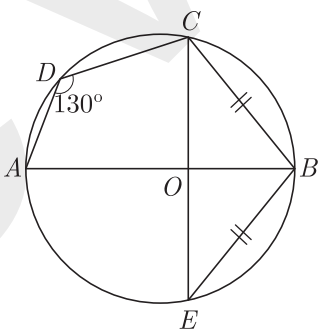
Age (in years)	Number of teachers
15-20	10
20-25	30
25-30	50
30-35	50
35-40	30
40-45	6
45-50	4

(i) Write the lower limit of the first class interval.

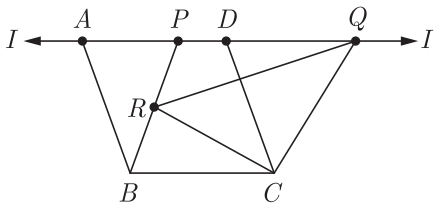
(ii) Determine the class limits of the fourth class interval.

(iii) Find the class mark of the class 45-50.

Q31. In the given figure, $\angle ADC = 130^\circ$ and chord BC = chord BE. Find $\angle CBE$. [3]



Q32. In the given figure, parallelogram $ABCD$ and $PBCQ$ are given. If R is a point on PB, then show that $ar(\Delta QRC) = \frac{1}{2} ar(||gm\ ABCD)$. [3]



Q33. Prove that the mid point of the hypotenuse of a right angled triangle is equidistant from its vertices. [3]

Q34. Prove that the sum of any two sides of a triangle is greater than the third side. [3]

SECTION D

Q35. Simplify : [4]

$$\frac{1}{1+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+...+\frac{1}{\sqrt{8}+\sqrt{9}}$$

Q36. Find the value of $x^3-8y^3-36xy-220$, when $x=2y+6$. [4]

OR

Which of the following points $A\left(0,\frac{17}{3}\right)$, $B(2,6)$, $C(1,5)$ and $D(5,1)$ lie on the linear equation $2(x+1)+3(y-2)=13$.

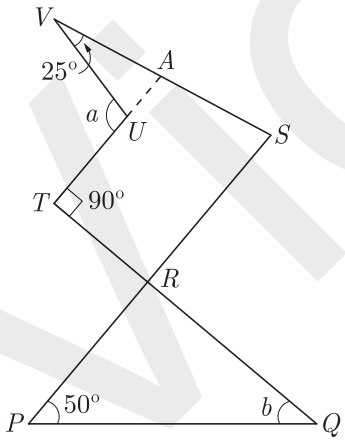
Q37. Factorise : $4x^4+7x^2-2$. [4]

Q38. The sum of the height and radius of the base of a solid cylinder is 37 cm. If the total surface area of the cylinder is 1628 cm^2, then find its volume. [4]

OR

Three cubes of metal whose edges are in the ratio 3 : 4 : 5 are melted down into a single cube whose diagonal is $12\sqrt{3}$ cm. Find the edges of the three cubes.

Q39. In the given figure, if $TU\,||\,SR$ and $TR\,||\,SV$, then find $\angle a$ and $\angle b$. [4]



Q40. The percentage of salary donated by twelve different households to an orphanage every month are : 2, 5, 3, 5, 6, 1, 2, 4, 3, 5, 2, 2.

Find the mean, median and mode of the data. [4]