CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-05

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.   The value of $\left(\frac{x^q}{x^r}\right)^{\frac{1}{qr}} \times \left(\frac{x^r}{x^p}\right)^{\frac{1}{rp}} \times \left(\frac{x^p}{x^q}\right)^{\frac{1}{pq}}$ is equal to   [1]

(a) $x^{\frac{1}{p}+\frac{1}{q}+\frac{1}{r}}$ (b) 0

(c) $x^{pq+qr+rp}$ (d) 1

Q2.   For the polynomial $p(x) = x^5 + 4x^3 - 5x^2 + x - 1$, one of the factors is   [1]

(a) $(x+1)$ (b) $(x-1)$

(c) x (d) $(x+2)$

Q3.   The point for which the abscissa and ordinate have same signs will lie in   [1]

(a) I and II quadrants   (b) I and III quadrants

(c) I and IV quadrants   (d) III and IV quadrants

Q4.   Which of the following equation has graph parallel to y-axis?   [1]

(a) $y = -2$ (b) $x = 1$

(c) $x - y = 2$ (d) $x + y = 2$

Q5.   Axioms are   [1]

(a)   universal truths in all branches of Mathematics

(b)   universal truths specific to geometry

(c)   theorems

(d)   definitions

Q6.   If two parallel lines are intersected by a transversal, then each pair of corresponding angles so formed is   [1]

(a) Equal   (b) Complementary

(c) Supplementary   (d) None of these

Q7.   Which of the following is a correct statement?   [1]

(a)   In an isosceles triangle, the angles opposite to equal sides are equal.

(b)   If the hypotenuse and an acute angle of the right-angled triangle are not equal to the hypotenuse and the corresponding acute angle of another triangle, then the triangles are congruent.

(c)   The bisector of the vertical angle of an isosceles triangle bisects the base at acute angles.

(d)   All of these

Q8.   In the given figure, the measure of $\angle C$ is equal to   [1]
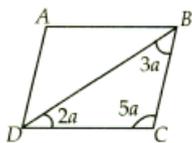
(a) 90°   (b) 80°

(c) 75°   (d) 95°

Q9.   In the adjoining figure, $ABCD$ is a quadrilateral in which diagonal $BD = 14$ cm. If $AL \perp BD$ and $CM \perp BD$ such that $AL = 8$ cm and $CM = 6$ cm, then area of quadrilateral $ABCD$ is   [1]
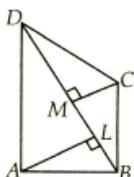
(a) 60 cm²   (b) 72 cm²

(c) 84 cm²   (d) 98 cm²

Q10.   Which of the following statements is true for a regular pentagon?   [1]

(a) All vertices are con-cyclic.

(b) All vertices are not con-cyclic.

(c) Only four vertices are con-cyclic

(d) Cannot say anything about regular pentagon

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

Q11.   The construction of a triangle ABC, given that $BC = 3$ cm, $\angle C = 60°$ is possible when difference of AB and AC is equal to .... cm   [1]

Q12.   The length of the sides of a triangle are 4 cm, 6 cm and 8 cm. The length of perpendicular from the opposite vertex to the side whose length is 8 cm, is equal to .... cm.   [1]

OR

Area of a triangle with perimeter 42 cm and length of two sides 18 cm and 10 cm is given by ....

Q13.   A sphere has only .... surface and that is curved.   [1]

Q14.   If n is an odd number, the median = value of the .... observation.   [1]

Q15.   Number of favourable outcomes for an event cannot be .... than the number of total outcomes.   [1]

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

Q16.   The hollow sphere, in which the circus motorcyclist performs his stunt, has a diameter of 7 m. Find the area available to the motorcyclist for riding?   [1]

Q17.   Find k, if $x^{51} + 2x^{60} + 3x + k$ is divisible by $x + 1$.   [1]

Q18.   Which of the following points lies in II-quadrant.   [1]

        $A(2, 3), B(-2, 6), C(-2, -3), D(-1, 2), E(4, 1)$.

Q19.   The radius of a cone is 3 cm and vertical heights is 4 cm. Find the area of the curved surface.   [1]

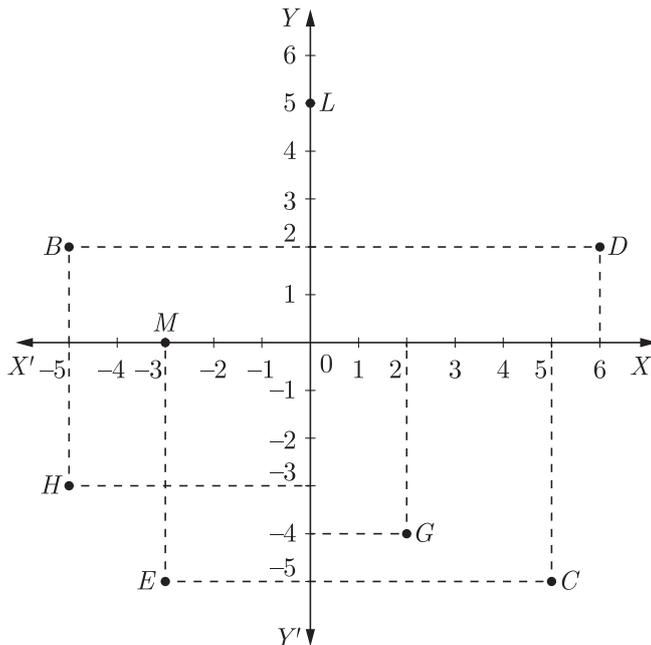Q20.   Find the probability of Sun revolving around Earth.   [1]

SECTION B

Q21.   Simplify : $\dfrac{6^{2/3} \times \sqrt[3]{6^7}}{\sqrt[3]{6^6}}$.   [2]

OR

If $\dfrac{5 + 2\sqrt{3}}{7 + 4\sqrt{3}} = a + b\sqrt{3}$, find the values of a and b.

Q22.   If $\left(x + \dfrac{1}{x}\right) = 9$, then find the value of $x^3 + \dfrac{1}{x^3}$.   [2]

Q23.   See Fig. and write the following :   [2]

(i)   The coordinates of B.
(ii) The coordinates of C.
(iii) The point identified by the coordinates (–3, –5).
(iv) The point identified by the coordinates (2, –4).

Q24.   Find the area of regular hexagon of side a cm.   [2]
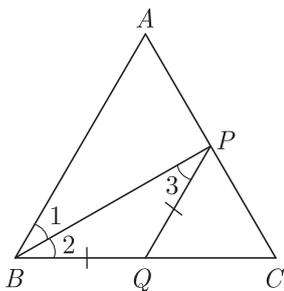
OR

The sides of a triangle are 4 cm, 8 cm and 6 cm. Find the length of the perpendicular from the opposite vertex to the longest side.

Q25. $ABCD$ is a parallelogram in which $\angle ADC = 75°$ and side AB is produced to point E as shown in the figure. Find $(x + y)$.   [2]
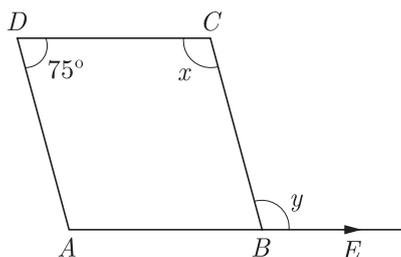
Q26. P is a point on the bisector of $\angle ABC$. If the line through P, parallel to BA meet BC at Q, prove that BPQ is an isosceles triangle.   [2]

OR

In quadrilateral $PQRS$, if $\angle P = 60°$ and $\angle Q : \angle R : \angle S = 2 : 3 : 7$, then find the value of $\angle S$.

SECTION C

Q27.   Find the remainder, when $3x^3 - 6x^2 + 3x - \dfrac{7}{9}$ is divided by $3x - 4$.   [3]

OR

Write the equation of the lines drawn in following graph. Also, find the area enclosed between them.

Q28.   A family with monthly income of ₹ $30,000$ had planned the following expenditures per month under various heads :   [3]

Heads	Expenditure (in ₹ 1000)
Rent	5
Grocery	4
Clothings	3
Education of children	5
Medicine	2
Entertainment	3
Miscellaneous	6
Savings	2

Draw a bar graph for the above data.

OR

If the mean of five observations x, $x + 2$, $x + 4$, $x + 6$ and $x + 8$ is 11. Find the value of x.

Q29.   Find the curved surface area and total surface area of a hemisphere of radius $35\,\text{cm}$.   [3]

OR

The volume of a cylindrical rod is $628\,\text{cm}^3$. If its height is 20 cm, find the radius of its cross section. (Use $\pi = 3.14$).

Q30.   In the given figure, the bisectors of $\angle ABC$ and $\angle BCA$, intersect each other at point O. If $\angle BOC = 100°$, then find $\angle A$
.   [3]
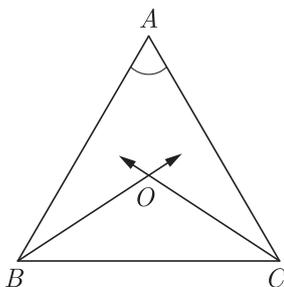
Q31.   Write true or false and justify your answer. If the side of a rhombus is 10 cm and one diagonal is 16 cm, the area of the rhombus is $96\,\text{cm}^2$.   [3]

Q32. $ABCD$ is a parallelogram. A circle through A and B is drawn, so that it intersects AD at P and BC at Q. Prove that P, Q, C and D are concyclic.   [3]

Q33. Two equal chords AB and CD of a circle when produced, intersect at a point P. Prove that $PB = PD$. [3]

Q34. Draw a right angled triangle whose hypotenuse measure 6 cm and the length of one of whose sides containing the right angle is 4 cm. [3]

SECTION D

Q35. A recent survey found that the age of workers in a factory as follows : [4]

Age (in yrs)	Number of workers
20-29	38
30-39	27
40-49	86
50-59	46
60 and above	3

If a person is selected at random, then find the probability that the person is

OR

The mean of the following frequency distribution is 16.6.

x_i	8	12	15	18	20	25	30	Total
f_i	12	16	p	24	16	q	4	100

Find the missing frequencies p and q.

Q36. If $x = \dfrac{1}{2 - \sqrt{3}}$, then find the value of $x^3 - 2x^2 - 7x + 5$. [4]

Q37. Water flows in a tank 150 m $\times$ 100 m at the base through a pipe whose cross-section is 2 dm $\times$ 1.5 dm at the speed of 15 km/h. In what time, will the water be 3 m deep ? [4]

OR

An open rectangular cistern is made of iron 2.5 cm thick. When measured from outside, it is 1 m 25 cm long, 1 m 5 cm broad and 90 cm deep.
Find :
(i) the capacity of the cistern in litres
(ii) the volume of iron used
(iii) the total surface area of the cistern

Q38. Find the zeroes of the given polynomial $f(x) = 2x^3 + 3x^2 - 11x - 6$. [4]

Q39. AB and AC are two chords of a circle of radius r such that $AB = 2AC$. If p and q are the distances of AB and AC from the centre then prove that $4q^2 = p^2 + 3r^2$. [4]

Q40. A man hires an auto rickshaw to cover a certain distance. The fare is ₹ 10 for first kilometre and ₹ 7 for subsequent kilometres. Taking total distance covered as x km and total fare as ₹ y. [4]

(i) Write a linear equation for this.
(ii) The man covers a distance of 16 km and gave ₹ 120 to the auto driver. Auto driver said. "it is not the correct amount" and returned him the balance. Find the correct amount paid back by the auto driver.