CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-03

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 rationalising factor of $\sqrt[5]{a^2b^3c^4}$ is [1]

(a) $\sqrt[5]{a^3b^2c}$ (b) $\sqrt[4]{a^3b^2c}$
(c) $\sqrt[3]{a^3b^2c}$ (d) $\sqrt{a^3b^2c}$

Q2. Factorisation of $a^{2x}-b^{2x}$ is [1]

(a) $(a^x+b^x)(a^x-b^x)$ (b) $(a^x-b^x)^2$
(c) $(a^x+b^x)(a^2-b^2)$ (d) $(a^x-b^x)(a^2+b^2)$

Q3. In which quadrant will $(-3,4)$ lie? [1]

(a) I quadrant (b) II quadrant
(c) III quadrant (d) IV quadrant

Q4. The number of solutions, the equation $3x+5y+15=0$ can have [1]

(a) one only (b) exactly two
(c) zero (d) infinite

Q5. Two distinct intersecting lines l and m cannot have [1]

(a) any point in common (b) one point in common
(c) two points in common (d) None of these

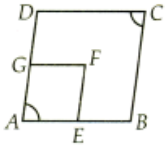
Q6. Supplement of angle is one fourth of itself. The measure of the angle is [1]

(a) 18° (b) 36°
(c) 144° (d) 72°

Q7. In $\triangle ABC$, if $\angle B < \angle A$, then [1]

(a) $BC > CA$ (b) $BC < CA$
(c) $BC > AB + CA$ (d) $AB < CA$

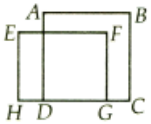
Q8. In the following figure, $ABCD$ and $AEFG$ are two parallelograms. If $\angle C = 55^\circ$, find $\angle F$. [1]

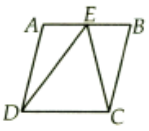


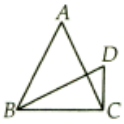
(a) 65° (b) 75°

(c) 85° (d) 55°

Q9. Which of the following figures lie on the same base and between the same parallels? [1]

(a) 

(b) 

(c) 

(d) All of these

Q10. In the given figure, O is the centre of circle. $\angle OPQ = 27^\circ$ and $\angle ORQ = 21^\circ$. The values of $\angle POR$ and $\angle PQR$ respectively are [1]

(a) $84^\circ, 42^\circ$ (b) $96^\circ, 48^\circ$

(c) $54^\circ, 42^\circ$ (d) $108^\circ, 54^\circ$

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

Q11. If the lengths of two sides of an isosceles triangle are 4 cm and 10 cm, then the length of the third side is ..... cm. [1]

Q12. The perimeter of a right angled triangle is 450 m. If its sides are in the ratio 5 : 12 : 13, then area of the triangle is ..... m^2. [1]

OR

If each side of a scalene triangle is halved then its area will reduced by ..... percentage.

Q13. The sum of the areas of the plane and curved surfaces (faces) of a solid is called its ..... surface area. [1]

Q14. ..... is found by adding all the values of the observations and dividing this by the total number of observations. [1]

Q15. Probability of an event can be any ..... from 0 to 1. [1]

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

Q16. If $125^x = \frac{25}{5^x}$, find the value of x. [1]

OR

What is the best way to evaluate $(996)^2$?

Q17. In which quadrants, abscissa of a point is negative? [1]

Q18. If two angles of a triangle are complementary, then what type of triangle will be formed? [1]

Q19. What is the lateral surface area of a cuboid with dimensions l, b and h? [1]

Q20. If each observation of the data is decreased by 5, then what is the effect on the mean? [1]

SECTION B

Q21. Without actually calculating the cubes, find the value of $48^3 - 30^3 - 18^3$. [2]

OR

Find the value of x, if $5^{x-3} \times 3^{2x-8} = 225$.

Q22. The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by $x + 1$, leaves the remainder 19. Find the value of a. Also, find the remainder when $p(x)$ is divided by $x + 2$. [2]

OR

Factorise : $2x^3 - 5x^2 - 19x + 42$.

Q23. Find the coordinates of the point : [2]

(i) Which lies on x and y axes both.
(ii) Whose abscissa is 2 and which lies on the x-axis.

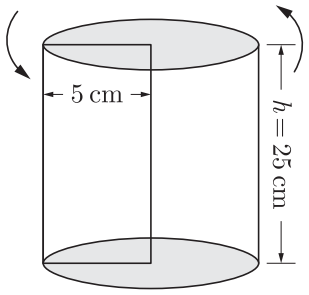
Q24. If the complement of an angle is one-third of its supplement, find the angle ? [2]

OR

In ΔABC, if $\angle A = 50^\circ$ and $\angle B = 60^\circ$, determine the shortest and the longest side of the triangle.

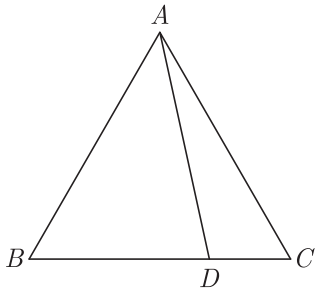
Q25. $ABCD$ is a rhombus. If $AC = 8\,\text{cm}$, $DB = 6\,\text{cm}$, find the length of BC. [2]

Q26. A rectangle strip 5 cm $\times$ 25 cm is rotated completely about the 25 cm side. Find the total surface area of the solid thus generated. [2]



SECTION C

Q27. In the given figure, $AB > AC$ and D is any point on side BC of ΔABC. Prove that $AB > AD$. [3]



Q28. The remainder of the polynomial $5 + bx - 2x^2 + ax^3$, when divided by $(x - 2)$ is twice the remainder when it is divided by $(x + 1)$. Show that $10a + 4b = 9$. [3]

Q29. The mean of first 8 observations is 18 and last 8 observation is 20. If the mean of all 15 observations is 19, find the 8^{th} observation. [3]

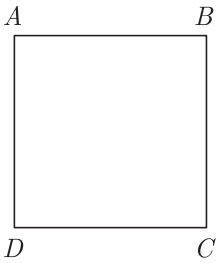
OR

Two coins are tossed simultaneously 200 times and the following outcomes are recorded :

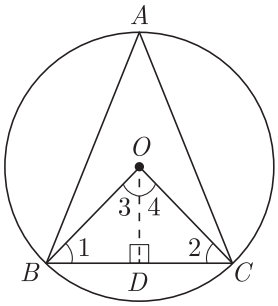
HH	HT/TH	TT
56	110	34

What is the empirical probability of occurrence of at least one head in the above case ?

Q30. In the given figure, $AB||DC$ and $AD||BC$. Prove that, $\angle DAB = \angle DCB$. [3]



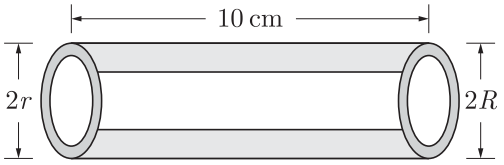
Q31. The circumcentre of the triangle ABC is O. Prove that $\angle OBC + \angle BAC = 90^\circ$. [3]



Q32. A spherical canon ball, 28 cm, in diameter is melted into a right circular conical mould, the base of which is 35 cm in diameter. Find the height of the cone, correct to one place of decimal. [3]

OR

The total surface area of a hollow metal cylinder open at both ends of external radius 8 cm and height 10 cm is 338π cm^2. Taking r to be inner radius, find the thickness of the metal in the cylinder.

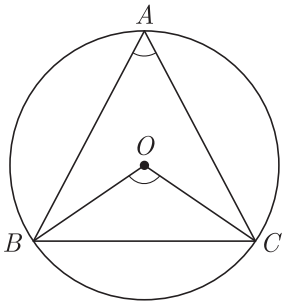


Q33. Construct a ΔABC whose perimeter is 12 cm and sides are in the ratio 3 : 4 : 5. [3]

OR

Construct a triangle ABC in which $BC = 7$ cm, $\angle B = 75^\circ$ and $AB + AC = 13$ cm.

Q34. 3 STD booths situated at A, B and C in the figure are operated by handicapped persons. These three booths are equidistant from each other as shown in the figure. [3]



(i) Find $\angle BAC$.
(ii) Find $\angle BOC$

SECTION D

Q35. If $x = (5 + 2\sqrt{6})$, then show that $\sqrt{x} + \frac{1}{\sqrt{x}} = 2\sqrt{3}$. [4]

Q36. Factorise : $a^7 - ab^6$. [4]

Q37. Draw the graph of the equation $x - y = 3$. If $y = 3$, then find the value of x from the graph. [4]

OR

A and B are friends A is elder to B by 5 years. B's sister C is half the age of B while A's father D is 8 years older than twice the age of B. If the present age of D is 48 years, find the present ages of A, B and C.

Q38. Draw a frequency polygon representing the following frequency distribution. [4]

Class intervals	30-34	35-39	40-44	45-49	50-54	55-59
Frequency	12	16	20	8	10	4

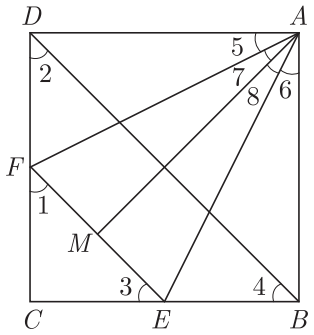
OR

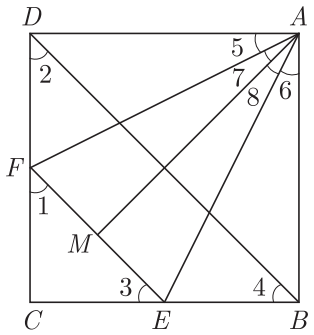
The mean of 1, 7, 5, 3, 4 and 4 is m. The observations 3, 2, 4, 2, 3, 3 and p have mean $(m - 1)$ and median q. Find p and q.

Q39. The length of the sides of a triangle are in the ratio 3 : 4 : 5 and its perimeter is 144 cm. Find [4]

(i) the area of the triangle
(ii) the height corresponding to the longest side

Q40. In the given figure, $ABCD$ is a square, EF is parallel to diagonal BD and $EM = FM$. [4]





Prove that
(i) $DF = BE$
(ii) AM bisects $\angle BAD$.