

**CLASS IX (2019-20)**  
**MATHEMATICS (041)**  
**SAMPLE PAPER-07**

**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.

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**SECTION A**

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

- Q1. If  $25^{x-1} = 5^{2x-1} - 100$ , then the value of  $x$  is. [1]  
(a) 3 (b) 2  
(c) 4 (d) 1
- Q2. One of the dimensions of the cuboid whose volume is  $16x^2 - 26x + 10$  is [1]  
(a) 2 (b)  $(8x - 5)$   
(c)  $(x - 1)$  (d) All of these
- Q3. Point  $(0, -2)$  lies [1]  
(a) on the  $x$ -axis (b) in the second quadrant  
(c) on the  $y$ -axis (d) none of these
- Q4. An ordered pair that satisfy an equation in two variables is called its. [1]  
(a) Zero (b) Root  
(c) Solution (d) Both (b) and (c)
- Q5. Priya and Pooja have the same amount of money. If each gets ₹4000 more, how will their new amounts be compared?[1]  
(a) Amount with Priya is less than that with Pooja  
(b) Amount with Pooja is less than that with Priya  
(c) Both have same amount of money  
(d) None of these
- Q6. Which one of the following statements is not false? [1]  
(a) If two angles form a linear pair, then each of these angles is of measure  $90^\circ$   
(b) Angles forming a linear pair can both be acute angles.  
(c) Both of the angles forming a linear pair can be obtuse angles.  
(d) Bisectors of the adjacent angles forming a linear pair form a right angle.
- Q7. In triangles  $ABC$  and  $PQR$ ,  $AB = PQ$  and  $\angle B = \angle Q$ . The two triangles will be congruent by SAS axiom if [1]  
(a)  $BC = QR$  (b)  $AC = PR$   
(c)  $AB = QR$  (d) None of these

- Q8. A quadrilateral has three acute angles each measuring  $70^\circ$ . The measure of fourth angle is [1]  
 (a)  $140^\circ$  (b)  $150^\circ$   
 (c)  $105^\circ$  (d)  $120^\circ$

- Q9. Parallelograms on the same base and between the same parallels are equal in [1]  
 (a) perimeter (b) volume  
 (c) area (d) weight

- Q10. In the given figure, chord  $RS =$  chord  $NS$ . How  $\widehat{RS}$  is related with  $\widehat{NS}$ ? [1]



- (a)  $\widehat{RS}$  is smaller than  $\widehat{NS}$  (b) Both are equal  
 (c)  $\widehat{RS}$  is greater than  $\widehat{NS}$  (d) None of these

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

- Q11. The construction of a  $\triangle DEF$  in which  $DE = 7$  cm,  $\angle D = 75^\circ$  is possible when  $(DE - EF)$  is equal to ..... cm. [1]  
 Q12. A triangle and parallelogram have the same base and the same area. If the sides of the triangle are 34 cm, 42 cm and 20 cm, then the height of parallelogram having base 42 cm, is equal to ..... cm. [1]

**OR**

Area of a triangle with the length of sides  $a, b, c$  is given by  $\sqrt{s(s-a)(s-b)(s-c)}$  by ..... formula.

- Q13. A right circular cone is generated by revolving a right angled triangle about one of the sides containing the ..... [1]  
 Q14. The ..... of all bars in histogram should be uniform. [1]  
 Q15. A ..... is an action which results in one of several outcomes. [1]

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

- Q16. The diagonal of a cube is  $4\sqrt{3}$  cm. Find its volume. [1]  
 Q17. In an experiment a coin is tossed 200 times. If the head turns up 120 times, then find the experimental probability of getting a head. [1]  
 Q18. Find a rational number between 8 and 9. [1]

**OR**

Find the value of  $(256)^{0.6} \times (256)^{0.09}$

- Q19. Find the distance of point S  $(-3, 6)$  from  $y$ -axis. [1]  
 Q20. In a grouped frequency distribution, the class intervals are 1-10, 11-20, 21-30, ..... Find the class width. [1]

**SECTION B**

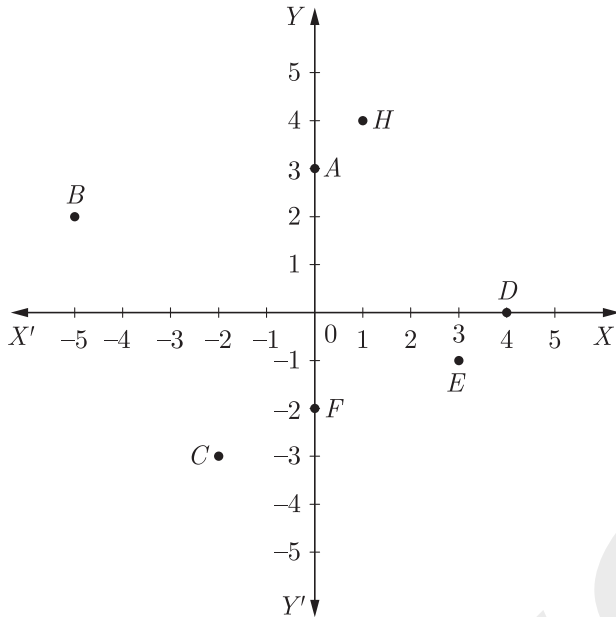
- Q21. If  $x = 9 - 4\sqrt{5}$ , find the value of  $x^2 + \frac{1}{x^2}$ . [2]

OR

Prove that  $\frac{1}{2 + \sqrt{3}} + \frac{2}{\sqrt{5} - \sqrt{3}} + \frac{1}{2 - \sqrt{5}} = 0$

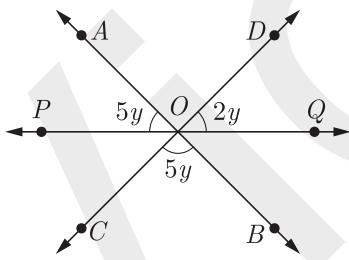
Q22. Given the equation of three lines passing through (4, -5). How many more such lines are there and why? [2]

Q23. From the figure, write the following : [2]



- (i) Coordinates of  $B$ ,  $C$  and  $E$
- (ii) The point identified by the coordinates (0, -2)
- (iii) The abscissa of the point  $H$
- (iv) The ordinates of the point  $D$ .

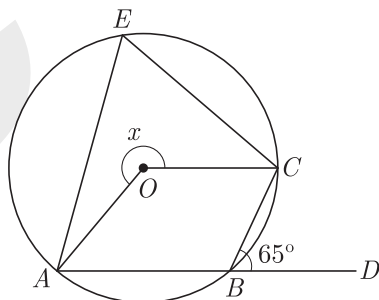
Q24. In the given figure,  $AB$ ,  $CD$  and  $PQ$  are three lines concurrent at  $O$ . If  $\angle AOP = 5y$ ,  $\angle QOD = 2y$  and  $\angle BOC = 5y$ , then find the value of  $y$ . [2]



OR

If ray  $OC$  stands on line  $AB$  such that  $\angle AOC = \angle COB$ , then show that  $\angle AOC = 90^\circ$ .

Q25. If  $O$  is the centre of the circle, then find the value of  $x$  in the given figure. [2]



Q26. A conical tent is to accommodate 11 persons. Each person must have 4 sq m of the space on the ground and 20 cubic metre of air to breathe. Find the height of the cone. [2]

OR

The diameter of a roller, 120 cm long is 84 cm. It takes 500 complete revolutions to level a playground. Find the cost of levelling it at the rate of ₹ 25 per sq metre.

**SECTION C**

- Q27. (i) Without actually calculating the cubes, find the value of  $48^3 - 30^3 - 18^3$ .  
 (ii) Without finding the cubes, factorise  $(x - y)^3 + (y - z)^3 + (z - x)^3$  [3]

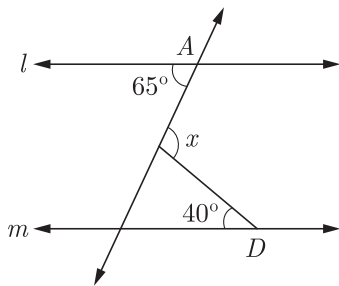
OR

Find the value of  $k$ , if  $x + k$  is the factor of the polynomials :

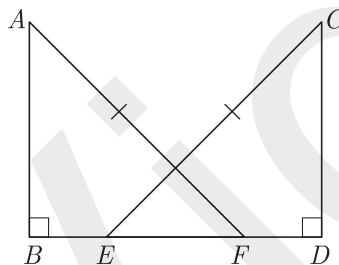
- (i)  $x^3 + kx^2 - 2x + k + 5$   
 (ii)  $x^4 - k^2x^2 + 3x - 6k$

- Q28. Prove that through a given point, we can draw only one perpendicular to a given line. [3]

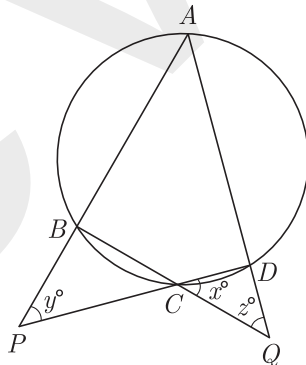
- Q29. In the given figure, if  $l \parallel m$ , then find the value of  $x$ . [3]



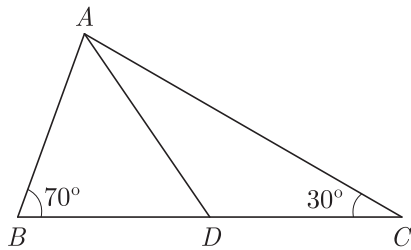
- Q30. In the given figure,  $AB$  and  $CD$  are perpendiculars on  $BD$ . Also,  $AB = CD$  and  $AF = CE$ . Prove that  $BE = FD$ . [3]



- Q31. In the given figure, if  $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$ , then calculate the values of  $x$ ,  $y$  and  $z$ . [3]



- Q32. In the given figure  $AD$  bisects  $\angle A$ . Then, find the relation between the sides  $AB$ ,  $AC$  and  $DC$ . [3]



Q33. A copper sphere of diameter 18 cm is drawn into a wire of diameter 4 mm. Find the length of the wire. [3]

**OR**

The volume of a right circular cone is  $9856 \text{ cm}^3$ . If the diameter of the base is 28 cm, find

- (i) height of the cone
- (ii) slant height of the cone
- (iii) curved surface area of the cone

Q34. Probability of getting a blue ball is  $\frac{2}{3}$ , from a bag containing 6 blue and 3 red balls. 12 red balls are added in the bag, then find the probability of getting :

- (i) a blue ball
- (ii) a red ball

[3]

**OR**

Over the past 200 working days, the number of defective parts produced by a machine is given below :

<b>No. of defective parts</b>	0	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Days</b>	50	32	22	18	12	12	10	10	10	8	6	6	2	2

Determine the probability that tomorrow's output will have :

- (i) no defective part
- (ii) not more than 5 defective parts
- (iii) more than 13 defective parts ?

### SECTION D

Q35. Using factor theorem, factorise  $x^3 - 6x^2 + 3x + 10$ . [4]

**OR**

If  $ab + bc + ca = 0$ , find the value of

$$\frac{1}{a^2 - bc} + \frac{1}{b^2 - ca} + \frac{1}{c^2 - ab}$$

Q36. If  $2^x = 3^y = 6^z$ , prove that  $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$  or  $z = \frac{xy}{x+y}$ . [4]

Q37. In countries like USA and Canada, temperature is measured in Fahrenheit, whereas in countries like India, it is measured in Celsius. Here is a linear equation that converts Fahrenheit to Celsius : [4]

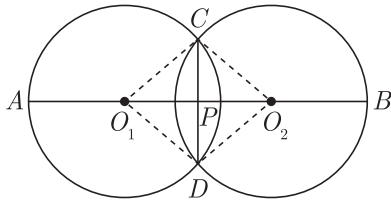
$$F = \left(\frac{9}{5}\right)C + 32$$

- (i) Draw the graph of the linear equation above using Celsius for  $x$ -axis and Fahrenheit for  $y$ -axis.
- (ii) If the temperature is  $30^\circ\text{C}$ , what is the temperature in Fahrenheit ?
- (iii) If the temperature is  $95^\circ\text{F}$ , what is the temperature in Celsius ?
- (iv) If the temperature is  $0^\circ\text{C}$ , what is the temperature in Fahrenheit and if the temperature is  $0^\circ\text{F}$ , what is the temperature in Celsius ?

Q38. Prove that if any two chords of a circle are drawn, then one which is nearer to the centre, is larger. [4]

**OR**

$O_1$  and  $O_2$  are the centres of two congruent circles intersecting each other at points  $C$  and  $D$ . The line joining their centres intersects the circles in points  $A$  and  $B$  such that  $AB > O_1O_2$ . If  $CD = 6 \text{ cm}$  and  $AB = 12 \text{ cm}$ , determine the radius of either circle.



- Q39. Find the weight of a lead pipe 3.5 m long, if the external diameter of the pipe is 2.4 cm and the thickness of the lead is 2 mm and 1 cu. cm of lead weights 11 g. [4]
- Q40. Prove that  $\sum_{i=1}^n (x_i - \bar{x}) = 0$ , where  $\bar{x}$  is the mean of the  $n$  observations  $x_1, x_2, \dots, x_n$ . [4]