

**Cheating is Dishonesty.**

TERM II

MM:80

BVP/IX/MATHS/2022-23

Time:3hrs

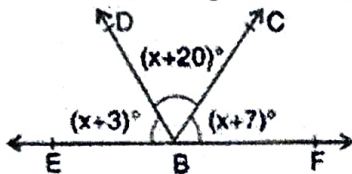
1. This question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 3 case study based questions carrying 4 marks each.
6. Section E has 4 questions carrying 5 marks each.
7. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

**Section - A (1 mark each)**

Q1 If  $a+b+c=0$ , then  $a^3+b^3+c^3$  is equal to

- (a) 0
- (b) abc
- (c)  $3abc$
- (d)  $2abc$

Q2 In the given figure, find the value of  $x$ :



- (a)  $40^\circ$
- (b)  $50^\circ$
- (c)  $60^\circ$
- (d)  $80^\circ$

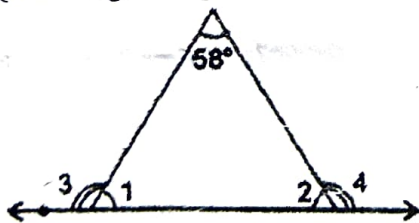
Q3 If the coordinates of two points are A (3, 4) and B (-2, -1), then (abscissa of A) + (ordinate of B) is

- (a) 4
- (b) 2
- (c) - 2
- (d) 3

Q4 If the coordinates of a point are (0, -4), then it lies in:

- (a) X-axis
- (b) Y-axis
- (c) At origin
- (d) Between x-axis and y-axis

Q5 In the given figure,  $\angle 1 = \angle 2$  then the measurements of  $\angle 3$  and  $\angle 4$  are:



- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>(a) <math>58^\circ, 61^\circ</math></li> <li>(c) <math>119^\circ, 61^\circ</math></li> </ol> | <ol style="list-style-type: none"> <li>(b) <math>61^\circ, 61^\circ</math></li> <li>(d) <math>119^\circ, 119^\circ</math></li> </ol> |
|---|--|

1 5/6

*Directions:* Choose the correct answer out of the following choices :

- (a) Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion.
- (b) Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion.
- (c) Assertion is correct statement but Reason is wrong statement.
- (d) Assertion is wrong statement but Reason is correct statement.

Q6 **Assertion:** If  $p(x) = ax + b$ ,  $a \neq 0$  is a linear polynomial, then  $x = -b/a$  is the only zero of  $p(x)$ .

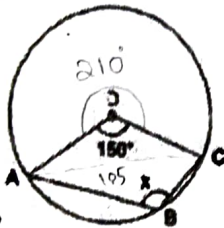
**Reason:** A linear polynomial has one and only one zero.

Q7 **Assertion:** ABCD is a quadrilateral in which P, Q, R and S are the mid - points of AB, BC, CD and DA respectively. Then, PQRS is a parallelogram.

**Reason:** The line segment joining the mid - points of any two sides of a triangle is parallel to the third side and equal to half of it.

Q8 In the figure, O is the centre of the circle. What is the value of  $x$ ?

- (a)  $125^\circ$
- (b)  $105^\circ$



- (c)  $95^\circ$
- (d)  $85^\circ$

Q9 Point (3, 4) lies on the graph of the equation  $3y = kx + 7$ . The value of  $k$  is:

- (a)  $4/3$
- (b)  $5/3$
- (c) 3
- (d)  $7/3$

Q10 The linear equation  $2x - 5y = 7$  has

- (a) No solution
- (b) Unique solution
- (c) Two solutions
- (d) Infinitely many solutions

Q11 A binomial of degree 20 in the following is:

- (a)  $20x + 1$
- (b)  $x/20 + 1$
- (c)  $x^{20} + 1$
- (d)  $x^2 + 20$

Q12 The value of  $f(x) = 5x - 4x^2 + 3$  when  $x = -1$ , is:

- (a) 3
- (b) -12
- (c) -6
- (d) 6

Q13 If  $8^{x+1} = 64$ , what is the value  $3^{2x+1}$

- (a) 1
- (b) 3
- (c) 9
- (d) 27

Q14 Find the coefficient of  $x^2$  in  $(3x^2-5)(4+4x^2)$

- (a) 12
- (b) 5
- (c) 8
- (d) -8

Q15 If  $a+b+c=3$ ,  $a^2+b^2+c^2=5$  and  $a^3+b^3+c^3=9$ , then the value of  $abc=$

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

Q16 The value of

$$\frac{(361)^3 + (139)^3}{(361)^2 - 361 \times 139 + (139)^2}$$

is

- (a) 300
- (b) 500
- (c) 400
- (d) 600

Q17 What is the length of each side of an equilateral triangle having an area of  $4\sqrt{3} \text{ cm}^2$  ?

- (a) 4cm
- (b) 5cm
- (c) 7cm
- (d) 6cm

Q18 The diameter of the base of a cone is 10.5 cm, and its slant height is 10 cm. The curved surface area is:

- (a) 150 sq.cm
- (b) 165 sq.cm
- (c) 177 sq.cm
- (d) 180 sq.cm

Q19 The radius of a sphere is  $2r$ , then its volume will be

- (a)  $(4/3) \pi r^3$
- (b)  $4\pi r^3$
- (c)  $(8/3) \pi r^3$
- (d)  $(32/3) \pi r^3$

Q20 Area of a triangle is equal to:

- (a) Base x Height
- (b)  $2(\text{Base} \times \text{Height})$
- (c)  $\frac{1}{2}(\text{Base} \times \text{Height})$
- (d)  $\frac{1}{2}(\text{Base} + \text{Height})$

**Section - B (2 marks each)**

Q21 Prove that

$$\left(\frac{x^a}{x^b}\right)^c \times \left(\frac{x^b}{x^c}\right)^a \times \left(\frac{x^c}{x^a}\right)^b = 1$$

Q22 The radius of a hemispherical balloon increases from 6 to 12cm as air is being pumped into it. Compare the volumes of the balloon in the two cases.

Q23 AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that  $\angle BAD = \angle ABE$  and  $\angle EPA = \angle DPB$  (see Fig. 7.22). Show that  
 (i)  $\triangle DAP \cong \triangle EBP$   
 (ii)  $AD = BE$

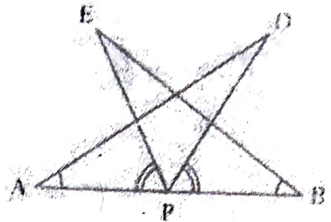


Fig. 7.22

Q24 Without plotting the points indicate the quadrant in which they will lie, if  
 (i) the ordinate is 5 and abscissa is -3  
 (ii) the abscissa is -5 and ordinate is -3  
 (iii) the abscissa is -5 and ordinate is 3  
 (iv) the ordinate is 5 and abscissa is 3

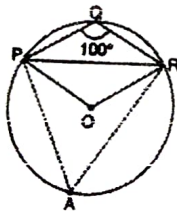
Q25) If  $3x - 2y = 11$  and  $xy = 12$ , find  $27x^3 - 8y^3$

OR

Factorize:  $4a^2 - 9b^2 - 2a - 3b$

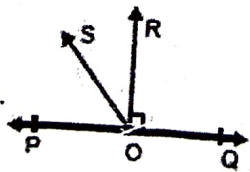
**Section - C (3 marks each)**

Q26 In the given figure,  $\angle PQR = 100^\circ$ , where P, Q and R are points on a circle with centre O. Find  $\angle OPR$ .



Q27 In the given figure, POQ is a line. Ray  $\overline{OR} \perp \overline{PQ}$ ,  $\overline{OS}$  is another ray lying between rays  $\overline{OP}$  and  $\overline{OR}$ . Prove that

$$\angle ROS = \frac{1}{2}(\angle QOS - \angle POS).$$



Q28 Examine whether the given number is rational or irrational. Justify your answer.

$$\frac{\sqrt{36} + \sqrt{288}}{2 + 4\sqrt{2}}$$

Q29 The perimeter of a triangular garden is 96cm and its sides are in the ratio 5:4:3. Find  
 i) the area of the triangle.

ii) the height of the triangle corresponding to the longest side.

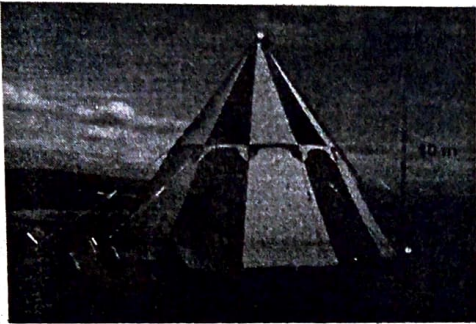
Q30 The weight of a book is three times the weight of a notebook. Express this fact in the form of an equation in two variables. Write the equation in the form of  $ax+by+c=0$  and find the values of a, b and c. (Take weight of book as x and notebook as y)

Q31 Show that  $(x-2)$  a factor of the polynomial  $f(x)=2x^3-3x^2-17x+30$  and hence factorize  $f(x)$ .

**Section - D (4 marks each)**

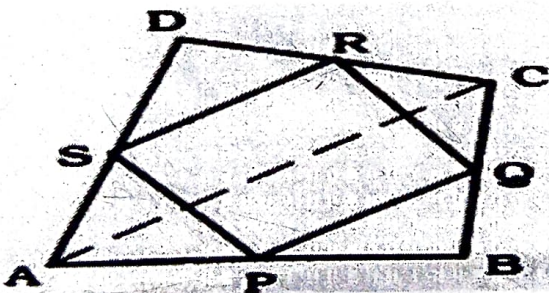
Q32 Read the passage given below and answer the questions:

Once four friends Rahul, Arun, Ajay and Vijay went for a picnic at a hill station. Due to peak season, they did not get a proper hotel in the city. The weather was fine so they decided to make a conical tent at a park. They were carrying 300 m<sup>2</sup> cloth with them. As shown in the figure they made the tent with height 10 m and diameter 14 m. The remaining cloth was used for the floor.



- How much cloth was used for the floor?
- What was the volume of the tent?
- What was the area of the floor?
- What was the total surface area of the tent?

Q33 Mathematics teacher of class 9<sup>th</sup> gave students coloured paper in the shape of quadrilateral and then ask the students to make parallelogram from it by using paper folding and ask the students to answer the following:



- How can a parallelogram be formed by using paper folding?
- If  $\angle RSP = 30^\circ$ , then what is the measure of  $\angle RQP$ ?
- If  $\angle RSP = 50^\circ$ , then what is the measure of  $\angle SPQ$ ?
- If  $SP = 3\text{cm}$ , then what is the measure of  $RQ$ ?
- If  $SR = 5\text{cm}$ , then what is the length of  $AC$ ?

Q34 On one day, principal of a particular school visited the classroom. Class teacher was teaching the concept of polynomial to students. He was very much impressed by her way of teaching. To check, whether the students also understand the concept taught by her or not, he asked various questions to students. Some of them are given below. Answer them.

- (i) What is the degree of the zero polynomial?
- (ii) If  $P(x) = x^2 - 2\sqrt{2}x + 1$ , then find the value of  $P(2\sqrt{2})$
- (iii) What is the remainder when  $x^{51} + 51$  is divided by  $x + 1$ ?
- (iv) What is the value of  $a$  if  $x - 2$  is a factor of  $x^3 - 2ax^2 + ax - 1$ ?

**Section- E (5 marks each)**

Q35 Prove that the angle subtended by an arc at the Centre of a circle is double the angle subtended by it at any point on the remaining part of the circle.

OR

Three girls, Reshma, Salma and Mandip, are playing a game by standing on a circle of radius 5m drawn in a park. Reshma throws a ball to Salma, Salma to Mandip, and Mandip to Reshma. If the distance between Reshma and Salma and between Salma and Mandip is 6m each, what is the distance between Reshma and Mandip.

Q36 Represent the following data of marks obtained by two groups of class IX in a government school in the form of frequency polygon on same axes.

Marks		30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of students	Group A	16	7	9	20	22	2	3
	Group B	10	12	25	14	15	5	1

Q37 ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that

- (i) D is the mid-point of AC
- (ii)  $MD \perp AC$
- (iii)  $CM = MA = \frac{1}{2} AB$

Q38 a) Determine rational numbers  $a$  and  $b$  if  $\frac{3+\sqrt{8}}{3-\sqrt{8}} + \frac{3-\sqrt{8}}{3+\sqrt{8}} = a + b\sqrt{2}$

b) Write two irrational numbers between 0.5 and 0.6.