



**St. PETER'S CONVENT**  
**Annual Examination Model Test Paper(2024-25)**  
**Subject- Mathematics**  
**Grade-9**

**Time: 3 hrs.**

**Max.Marks:80**

**GENERAL INSTRUCTIONS:**

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 01 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the value 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in 2 questions of 2 marks, 2 questions of 3 marks and 2 questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

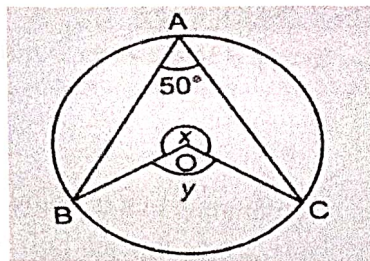
**SECTION – A**

**(1x20=20)**

Section A consists of 20 questions of 1 mark each.

- Q1. If  $x$  is a positive real number and  $x^2 = 2$ , then  $x^3 =$  1  
a)  $\sqrt{2}$                       b)  $3\sqrt{2}$                       c)  $2\sqrt{2}$                       d) 4
- Q2. The area of an equilateral triangle with side  $2\sqrt{3}$  cm is 1  
a)  $3\sqrt{3}$ cm                      b)  $3\sqrt{2}$ cm                      c)  $2\sqrt{3}$ cm                      d)  $2\sqrt{2}$ cm
- Q3. If  $(x+2)(x-5) = x^2 + (a+b)x + ab$ , then the value of  $(a+b)$  is 1  
a) (-3)                      b) 7                      c) (-7)                      d) 3
- Q4. In parallelogram ABCD, bisectors of angles A and B intersect each other at "O" the value of angle AOB 1  
a)  $90^\circ$                       b)  $60^\circ$                       c)  $30^\circ$                       d)  $120^\circ$
- Q5. The zero(s) of the polynomial  $x^2 - 8$  is (are): 1  
a) 8                      b)  $2\sqrt{2}, -2\sqrt{2}$                       c)  $2\sqrt{2}$                       d)  $\sqrt{8}$
- Q6. The point  $(a, 0)$  lies 1  
a) on x axis                      b) on y axis                      c) in quadrant I                      d) in quadrant IV
- Q7. If  $(4, 19)$  is a solution of the equation  $y = ax + 3$ , then  $a =$  1  
a) 4                      b) 6                      c) 8                      d) 5
- Q8. The graph of the linear equation  $2x + 3y = 6$  is a line which meets the x-axis at the point 1  
a)  $(0, 3)$                       b)  $(3, 0)$                       c)  $(2, 0)$                       d)  $(0, 2)$
- Q9. If two complementary angles are in the ratio 11:7, then the angles are 1  
a)  $55^\circ, 35^\circ$                       b)  $50^\circ, 40^\circ$                       c)  $45^\circ, 45^\circ$                       d)  $30^\circ, 60^\circ$
- Q10. Which of the following is not a criterion for congruence of triangles? 1  
a) SSS                      b) RHS                      c) AAA                      d) SAS
- Q11. The lengths of the three sides of a triangular field are 40m, 24m and 32m respectively. The area of the triangle is 1  
a)  $320m^2$                       b)  $480m^2$                       c)  $384m^2$                       d)  $360m^2$
- Q12. If the radius of a sphere is doubled, then what is the ratio of their surface areas? 1  
a) 1 : 2                      b) 2 : 1                      c) 1 : 4                      d) 4 : 1
- Q13. In a histogram, which of the following is proportional to the frequency of the corresponding class? 1  
a) width of the rectangle                      c) length of the rectangle  
b) perimeter of the rectangle                      d) area of the rectangle

Q14. Find  $x$  in the adjoining figure.

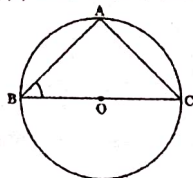


1

- a)  $110^\circ$       b)  $100^\circ$       c)  $260^\circ$       d)  $290^\circ$

Q15. In the given fig., BOC is a diameter of a circle and  $AB = AC$ . Then  $\angle ABC =$

1



- a)  $30^\circ$       b)  $45^\circ$       c)  $60^\circ$       d)  $90^\circ$

Q16. What is the minimum number of lines required to make a closed figure?

1

- a) one      b) two      c) three      d) four

Q17. When the sphere is divided into two equal parts, then each part is called a

1

- a) half sphere      b) semisphere      c) hemisphere      d) none

Q18. Consecutive angles of parallelogram are

1

- a) equal      b) complementary      c) supplementary      d) none

**DIRECTION (19-20)** In the following questions, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Mark the correct choice as:

- a) Both assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of assertion (A)  
 b) Both assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of assertion (A)  
 c) Assertion (A) is true but Reason (R) is false.  
 d) Assertion (A) is false but Reason (R) is true.

Q19. **Assertion (A):**  $\sqrt{5}$  is an irrational number.

1

**Reason (R):** The sum of a rational number and an irrational number is an irrational number.

Q20. **Assertion (A):** Range = Maximum value – Minimum value

1

**Reason (R):** The range of the first 6 multiples of 6 is 9.

### SECTION – B

(2x5=10)

Section B consists of 5 questions of 2 marks each.

Q21. Find  $p\left(\frac{1}{2}\right)$  for  $p(t) = t^2 - t + 2$ .

2

**OR**

If  $a + b + c = 7$  and  $ab + bc + ca = 20$ , find the value of  $a^2 + b^2 + c^2$ .

Q22. ABC is an isosceles triangle in which  $AC = BC$ . AD and BE are respectively two altitudes to sides BC and AC. Prove that  $AE = BD$ .

2

Q23. Find the value of k, if  $(3, -1)$  is a solution of the equation  $3x - ky = 8$ .

2

**OR**

Find three solutions of the given equation  $2x + y = 7$ .

Q24. If a point C lies between two points A and B such that  $AC = BC$ , then prove that  $AC = \frac{1}{2} AB$ . Explain by drawing the figure.

2

Q25. Find the amount of water displaced by a solid spherical ball of diameter 4.2 cm, when it is completely immersed in water.

2

### SECTION-C

(3x6=18)

Section C consists of 6 questions of 3 marks each.

Q26. Solve the equation for x:  $3^{2x+4} + 1 = 2 \times 3^{x+2}$

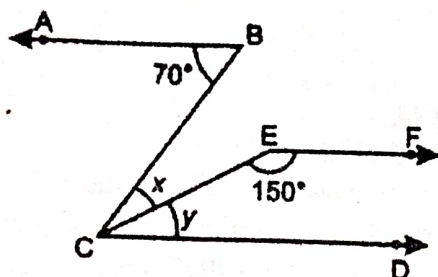
3

OR

Express 1.32222... in the form  $p/q$  where p and q are integers and  $q \neq 0$ .

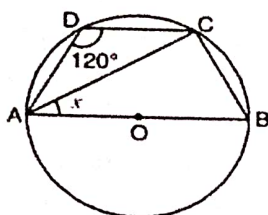
Q27. If  $AB \parallel EF$  and  $EF \parallel CD$ , then find the value of x.

3



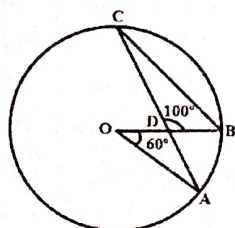
Q28. In the given fig., O is the centre of a circle passing through points A, B, C and D and  $\angle ADC = 120^\circ$ . Find the value of x.

3



OR

In the fig., O is the centre of the circle,  $\angle AOB = 60^\circ$  and  $\angle BDC = 100^\circ$ . Find  $\angle OBC$ .



Q29. Show that the diagonals of a square are equal and bisect each other at right angles.

3

Q30. If each equal side of an isosceles triangle is 13 cm and its base is 24 cm. Find its area.

3

Q31. Draw a histogram of the weekly pocket expenses of 125 students of a school given below:

3

Weekly Pocket Expenses (in `)	Number of Students
0-10	10
10-20	20
20-30	10
30-50	15
50-80	30

### SECTION D

(5x4=20)

Section D consists of 4 questions of 5 marks each.

Q32. If  $x = \frac{1}{\sqrt{5}-2}$ , find the value of  $x^3 - x^2 - 5x + 3$

5

OR

If  $a = \frac{1}{3-\sqrt{11}}$  and  $b = \frac{1}{a}$ , then find  $a^2 - b^2$

Q33. Factorise:  $x^3 - 23x^2 + 142x - 120$ .

5

Q34. The water for a factory is stored in a hemispherical tank whose internal diameter is 14 m. The tank contains 50 kilolitres of water. Water is pumped into the tank to fill to its capacity. Calculate the volume of water pumped into the tank.

5

OR

The volumes of the two spheres are in the ratio 64:27. Find the ratio of their surface areas.

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

5

### SECTION E

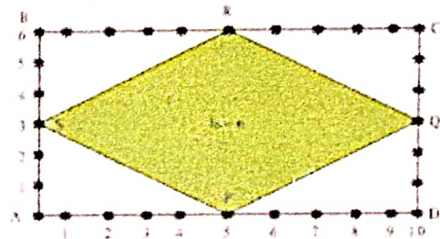
(4x3=12)

Case study based questions are compulsory.

Q36. The Class IX students of a secondary school in Krishinagar have been allotted a rectangular plot of land for their gardening activity. Saplings of Gulmohar are planted on the boundary at a distance of 1m from each other. There is a lawn PQRS in the ground as shown in below figure.

Now answer the following questions:

- What are the co-ordinates of C, taking A as origin?
- What are the co-ordinates of R, taking A as origin?
- What is the shape of the lawn?



1  
1  
2

OR

What are the co-ordinates of Q, taking A as origin?

Q37. Four friends decided to play a game, Meena advised instead of playing physical game let's play a geometry game. Meena drew a  $\triangle ABC$ . Rohit found the midpoint of side AB and marked it as D.

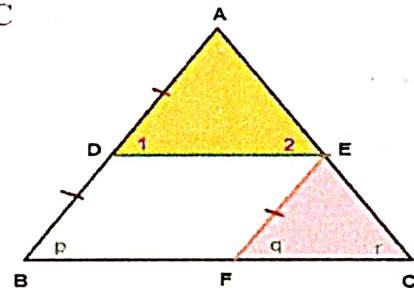
Now the third student Mathew, from D drew a line  $DE \parallel BC$ , for this, he made  $\angle ADE = \angle ABC$ .

Further, the fourth friend Veena from the point E drew a line parallel to AB. She observed that this line cuts BC at new point F. Veena found that  $EF = BD$  as marked in the given picture.

Now all the friends were trying to prove that  $\triangle ADE \cong \triangle EFC$

Now answer the following questions:

- In the  $\triangle ADE$  and  $\triangle EFC$ , AD is equal to which side?
- AE is equal to which side?
- $\triangle ADE$  and  $\triangle EFC$  are congruent according to which criteria?



1  
1  
2

OR

If  $\triangle ABC \cong \triangle PQR$  by SSS congruence rule, then AC is equal to which side?

Q38. Mathematics teacher of a school took her 9th standard students to show Gol Gumbaz. It was a part of their educational trip. The teacher had interest in history as well. She narrated the facts of Gol Gumbaz to students. Gol Gumbaz is the tomb of king Muhammad Adil Shah, Adil Shah Dynasty. Construction of the tomb, located in Vijayapura, Karnataka, India, was started in 1626 and completed in 1656. It reaches up to 51 metres in height while the giant dome has an external diameter of 44 metres, making it one of the largest domes ever built. At each of the four corners of the cube, is a dome shaped octagonal tower seven stories high with a staircase inside.

- What is the curved surface area of hemispherical dome?
- What is the circumference of the base of the dome?
- Find the total surface area of a hemispherical dome having radius 7 cm.

1  
1  
2

OR

Find the ratio of curved surface area and total surface area of a dome.