

**AIR FORCE BAL BHARATI SCHOOL , LODI ROAD .**  
**ANNUAL EXAMINATION (2024-2025)**  
**SUBJECT : MATHEMATICS**  
**CLASS : IX**

**GENERAL INSTRUCTIONS:**

1. This question paper contains 38 questions. All questions are compulsory.
2. The question paper is divided into Five sections – Sections A, B, C, D, and E.
3. In section A, questions number 1 to 18 are multiple-choice questions (MCQs) and questions number 19 and 20 are Assertion – Reason-based questions of 1 mark each.
4. In section B, questions number 21 to 25 are very short answer (VSA) type questions of 2 marks each.
5. In section C, questions number 26 to 31 are short answer (SA) type questions carrying 3 marks each.
6. In section D, questions number 32 to 35 are long answer (LA) type questions carrying 5 marks each.
7. In section E, questions number 36 to 38 are case-based integrated units of assessment questions carrying 4 marks each. Internal choice is provided in 2-mark questions in each case study.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, and 2 questions in Section D.
9. Draw neat figures wherever required. Take  $\pi = 22/7$ , wherever required if not stated.
10. The use of a calculator is not allowed.

**SECTION - A**

*Section A consists of 20 Multiple choice Questions of 1 mark each.*

Q1. If  $\left(\frac{3}{1}\right)^6 \times \left(\frac{16}{9}\right)^5 = \left(\frac{4}{3}\right)^{x+2}$ , then the value of x is

- a) 2                      b) 4                      c) -2                      d) 6

Q2. Simplification of  $\frac{\sqrt{32} + \sqrt{48}}{\sqrt{8} + \sqrt{12}}$  gives what value from the following.

- a) 3                      b) 4                      c) 2                      d)  $\sqrt{2} + \sqrt{3}$

Q3. For what value of 'a', (a, 0) is the solution of the eq.

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

Q4. Which of the linear equation has solution  $x = 1, y = 3$ ?

- a)  $3x - y = 2$       b)  $3x + y = 3$       c)  $3x - y = 0$       d)  $3x + y = 5$

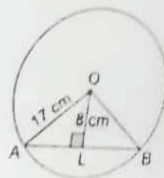
Q5. What is the degree of the polynomial  $\sqrt{2}$ ?

- a) 2      b) 0      c) 1      d)  $1/2$

Q6. The value of n for which  $\sqrt{n}$  be a rational number is

- a) 2      b) 4      c) 3      d) 5

Q7. A chord is at a distance of 8 cm from the centre of a circle of radius 17 cm. What is the length of chord?



- a) 25 cm      b) 12.5 cm      c) 30 cm      d) 9 cm

Q8. Which of the following point does not lie on the line  $y = 3x + 4$ ?

- a) (1, 7)      b)  $y = 0$       c)  $x = y$       d)  $x + y = 0$   
 (0, 0)

Q9. What is the value of  $(249^2 - 248^2)$ ?

- a)  $1^2$       b) 477      c) 487      d) 497

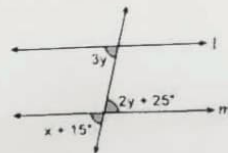
Q10. The point (a, b) is reflected over the origin, what is its image?

- a) (-a, -b)      b) (a, b)      c) (-b, -a)      d) (b, a)

Q11. What is the value of  $(3 + \sqrt{3})(3 - \sqrt{2})$ ?

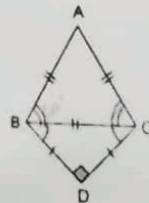
- a)  $9 - 5\sqrt{2} - \sqrt{6}$       b)  $9 - \sqrt{6}$   
 c)  $3 + \sqrt{2}$       d)  $9 - 3\sqrt{2} + 3\sqrt{3} - \sqrt{6}$

Q12. In the given figure, if  $l \parallel m$ , then what is the value of x?



- a)  $30^\circ$       b)  $45^\circ$       c)  $50^\circ$       d)  $60^\circ$

Q13. In the given figure, ABC is an equilateral triangle and BDC is an isosceles right triangle, right angled at D. What is the value of  $\angle ABD$ ?



- a)  $45^\circ$       b)  $60^\circ$       c)  $105^\circ$       d)  $120^\circ$

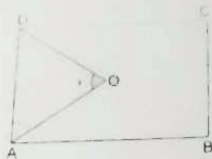
Q14. The coordinates of the point which lies on the y-axis and is equidistant from the origin and X-axis are :

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

Q15. What is angle which is five times its supplement ?

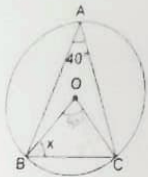
- a) 150°      b) 180°      c) 90°      d) 360°

Q16 In a rectangle ABCD, AO and DO are bisectors of  $\angle A$  and  $\angle D$ , then what is the value of  $x$  ?



- a)  $\angle B + \angle C$       b)  $180^\circ - (\angle B + \angle C)$       c)  $\frac{1}{2} (\angle B + \angle C)$       d)  $\frac{1}{2} (\angle B - \angle C)$

Q17. What is the value of  $x$  from the given figure, in which O is the centre of the circle ?



- a) 50°      b) 60°      c) 45°      d) 55°

Q18. If the area of an isosceles right triangle is  $8\text{ cm}^2$ , then what is the perimeter of the triangle ?

- a)  $(8 + \sqrt{2})\text{ cm}$       b)  $(8 + 4\sqrt{2})\text{ cm}$   
c)  $(4 + 8\sqrt{2})\text{ cm}$       d)  $12\sqrt{2}\text{ cm}$

Directions: In Q. No. 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

Choose the correct option .

- a) Both Assertion(A) and Reason(R) are correct and Reason(R) is the correct explanation for Assertion(A).  
b) Both Assertion(A) and Reason(R) are correct and Reason(R) is not the correct explanation for 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)** :  $12^9 \div 12^8 = 12$

**Reason (R)** : If  $a > 0$  be a real number and p and q be rational number then

$$a^p \div a^q = a^{p-q}$$

Q20. **Assertion (A)**: In a parallelogram ABCD,  $\angle A = 90^\circ$  then ABCD is a rectangle.

**Reason (R)** : Every parallelogram is a rectangle.

## SECTION - B

Section B consists of 5 Questions of 02 marks each.

Q.21 Express  $0.2\overline{35}$  in the  $p/q$  form , where p and q are integers and  $q \neq 0$ .

OR

Find the value of  $x$ , if  $\left(\frac{5}{7}\right)^6 \left(\frac{7}{5}\right)^{-9} = \left(\frac{5}{7}\right)^{3x}$

Q.22. Write the most appropriate answer for the following.

- i) The number of dimension(s), a point has \_\_\_\_\_?

Q.23. Lines are parallel if they do not intersect. This is stated in the form of \_\_\_\_\_?

Q.23. Find the values of  $x$  and  $y$  if  $(x+5, 2y+3) = (9, 6)$

Q.24. Find the volume of biggest sphere in a cube of edge 6 cm.

OR

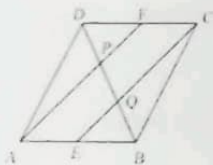
A glass hemispherical bowl is of radius 9 cm. How many litres of water it can hold?

Q.25. Solve the equation  $x-3=7$  and state the axiom that you use here.

### SECTION - C

Section C consists of 6 Questions of 03 marks each.

Q.26. In a parallelogram ABCD, E and F are the mid-points of sides AB and CD respectively. Show that the line segments AF and EC trisect the diagonal BD.



OR

Prove that the diagonal divides a parallelogram into two congruent triangles.

Q.27. The heights of 20 students are noted as follows

4.5, 5.5, 5.5, 4.4, 4.5, 5.5, 5.5, 3.5, 3.5, 4.2, 4.6, 4.2, 4.7, 5.5, 5.3, 5.3

Q.28. Make a frequency distribution table for the above data.

Q.29. Find the most common height and the rarest height among these students?

Q.28. If  $p = 3 - 2\sqrt{2}$  then find the value of  $p^2 + 1/p^2$

OR

If  $a = \frac{2-\sqrt{5}}{2+\sqrt{5}}$ ,  $b = \frac{2+\sqrt{5}}{2-\sqrt{5}}$ , find  $a^2 - b^2$

Q.29. Find the value of  $a$ , if  $x+a$  is a factor of the polynomial,  $p(x) = x^3 + ax^2 - 2x + a + 4$

Q.30. i) For what value of  $p$ ;  $x=2, y=3$  is a solution of  $(p+1)x - (2p+3)y - 1 = 0$ ?

ii) Write the equation.

iii) Is this line passes through the point  $(-2, 3)$ ? Give justification.

Q.31. The marks scored by 750 students in an examination are given in the form of a frequency distribution table.

Marks	300-340	340-380	380-420	420-460	460-500	500-540	540-580
No of students	36	25	156	264	152	99	18

Represent this data in the form of a histogram and construct a frequency polygon.

## SECTION - D

Section D consists of 4 Questions of 05 marks each.

Q.32. If both  $(x - 2)$  and  $(x - 1/2)$  are factors of  $px^2 + 5x + r$ , show that  $p = r$ .

OR

Find the value of  $a$  &  $b$  so that  $x = 1$  and  $x = -2$  are roots of the polynomial  $x^3 - ax^2 + x - b$ .

Q.33. Find the area of an isosceles triangle having unequal side as 12 cm and each of the equal sides as 24 cm. Also, find its altitude corresponding to the unequal side.

Q.34. A right triangle with sides 6 cm, 8 cm, 10 cm is revolved about the side 8 cm. Find the volume and the curved surface of the solid so formed.

OR

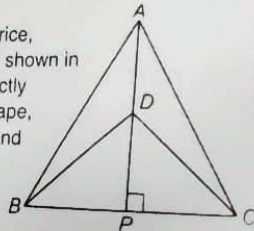
The internal and external diameters of a hollow hemispherical vessel are 21 cm and 22 cm respectively. The cost to paint 1  $\text{cm}^2$  the surface is ₹1. Find the total cost to paint the vessel all over.

Q.35. If two parallel lines are intersected by a transversal, then prove that bisectors of the interior angles form a rectangle.

## SECTION - E

Section E consists of 3 case based Questions of 04 marks each.

Q.36. A farmer in his triangular field, wants to grow wheat, rice, sugarcane and cotton. He divides his field in four parts (as shown in figure). He wants to grow wheat and rice in triangles of exactly same shape and similarly in other two triangles of same shape, he wants to grow sugarcane and cotton. In figure,  $\triangle ABC$  and  $\triangle DBC$  are two isosceles triangles and  $AP$  is perpendicular to side  $BC$ .



Based on the above information, answer the following questions :

(i) In which triangle farmer will grow wheat if he grows rice in triangle ABD ? [1]

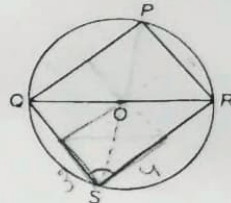
(ii) Which triangles farmer will choose for cotton and sugarcane? [1]

(iii) Explain the congruency criteria for any two triangles in the given figure. [2]

OR

If  $\angle A = 90^\circ$ , then find the values of  $\angle B$  and  $\angle C$ .

Q.37. Sunil visited a circular park with his father. He sees a triangular shaped pond PQR and also observes that three shops are situated at P, Q, and R as shown in the figure from where they have to purchase some food items according to their need. Distance between shop P and Q is 8 m, and that between shop P and R is 6 m. 'S' is the point where Sunil is standing with his father.



Based on the above information, answer the following questions :

(i) What is the measure of  $\angle QSR$  ? [1]

ii) Find the length of the longest chord of the circle. [1]

iii) Prove that  $\angle QPR$  is a right angle. [2]

OR

Find the value of  $(\angle PQR + \angle PRQ + \angle QSR)$

Q.38. It is common that Governments revise travel fares from time to time based on various factors such as inflation (a general increase in prices and fall in the purchasing value of money) on different types of vehicles like auto, Rickshaws, taxis, Radio cab etc. The auto charges in a city comprise of a fixed charge together with the charge for the distance covered. Study the following situations :-

**Situation 1 :** In city A, for a journey of 10 km, the charge paid is ₹ 75 and for a journey of 15 km, the charge paid is ₹ 110.

**Situation 2 :** In a city B, for a journey of 8km, the charge paid is ₹91 and for a journey of 14km, the charge paid is ₹145.

Based on the above information, answer the following questions :

- (i) If the fixed charges of auto rickshaw be ₹  $x$  and the running charges be ₹  $y$  km/hr, then form a pair of linear equations representing the situation1. [1]
- (ii) . If the fixed charges of auto rickshaw be ₹  $x$  and the running charges be ₹  $y$  km/hr, then form a pair of linear equations representing the situation2. [1]
- (iii) A person travels a distance of 50km. find the amount he has to pay in situation1. [2]

**OR**

What will a person have to pay for travelling a distance of 30km in situation 2?