

Time : 3 Hrs.

M.M. : 80

GENERAL INSTRUCTIONS:

1. The question paper contains five sections parts A, B, C, D and E.
2. Section A consists of 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 4 questions carrying 5 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1,1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 questions of 2 marks has been provided. -An internal choice has been provided in 2 marks questions of section E.
8. Draw neat figures wherever required. Take

SECTION - A

Section A consists of 20 question of 1 mark each.

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

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

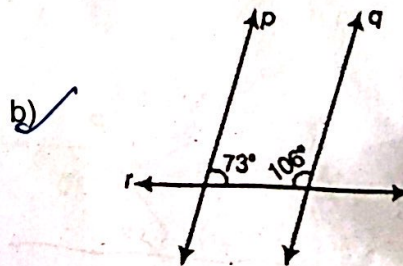
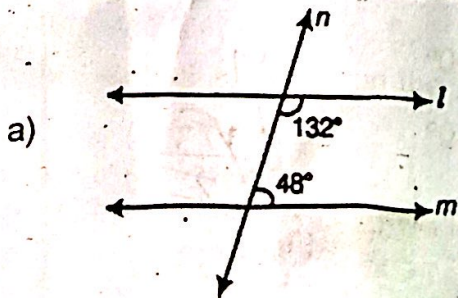
(1)

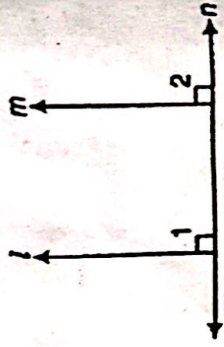
2. If $x+1$ is a factor of the polynomial $2x^2 + kx$, then $k =$

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

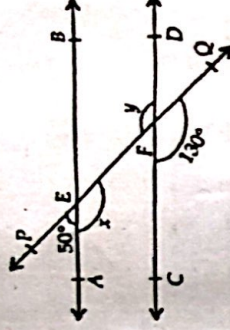
(1)

3. In the figure, which of the following pair of lines are not parallel?





c)



d)

(1)

4. How many linear equations are satisfied by $x=2$ and $y=-3$?

- a) Only one
- b) Two
- c) Three
- d) Infinitely many

(1)

5. If $\triangle ABC \cong \triangle PQR$, and $\triangle ABC$ is not congruent to $\triangle RPQ$, then which of the following is not true?

- a) $BC = PQ$
- b) $AC = PR$
- c) $AB = PQ$
- d) $QR = BC$

(1)

6. In $\triangle PQR$, is $\angle R = \angle P$ and $QR = 4\text{cm}$ and $PR = 5\text{cm}$. Then, the length of PQ is

- a) 4cm
- b) 5cm
- c) 2cm
- d) 2.5cm

(1)

7. If the area of an equilateral triangle is $9\sqrt{3}\text{ cm}^2$, then the semi-perimeter of the triangle is

- a) 9cm
- b) 24cm
- c) 12cm
- d) 10cm

(1)

8. The base and hypotenuse of a right-angle triangle are respectively 5cm and 13cm long.

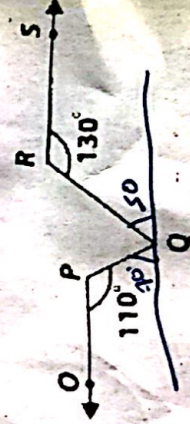
Its area is

$$\frac{\sqrt{3}}{4} \times 13$$

- a) 25cm²
- b) 28cm²
- c) 30cm²
- d) 40cm²

9. In the given figure, if $OP \parallel RS$, $\angle OPQ = 110^\circ$ and $\angle QRS = 130^\circ$, then $\angle PQR$ is equal to

- a) 40°
- b) 50°
- c) 60°
- d) 70°

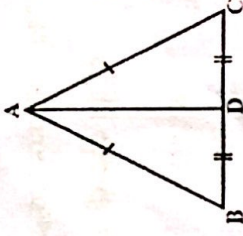


10. If (3,2) is a solution of the equation $3x - py - 7 = 0$, then the value of p is

- a) -1
 - b) 1
 - c) -13/3
 - d) 2
- (1)

11. In $\triangle ABC$, if $AB = AC$ and $BD = DC$ (see figure), then $\angle ADC =$

- a) 60°
 - b) 45°
 - c) 120°
 - d) 90°
- (1)



12. Degree of the polynomial $4x^4 + 0x^3 + 0x^2 + 5x + 7$ is

- a) 4
- b) 5
- c) 3
- d) 7

13. Rationalising factor of $(2 + \sqrt{5}) =$

- a) $2 - \sqrt{5}$
 - b) $3 + \sqrt{3}$
 - c) $\sqrt{3}$
 - d) $2 + \sqrt{2}$
- (1)

$$\frac{1}{2 + \sqrt{5}} \times \frac{2 - \sqrt{5}}{2 - \sqrt{5}}$$

$$\frac{2 - \sqrt{5}}{4 - 5} = \frac{2 - \sqrt{5}}{-1}$$

$$-2 + \sqrt{5} \quad (1)$$

14. If two parallel lines are intersected by a transversal, then each pair of corresponding angles so formed is

- a) Supplementary
 - b) Complementary
 - c) Equal
 - d) opposite
- (1)

15. Degree of the zero polynomial is

- a) 0
 - b) 1
 - c) Any natural number
 - d) Not defined
- (1)

16. Ordinate of all points on the x-axis is

- a) Any number
 - b) 1
 - c) -1
 - d) 0
- (1)

17. If $\sqrt{3}x + 5 = \sqrt{5}y$ is written in the standard form, then the value of a, b and c are

a) $a = -\sqrt{3}, b = 5, c = \sqrt{5}$ b) $a = \sqrt{3}, b = \sqrt{5}, c = 5$

c) $a = \sqrt{3}, b = -\sqrt{5}, c = 5$ d) $a = -\sqrt{3}, b = 5, c = \sqrt{5}$ (1)

18. If the coordinates of two points A and B are (10,5) and (-7,-4) respectively. Then the value of (x coordinate of A) - (y coordinate of B) is

a) -14 b) 14

c) -10 d) -12 (1)

19. Assertion: $3/5$ is terminating decimal expansion

Reason : The remainder become zero.

a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion

b) Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.

c) Assertion is true but the reason is false.

d) Assertion is false but reason is true. (1)

20. Assertion : If $(x + 1)$ is a factor of $f(x) = x^2 + ax + 2$ then $a = -3$.

Reason : If $(x - a)$ is a factor of $p(x)$, if $p(a) = 0$

a) Both Assertion (A) & Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

b) Both Assertion (A) & Reason (R) are true, but Reason (R) is not the correct explanation of Assertion(A).

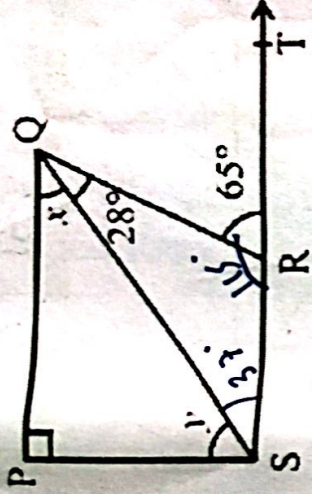
c) Assertion (A) is true but Reason (R) is false.

d) Assertion (A) is false but Reason (R) is true. (1)

SECTION - B

Section B consists of 5 questions of 2 marks each.

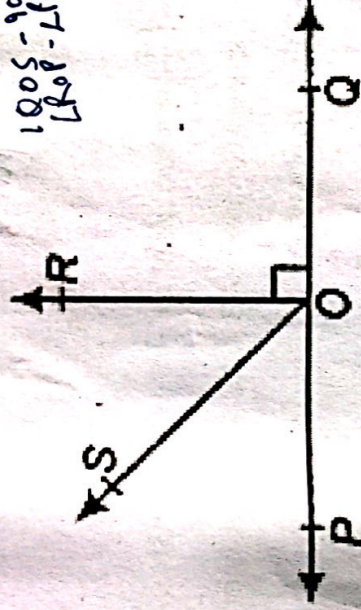
In the figure, if $PQ \perp PS$, $PQ \parallel SR$, $\angle SQR = 28^\circ$ and $\angle QRT = 65^\circ$, then find the values of x and y . (2)



OR

In figure, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that

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



Without plotting the points write in which quadrant or axis the following points lie?

a) $(-3, 3)$

b) $(0, 2)$

Find two solutions of the equation $2x + 3y = 4$

Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.

OR

If the area of an equilateral triangle is $16\sqrt{3}\text{cm}^2$, then find the perimeter of the triangle.

Determine the point which satisfies the linear equation $2x + 5y = 19$, whose ordinate is $\frac{1}{2}$ times its abscissa. (2)

$$\begin{array}{r} 180^\circ \\ -179^\circ \\ \hline 1^\circ \end{array}$$

$$\begin{array}{r} 710^\circ \\ -179^\circ \\ \hline 531^\circ \end{array}$$

$$\begin{array}{r} 170^\circ \\ -143^\circ \\ \hline 27^\circ \end{array}$$

$$\begin{array}{r} 115^\circ \\ -28^\circ \\ \hline 87^\circ \end{array}$$

$$\begin{array}{r} 115^\circ \\ +28^\circ \\ \hline 143^\circ \end{array}$$

$$\begin{array}{r} 90^\circ \\ +37^\circ \\ \hline 127^\circ \end{array}$$

$$\begin{array}{r} 90^\circ \\ +37^\circ \\ \hline 127^\circ \end{array}$$

$$\begin{array}{r} 176.10 \\ -127^\circ \\ \hline 49.10 \end{array}$$

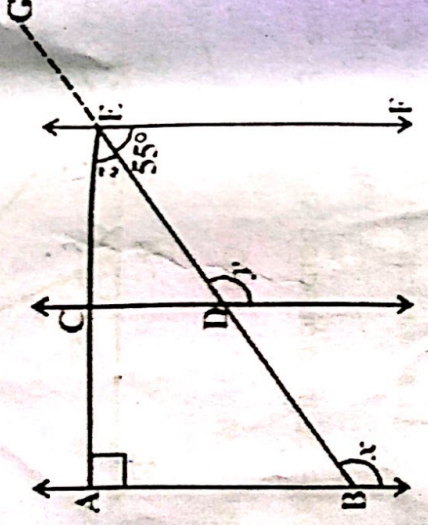
SECTION - C

Section C consists of 6 questions of 3 marks each.

26. If $\frac{5 + \sqrt{11}}{3 - 2\sqrt{11}} = x + y\sqrt{11}$, find the value of x and y . (3)

Handwritten solution:
 $\frac{5 + \sqrt{11}}{3 - 2\sqrt{11}} \cdot \frac{3 + 2\sqrt{11}}{3 + 2\sqrt{11}} = \frac{15 + 10\sqrt{11} + 3\sqrt{11} + 22}{9 - 44} = \frac{38 + 13\sqrt{11}}{-35}$

27. In the figure, $AB \parallel CD$ and $CD \parallel EF$. Also, $EA \perp AB$. If $\angle BEF = 55^\circ$, find the values of x , y and z .

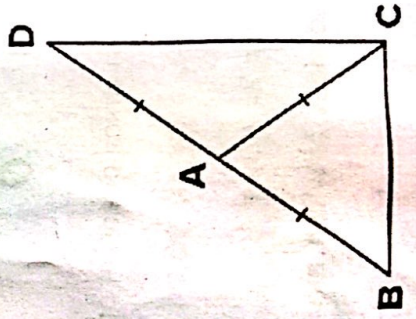


28. Factorise: $2y^3 + y^2 - 2y - 1$ (Mid- $\&$ Trial)

OR

If both $x - 2$ and $x - \left(\frac{1}{2}\right)$ are factors of $px^2 + 5x + r$, then show that $p = r$ (3)

29. $\triangle ABC$ is an isosceles triangle in which $AB = AC$. Side BA is produced to D such that $AD = AB$. Show that $\angle BCD$ is a right angle.



Handwritten solution for question 29:
 $\angle ABC = \angle ACB = x$
 $\angle BCD = 180^\circ - 2x$
 $\angle CAD = 2x$
 $\angle ACD = 180^\circ - 2x - x = 180^\circ - 3x$
 $\angle BCD = 180^\circ - 2x = 180^\circ - 3x$
 $\implies x = 60^\circ$
 $\implies \angle BCD = 180^\circ - 2(60^\circ) = 60^\circ$

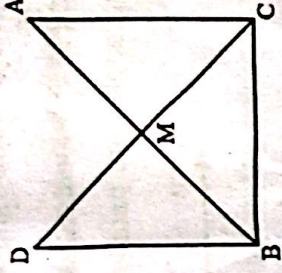
OR

In right triangle ABC , right angled at C , M is the mid-point of hypotenuse AB . C is joined to M and produced to a point D such that $DM = CM$. Point D is joined to point B (see figure). Show that

i) $\triangle AMC \cong \triangle BMD$

ii) $\angle DBC$ is a right angle

iii) $\triangle DBC \cong \triangle ACB$



30. Factorize :

$$2\sqrt{2}x^3 + 3\sqrt{3}y^3 + 5\sqrt{5} - 3\sqrt{30}xy$$

(3)

31. The perimeter of a triangle is 50 cm. One side of a triangle is 4 cm longer than the smaller side and the third side is 6 cm less than twice the smaller side. Find the area of the triangle. (3)

SECTION - D

Section D consists of 4 questions of 5 marks each

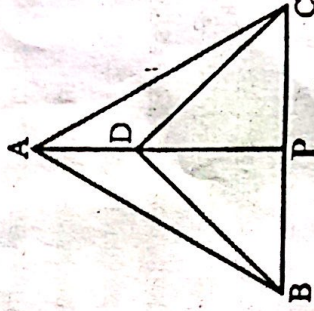
32. $\triangle ABC$ and $\triangle DBC$ are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC. If AD is extended to intersect BC at P, show that

i) $\triangle ABD \cong \triangle ACD$

ii) $\triangle ABP \cong \triangle ACP$

iii) AP bisects $\angle A$ as well as $\angle D$.

iv) AP is the perpendicular bisector of BC.



33. a) Represent $\sqrt{9.3}$ on the number line

b) Find the value of $\sqrt[4]{81^{-2}}$

OR

a) Express 23.434343..... in the form $\frac{p}{q}$ (p, q are integers, $q \neq 0$)

b) If $x = 2 + \sqrt{3}$, find the value of $x^2 + \frac{1}{x^2}$

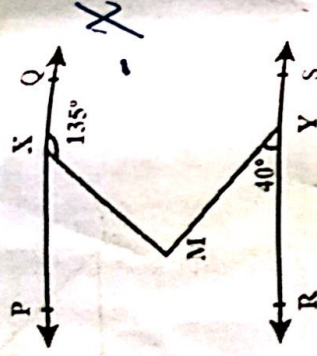
$$\frac{1}{(2+\sqrt{3})^2}$$

$$\frac{2320}{99}$$

5(3+2)

34. a) If $PQ \parallel RS$, $\angle MXQ = 135^\circ$ and $\angle MYR = 40^\circ$, find $\angle XMY$ ✕

b) If a transversal intersects two lines such that the bisectors of a pair of corresponding angles are parallel, then prove that the two lines are parallel.



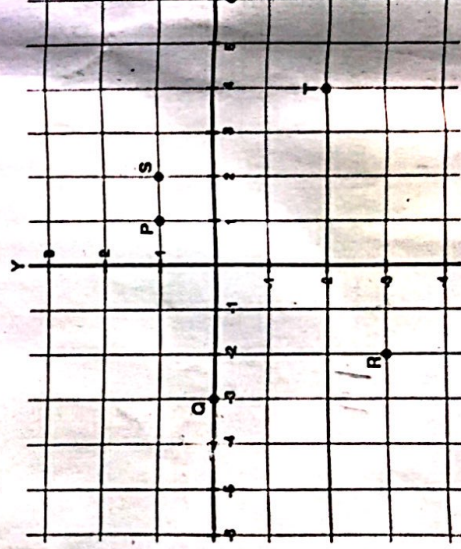
OR

- a) The two complementary angles are in the ratio 1 : 5. Find the measures of the angles
- b) It is given that $\angle XYZ = 64^\circ$ and XY is produced to point P . Draw a figure from the given information. If ray YQ bisects $\angle ZYP$, find $\angle XYQ$ and reflex $\angle QYP$ $5(2+3)$
35. Verify that : $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2} (x + y + z) [(x - y)^2 + (y - z)^2 + (z - x)^2]$ 5

SECTION - E

36. Students of class IX are on visit to Sansad Bhavan. It was an educational excursion. All the subject teachers assigned different activities to the students related to their subjects. Mathematics teacher asked the students to observe the positions of some of the members of the Parliament. The chairs in the parliament are arranged in rows and columns. Teacher fixed a point in between the house and asked the students to consider it as origin. Based on the given situation, answer the following questions:

Prime Minister's seat is fixed at a position such that its row number is 4th to the top of origin and column number is 5th to the left of the origin.



$$\frac{233}{7}$$

- a) The Prime Minister is in which quadrant? **II**
- b) If one member of a party is sitting at point T, then what is the coordinate of T and its distance from x axis.

OR

If the leader of the opposition parties are sitting at the point Q and R in the above figure, write the coordinates of Q and R and add there abscissa.

- c) The finance minister's seat is fixed at the point S, then what is the abscissa of point S? **(1+2+1)**

37. AB international School has organised a racing event for students of class IX. The students run for a distance of x metres. Raunak is the winner of the event. He finished the race in 2 mins. If his speed is represented by 'y' m/min then answer the following questions.

Use the formula $\text{Distance} = \text{speed} \times \text{time}$



- a) Represent the distance covered in the form of linear equation using the formula and write the equation in the standard form.
- b) If the speed is 300 m/minute, then find the distance covered **+ 6**

OR

If distance is 4000 m and the speed is 40 m/ min. How much time to complete the race?

- c) Find one solution of the above equation. **(1+2+1)**

38. The sides of a rectangular park are 80 m and 90 m respectively. A small triangular area of side 8m, 10m and 6m respectively is to be left out at the four corners of the park for growing flowering plants. The remaining area is to be planted with natural grass.



1. What is the semi-perimeter of the triangle for the above measurements?
2. Find the area used for growing flowering plants.

OR

If the rate of maintaining the rectangular garden is ₹75.50 per m^2 , then find the total cost of maintaining the rectangular garden.

3. What is the area of the rectangular garden?

(1+2+1)

-x-x-

$$\begin{array}{r} x \ 2y \\ \hline 96 \\ \hline x \ 2y \\ \hline 24 \\ \hline 24 \\ \hline 24 \end{array}$$