

Mathematics Paper – II
CLASS - IX
Final Term 2010-11
(Science Group)

Time allowed: 2 hours 20 minutes

Maximum Marks: 45

INSTRUCTIONS:

Please read the following instructions carefully.

1. Check your name and school information. Sign that it is correct

NAME: _____	CLASS/SEC: _____
Roll No: _____	Candidate's sign: _____
Invigilator signature _____	Checked by _____.

2. **RUBRIC:** There are **ELEVEN** questions. Answer all questions

- Q.1, Q.2, Q.4, Q.5, Q.6 & Q.10 are given with choices

3. When answering the questions:

- Read each question carefully.
- Use ONLY black ink.
- Do not use staples, paper clips, glue or correcting fluid.
- DO NOT write out side the answer box.
- Complete you answer in the allocated space only.

4. The marks for the questions are shown in brackets ().

5. You may use a simple calculator if you wish.

Either

Q.1 (a) Find the conjugate of the following complex numbers: **SLO # 1.5.3** (1 mark)

i). $(-3 + 4i)$

Solution:

Q.1 (b) Simplify the expression: **SLO # 1.4.2** (2 marks)

$$\left(\frac{x^{2m}}{x^{m-n}}\right)^{m-n} \left(\frac{x^{2n}}{x^{n-l}}\right)^{n-l} \left(\frac{x^{2l}}{x^{l-m}}\right)^{l-m}$$

Solution:

Q.1 (c) Remove the radical sign from the denominator: **SLO # 1.3.1** (1 mark)

$$\frac{3}{\sqrt{2}} \times \frac{5}{\sqrt{3}}$$

Solution:

OR

Q.1 (a) Simplify: $(x^{-3})^0 \cdot (x^{-3}y^{-4})^{-5}$ **SLO # 1.3.2** (1 mark)

Solution:

Q.1 (b) $25^{\frac{1}{2}} \times 27^{\frac{1}{3}}$ (1 mark)

Solution: _____

Q.1 (c) If $125 = 5^x$ Find the value of x: **SLO # 1.3.1** (1 mark)

Solution:

Q.1 (d) Express in the form of a complex number $a + i b$: **SLO # 1.5.2** (1 mark)

i). $(2 + 3i) + (-4 + 5i)$

Solution:

Either

Q.2 (a) A class of students is classified into game groups according to the games they like. 30 students play cricket, 22 play hockey and 12 play both cricket and hockey. With help of Venn diagram find the number of students in the class, if everyone plays at least one of these games:

SLO # 2.2.1 (2 marks)

Solution:

Q.2 (b) Find the value of: $(x - 1, y+2) = (2x + 4, -4)$: **SLO # 2.3.1** (2 marks)

Solution:

OR

Q.2 (a) If $A = \{-1, 1\}$ and $B = \{\frac{1}{2}, \frac{1}{3}\}$ then find $A \times B$.

SLO # 2.4.1

(1 mark)

Solution:

Q.2 (b) Write the set of Domain OR Range of $A \times B$:

SLO # 2.5.1

(1 mark)

Solution:

Q.2 (c) Identify the given relation is function? Also state the reason:

SLO # 2.5.3

(2 marks)

$$R_1 = \{(2, 0), (4, 3), (2, 5)\} \quad R_2 = \{(4, 0), (2, 3), (8, 0)\}$$

Solution:

Q.3 (a) Find the value of variable from the following:

SLO # 3.2.1

(1 mark)

i). $\log_a 216 = 3$

Solution:

Q.3 (b) Prove that $\log_a m n = \log_a m + \log_a n$:

SLO #3.3.1

(2 marks)

Solution:

Either

Q.4 (a) Write the type of the following polynomial with respect to their Coefficients: SLO # 4.1.2

$$\frac{1}{2}x^2 - \frac{2}{3}y + 5$$

(1 mark)

Solution:

Q.4 (b) Calculate the volume of the sphere (Volume = $\frac{4}{3} \pi r^3$) whose radius is 2 cm: SLO # 4.1.7

(1 mark)

Solution:

Q.4 (c) Find the value of $x^3 - \frac{1}{x^3}$ when $x - \frac{1}{x} = 1$: SLO # 4.2.7

(2 marks)

Solution:

OR

Q.4 (a) The product of two polynomials is $6y^3 - 11y^2 + 6y - 1$. If one polynomial is $3y^2 - 4y + 1$, find the other polynomial: SLO # 4.1.6 (2 marks)

Solution:

Q.4 (b) If $x = \frac{1}{5+2\sqrt{6}}$ find the value of $x + 1/x$: **SLO # 4.3.1** (2 marks)

Solution:

Either

Q.5 (a) Resolve into factors: **SLO # 5.1.1** (1 mark)

$$x^3 + 2x^2y - 2xy^3 - 4y^3$$

Solution:

Q.5 (b) $r^4 + 4s^4$ **SLO # 5.2.1** (2 marks)

Solution:

Q.5 (c) Use remainder theorem to find the remainder of the following expression:

$$x^3 + 6x^2 - 11x + 8$$

SLO # 5.3.1

(2 marks)

Solution:

OR

Q.5 (a) Find the factors of $x^3 + 8x^2 + 19x + 12$ by using remainder theorem: SLO # 5.4.1

(3 marks)

Solution:

Q.5 (b) Find the factors of: $x^3 - x - 2y + 8y^3$

SLO # 5.2.1

(2 marks)

Solution:

Either

Q.6 (a) Find the mean proportional in $(x - 2)$ & $(x + 3)(x^2 + x - 6)$

SLO # 6.1.2

(2 marks)

Solution:

Q.6 (b) If $a : b = c : d$, then prove that: **SLO # 6.2.1**

(2 marks)

$$\frac{2a^2 + 3b^2}{2c^2 + 3d^2} = \frac{2a^2 - 3b^2}{2c^2 - 3d^2}$$

Solution:

OR

Q.6 (a) If $\frac{a}{b} = \frac{c}{d}$ (where a, b, c & $d \neq 0$), then prove that:

SLO # 6.4.1

(2 marks)

$$\frac{a+b}{c+d} = \sqrt{\frac{a^2 - ab + b^2}{c^2 - cd + d^2}}$$

Solution:

Q.6 (b) Find the number that should be subtracted from 4, 5, 6 & 8 to obtain four proportionals:
SLO #6.3.2 (2 marks)

Solution:

Q.7 (a) Find the value of 'a' when $A = \begin{bmatrix} 2a & -4 \\ -1 & -1 \end{bmatrix}$ when $|A| = 20$ SLO # 7.5.2

(1 mark)

Solution:

Q.7 (b) If $A = \begin{bmatrix} 3 & 2 \\ 3 & 0 \end{bmatrix}$ then, Verify that $A \cdot A^{-1} = I$

SLO # 7.5.6

(2 marks)

Solution:

Q.7 (c) Apply the Cramer's rule to solve the equations:

SLO # 7.6.2

(2 marks)

$$5x - 2y = 1$$

$$2x - y = 0$$

Solution:

Q.8 (a) Marks of 25 students in Mathematics at their final examination are given below. Make a frequency distribution table by using 5 as size of class interval:

45, 50, 51, 51, 54, 53, 53, 52, 55, 57, 54, 58, 60, 62, 59, 61, 62, 64, 63, 48, 65, 53, 66, 65, 49.

SLO # 8.1.1

(2 marks)

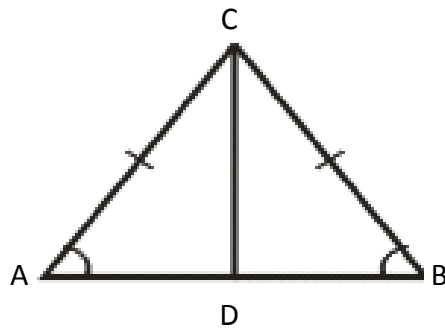
Solution:

Q.8 (b) Five Players scored 90, 46, 84, 52, and 51 runs in a cricket match. Find the variance of their score: SLO # 8.4.1

(2 marks)

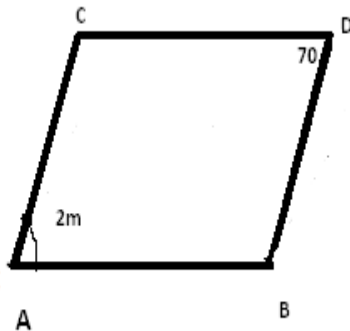
Solution:

Q.9 (a) State whether or not following triangle pair is congruent, if so, state reason: **SLO # 9.1.1**
(2 marks)



Solution:

Q.9 (b) A parallelogram is shown in which $m \angle D = 70^\circ$ find the values of $\angle A$ & $\angle C$: **SLO # 10.1.1**
(2 marks)



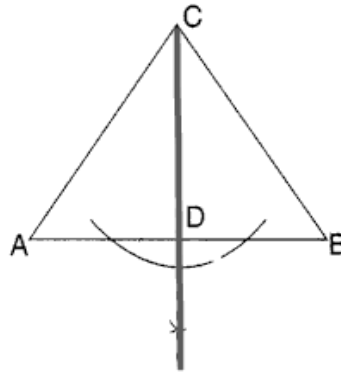
Solution:

Either

Q.10 (a) Identify the segment \overline{CD} which is shown in the geometrical construction: **SLO # 11.1.1**
(2 marks)

Define & state its properties:

(2 marks)



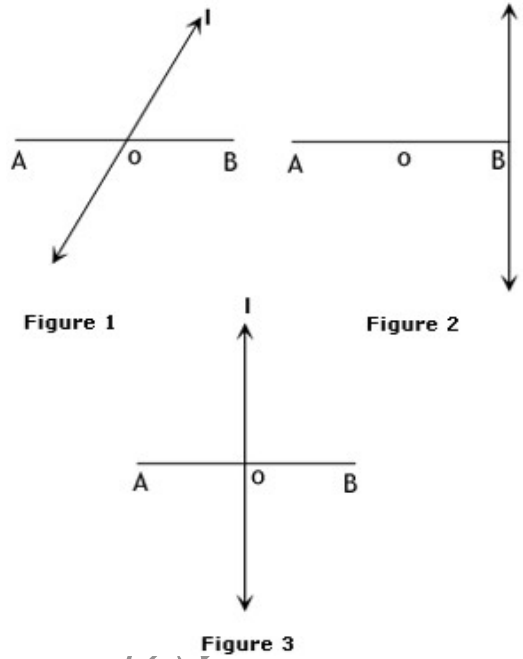
Solution:

Q.10 (b) In $\triangle ABC$, $m\angle A = 60^\circ$ and $m\angle B = 40^\circ$. Find the longest side of $\triangle ABC$. Draw the figure and state the reason to justify your applied logic: **SLO # 12.1.1** (2 marks)

Solution:

OR

Q.10 (a) Which of the following figures represents the perpendicular bisector of AB, if O is the midpoint. State reason to support your answer: **SLO #11.1.1** (1 mark)



Solution:

Q.10 (b) State the type of angles formed by the perpendicular bisector drawn to a line segment: (1 mark)

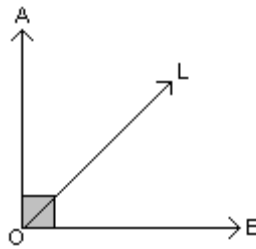
Solution:

Q.10 (c) What is the measure of the two resulting angles, if a line bisects an angle of 180° : (1 mark)

Solution:

Q.10 (d) If OA is perpendicular to OB and OL is the bisector of $\angle AOB$, find $\angle LOA$ and $\angle LOB$:

(1 mark)



Solution:

Q.11 Construct a $\triangle ABC$ in which $m \angle A = 40^\circ$, $m \angle B = 60^\circ$, and $m \angle C = 80^\circ$. Draw medians to each side and verify that they are concurrent: **SLO # 14.1.2** (4 marks)

Solution: