



Version No.			

ROLL NUMBER						

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Answer Sheet No. _____

Sign. of Candidate _____

Sign. of Invigilator _____

MATHEMATICS SSC-I

(Science Group) (Curriculum 2006)

SECTION – A (Marks 15)

Time allowed: 20 Minutes

Note: Section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. Each part carries (01) mark.

1. If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ then value of A^2 is:

A) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

B) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

C) $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$

D) $\begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}$

2. Imaginary part of $-i(3i + 2)$ is:

A) -3

B) 3

C) -2

D) 2

3. For what value of x , $\sqrt[3]{3x - 5} = \sqrt[3]{x + 1}$?

A) 3

B) 6

C) 3^3

D) 6^3

4. If $4x = \log_2 64$ then value of x is:

A) 32

B) 21

C) 16

D) -16

5. What is the value of an expression $\log_1 27x^3$?

A) 0

B) 1

C) 3

D) 4

6. Which of the following is not a polynomial?

A) $3x + 8$

B) $x^2 + 2x + \sqrt{2}$

C) $x^2 + 2x + \sqrt{2x}$

D) $x^2 + 2x + \sqrt{2}x$

7. The number of zeroes of the polynomial $x^3 + x - 3 - 3x^2$ are:

A) 0

B) 1

C) 2

D) 3

8. What is the product of two polynomials, if their HCF is $(x - 1)$ and their LCM is $(x^2 - 2x + 1)$?

A) $(x - 1)^3$

B) $(x - 1)^2$

C) $x - 1$

D) $x^3 + 1$

9. What is the solution set of $|x + 5| = -2$?

A) $\{-7, -3\}$

B) $\{7, 3\}$

C) \emptyset

D) 7

10. The perpendicular distance of the point $P(3, 4)$ from y - axis is:

A) 0

B) 3

C) 4

D) 7

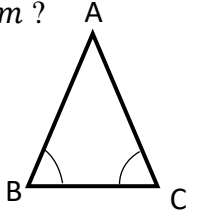
11. What is the length of $m\overline{AB}$ in ΔABC , if $m\angle B = m\angle C$, $m\overline{BC} = 3cm$ and $m\overline{AC} = 4cm$?

A) 3

B) 4

C) 5

D) 6



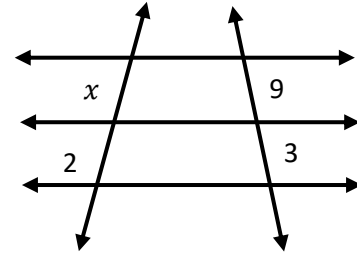
12. What is the value of x in the adjoining figure?

A) $\frac{2}{3}$

B) 3

C) 6

D) $\frac{27}{2}$



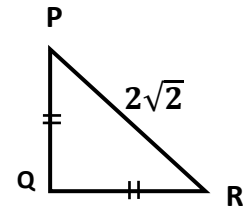
13. What is the length of \overline{QR} in ΔPQR , if $\overline{PR} = 2\sqrt{2}$ and $\overline{PQ} = \overline{QR}$?

A) 2

B) $\sqrt{2}$

C) $\sqrt{8}$

D) 4



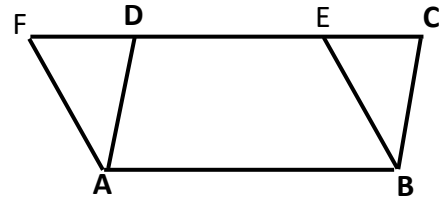
14. What is the length of \overline{AB} , if area of parallelogram $ABEF$ is $63cm^2$ and altitude of parallelogram $ABCD$ is $7cm$.

A) $3cm$

B) $9cm$

C) $18cm$

D) $27cm$



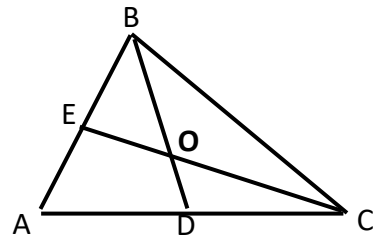
15. \overline{BD} , \overline{CE} are two medians of the triangle ABC . If $\overline{EO} = 7cm$, then what is the length of \overline{CE} ?

A) $(7 \times 1)cm$

B) $(7 \times 2)cm$

C) $(7 \times 3)cm$

D) $(7 \times 4)cm$





Federal Board SSC-I Examinations
Model Question Paper Mathematics
Science Group (Curriculum 2006)

Time allowed: 2.40 hours

Total Marks: 60

Note: Sections 'B' and 'C' comprise pages 1-2 and questions therein are to be answered on the separately provided Answer Book. Write your answers neatly and legibly.

SECTION-B (Marks 36)

Q.2 Attempt ALL parts. Each part carries (04) marks.

(i) Apply Cramer's Rule to solve $\begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 5 \end{bmatrix}$.

OR

If $A = \begin{bmatrix} -1 & 5 \\ 6 & 3 \end{bmatrix}$ then show that $AA^{-1} = I$

(ii) Find values of x and y if the product $(x - iy)(3 + 5i)$ is a conjugate of $(-6 - 24i)$.

OR

If $\frac{1}{x} = \sqrt{7} + \sqrt{6}$, then find the values of $\left(x + \frac{1}{x}\right)$, $\left(x - \frac{1}{x}\right)$ and $\left(x^2 - \frac{1}{x^2}\right)$.

(iii) Find the value of n if $\log_4(64)^{n+1} = \log_5(625)^{n-1}$

OR

Show that $\log_a b \times \log_b x = \log_a x$

(iv) Use factor theorem to factorize the cubic polynomial $x^3 + 5x^2 - 2x - 24$.

OR

Find a polynomial similar to $x^2 - 5x - 14$, such that their HCF is $(x - 7)$ and LCM is $(x^3 - 10x^2 + 11x + 70)$

(v) $\left| \frac{3x+9}{2x+1} \right| - 9 = 5$ where $x \in \mathcal{R}$

OR

Solve $\frac{2}{3} \leq \frac{1+x}{6} \leq \frac{3}{4}$ where $x \in \mathcal{R}$

(vi) Solve the following system of linear equations graphically.

$x + 2y = -4$; $2x + 4y = 8$

OR

Check whether the points $P(3, 3)$, $Q(8, 3)$ and $R(3, 12)$ are collinear or not.

(vii) Find area of the parallelogram shown in the figure.

OR

Prove that any point inside an angle, equidistant from its arms, is on the bisector of it.

(viii) Can a table 9 feet wide (legs folded) fit through a rectangular doorway 4 feet by 8 feet? Use Pythagoras theorem to decide.

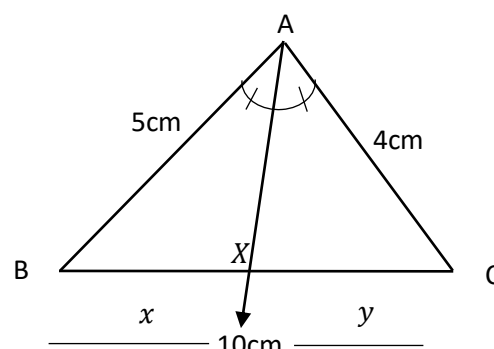
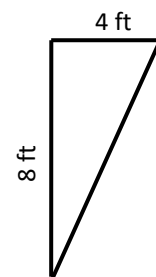
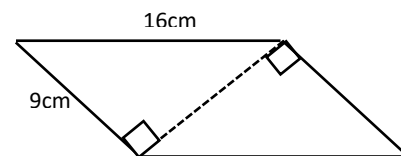
OR

Prove that in a scalene triangle, the angle opposite to the largest side is of measure greater than 60° .

(ix) In $\triangle ABC$ (shown in the figure), \overline{AX} bisects $\angle A$.

If $m\overline{AC} = 4\text{cm}$, $m\overline{AB} = 5\text{cm}$ and $m\overline{BC} = 8\text{cm}$

Find the values of x and y .



OR

Prove that if a line segment intersects two sides of a triangle in the same ratio, it is parallel to the third side.

SECTION-C (24Marks)

Note: Attempt ALL questions. Each question carries (08) marks.

Q3. If $A = \begin{bmatrix} 3 & 4 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}$ then show that $(AB)^{-1} = B^{-1}A^{-1}$.

OR

Prove that $\frac{x}{x^2-x-2} - \frac{1}{x^2+5x-14} - \frac{2}{x^2+8x+7} = \frac{x+3}{x^2+5x-14}$

Q4. From a point, outside a line, the perpendicular is the shortest distance from the point to the line.

OR

A line parallel to one side of a triangle and intersecting the other two sides divides them proportionally.

Q5. Construct a square equal in area to a rectangle whose adjacent sides are 4cm and 2cm.
Calculate area of the square and compare it with the area of rectangle.

OR

Construct a triangle ABC with the given data $m\angle A = 45^\circ$, $m\angle B = 75^\circ$, $m\overline{AB} = 6cm$
and draw its altitude.

Federal Board of Intermediate and Secondary Education

SSC-I Examinations

Model Question Paper Mathematics

(Curriculum 2006)

Alignment of Questions with Student Learning Outcomes

Sec-A Q1	Contents and Scope	Student Learning Outcomes *	Cognitive Level **	Allocated Marks
i	1.4 Multiplication of Matrices	ii) Multiply two (or three) matrices.	K	1
ii	2.5 Complex Numbers 2.6 Basic Operations on Complex Numbers	ii) Recognize a as real part and b as imaginary part of $z = a + ib$. Carryout basic operations (i.e., addition, subtraction, multiplication and division) on complex numbers.	U	1
iii	7.1 Linear Equations	iii) Reduce equations, involving radicals to simple linear form and find their solutions.	U	1
iv	3.2 Logarithm	i) Define logarithm of a number to the base a as the power to which a must be raised to give the number i.e. ($a^x = y \Leftrightarrow \log_a y = x$, $a > 0, y > 0$ and $a \neq 1$)	U	1
v	3.2 Logarithm	i) Define logarithm of a number to the base a as the power to which a must be raised to give the number i.e. ($a^x = y \Leftrightarrow \log_a y = x$, $a > 0, y > 0$ and $a \neq 1$)	K	1
vi	4.1 Algebraic Expressions	iii) Examine whether a given algebraic expression is a <ul style="list-style-type: none"> • Polynomial or not, • Rational expression or not. 	U	1
vii	5.2 Remainder Theorem and Factor Theorem	iii) Define zeros of a polynomial.	K	1
viii	6.1 Highest Common Factor and Least Common Multiple	iii) Know the relationship between HCF and LCM.	K	1
ix	7.2 Equation involving Absolute Value	ii) Solve the equation, involving variable.	U	1
x	14.1 Cartesian plane and Linear Graph	vii) Construct a table for pairs of values satisfying a linear equation in two variables.	U	1
xi	17.1 Congruent Triangles	ii) If two angles of a triangle are congruent then the sides opposite to them are also congruent.	A	1
xii	18.1 Parallelograms and Triangles	v) If three or more parallel lines make congruent intercepts on a transversal, they also intercept congruent segments on any other line that cuts them.	U	1
xiii	22.1 Pythagoras' Theorem	i) In a right-angled triangle, the square of the length of hypotenuse is equal to the sum of the squares of the lengths of the other two sides.	A	1
xiv	23.1 Theorems Related with Area.	i) Parallelogram on the same base and lying between the same parallel lines (or of the same altitude) are equal in area.	A	1
xv	29.1 Construction of Triangle	ii) Draw perpendicular bisectors of a given triangle and verify their concurrency.	U	1

Sec-B Q2	Contents and Scope	Student Learning Outcomes *	Cognitive Level **	Allocated Marks
i	1.6 Solution of simultaneous linear equations. OR 1.5 Multiplicative inverse of a matrix.	Solve a system of two linear equations and related real-life problems in two unknowns using • Cramer's Rule. OR (v) Find multiplicative inverse of a non-singular matrix A and verify that $AA^{-1} = I = A^{-1}A$ where I is an identity matrix.	U+U	4+4
ii	2.5 Complex Numbers 2.6 Basic Operations on Complex numbers OR 4.4 Rationalization	iii) Define conjugate of a complex number. iv) Know the condition for equality of complex numbers. Carryout basic operations on complex numbers. OR Explain rationalization (with precise meaning) of real numbers of the types $\frac{1}{a+b\sqrt{x}}$, $\frac{1}{\sqrt{x}+\sqrt{y}}$ and their combinations where x and y are natural numbers and a and b are integers.	K+U	4+4
iii	2.3 Radicals and Radicands OR 3.4 Laws of Logarithms	iii) Transform an expression given in radical form to an exponential form and vice versa. OR Prove the following law of logarithms. $\log_a m \log_m n = \log_a n$	A+A	4
iv	5.3 Factorization of a cubic polynomial. OR 6.1 Highest Common Factor and Least Common Multiple	Use Factor Theorem to factorize a cubic polynomial. OR iii) Know the relationship between HCF and LCM.	U+K	4
v	7.2 Equation involving Absolute Value OR 7.4 Solving Linear Inequalities.	ii) Solve the equation, involving variable. OR Solve Linear inequalities with rational coefficients.	U+U	4
vi	14.3 Graphic Solution of Equations in Two variables OR 15.2 Collinear Points	Solve simultaneous linear equations in two variables using graphical method. OR ii) Use distance formula to show that (given two or more) points are collinear.	U+K	4
vii	18.1 Parallelograms and Triangles OR 19.1 Line Bisectors and Angle Bisectors	i) In a parallelogram: • the opposite sides are congruent, • the opposite angles are congruent, • the diagonals bisect each other. OR v) Any point inside an angle, equidistant from its arms, is on the bisector of it.	U+K	4
viii	22.1 Pythagoras' Theorem OR 20.1 Sides and Angles of a Triangle	i) In a right-angled triangle, the square of the length of hypotenuse is equal to the sum of the squares of the lengths of the other two sides. OR i) If two sides of a triangle are unequal in length, the longer side has an angle of greater measure opposite to it.	A+A	4
ix	21.1 Ratio and Proportion OR 21.1 Ratio and Proportion	ii) The internal bisector of an angle of a triangle divides the side opposite to it in the ratio of the lengths of the sides containing the angle. OR ii) If a line segment intersects the two sides of a triangle in the same ratio, then it is parallel to the third side.	U+K	4

Sec-C	Contents and Scope	Student Learning Outcomes *	Cognitive Level **	Allocated Marks
Q 3	1.5 Multiplicative Inverse of a Matrix OR 6.2 Basic Operations on Algebraic Fractions	vii) Verify the result $(AB)^{-1} = B^{-1}A^{-1}$ OR Use highest common factor and least common multiple to reduce fractional expressions involving +, -, ×, ÷	U+U	8
Q 4	20.1 Sides and Angles of a Triangle OR 21.1 Ratio and Proportion	iv) From a point, out-side a line, the perpendicular is the shortest distance from the point to the line. OR i) A line parallel to one side of a triangle, intersecting the other two sides, divides them proportionally.	K+K	8
Q 5	29.2 Figures with Equal Areas OR 29.1 Construction of Triangle	iii) Construct a square equal in area to a given rectangle. OR i) Construct a triangle having given: • one side and two of the angles ii) Draw: • altitudes, of a given triangle and verify their concurrency.	U+A	8

*** Student Learning Outcomes**

National Curriculum for Mathematics Grades I-XII, 2006

****Cognitive Level**

K: Knowledge

U: Understanding

A: Application

Federal Board of Intermediate and Secondary Education
ASSESSMENT GRID FOR MODEL QUESTION PAPER

Level: SSC-I

Subject: Mathematics

Curriculum: 2006

Examination: Annual 2024

Units	8. Quadratic Equations	9. Theory of Quadratic Equations	10. Variations	11. Partial Fractions	12. Sets and Functions	13. Basic Statistics	16. Introduction to Trigonometry	24. Projection of a Side of a Triangle	25. Chords of a Circle	26. Tangent to a Circle	27. Chords and Arcs	28. Angle in a Segment of a Circle	30. Practical Geometry-Circles	Total marks for each assessment objective
Knowledge based	1 i (1)	1 ii (1)	2 iii (4) 4 (8)		1 xv (1) 2 iv (4) 2 iv (4)		1 viii (1)			2 ix (4)	5 (8)		2 ix (4)	40 30%
Comprehension/ Understanding based	2 i (4) 2 i (4)	1 iv (1) 2 ii (4) 2 ii (4) 3 (8)	1 iii (1) 2 iii (4) 4 (8)	1 v (1) 3 (8)	1 vi (1)	1 vii (1) 2 v (4) 2 v (4)	1 ix (1) 1 xi (1) 2 vi (4) 2 vi (4)						1 x (1)	68 50%
Application based							2 vii (4) 2 vii (4) 5 (8)	1 xii (1)	1 xiii (1) 2 viii (4)	2 viii (4)	1 xiv (1)			27 20%
Total marks for each unit	09	18	25	09	10	09	11	16	01	09	12	01	05	135

- 1, 2, 3 etc. stands for question numbers
- i, ii, iii etc. stands for part of question numbers
 - (1), (2), (3) etc. stands for marks of question papers