

**RUBRIC: SSC 1<sup>st</sup> ANNUAL EXAMINATION 2023**  
**SUBJECT: MATHEMATICS - II (HA)**

Q.# /Part #	Criteria	Level-I (Marks)	Level-II (Marks)	Level-III (Marks)	Level-IV (Marks)	Level-V (Marks)	Level-VI (Marks)
2(i)	Reducing the given equation in quadratic form, finding values of a, b, c and solving with the help of quadratic formula.	(a). Correctly writing the equation in standard form. (1)	Partially correct response (0.5)	Wrong answer (0)			
		(b). Finding the correct values of a, b and c. (0.5)	Wrong answer (0)				
		(c). Correctly applying the quadratic formula and finding two correct values of x. (2.5)	Correctly applying the quadratic formula and finding one correct value of x. (1.5)	Correctly applying the quadratic formula and finding two incorrect values of x. (0.5)	Applying the incorrect quadratic formula (0)		
2(ii)	Solving the exponential equation.	Correctly writing the equation in quadratic form in new variable and finding the two correct roots. (2)	Correctly writing the equation in quadratic form in new variable and finding one correct root. (1.5)	Correctly writing the equation in quadratic form in new variable and finding the two incorrect roots. (1)	Partially correct response (0.5)	Wrong answer (0)	
		Correctly converting the new variable in x and finding two correct values of x. (2)	Correctly converting the new variable in x and finding one correct value of x. (1.5)	Correctly converting the new variable in x and finding two incorrect values of x. (1)	Partially correct response (0.5)	Wrong answer (0)	
2(iii)	Finding sum, difference and reciprocal square sum of the roots.	(a). Correctly finding sum of the roots. (1)	(Wrong answer (0)	Wrong answer (0)			
		(b). Correctly finding product of roots. (1)	Wrong answer (0)				
		(c). Correctly converting the expression in the form of sum and product of roots <b>AND</b> Simplifying for the correct answer.	Correctly converting the expression in the form of sum and product of roots <b>AND</b> Showing partially correct simplification.	Correctly converting the expression in the form of sum and product of roots <b>AND</b> showing incorrect simplification.	Partially correct response (0.5)	Wrong answer (0)	

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		(2)	(1.5)	(1)			
2(iv)	Finding the condition that the roots are equal.	Correctly converting the given equation into standard form. (2)	Partially correct response. (1)	Wrong answer (0)			
		Correctly stating the discriminant <b>AND</b> setting $DISC = 0$ (1)	Correctly stating the discriminant <b>OR</b> setting $DISC = 0$ (0.5)	Wrong answer (0)			
		Correctly finding the condition required. (1)	Partially correct response. (0.5)	Wrong answer (0)			
2(v)	Proving $x: y = u: v$ by using the CD theorem.	Correctly applying the CD theorem on L.H.S <b>AND</b> R.H.S (2)	Correctly applying the CD theorem on L.H.S <b>OR</b> R.H.S (1)	Partially correct response (0.5)	Wrong answer (0)		
		Correctly simplifying <b>AND</b> proving the result. (2)	Correctly simplifying <b>OR</b> proving the result. (1)	Partially correct response (0.5)	Wrong answer (0)		
2(vi)	Finding the unknowns by joint variation.	(a) Correctly expressing the joint variation and writing the equation connecting $y, x$ and $z$ . (2)	Correctly expressing the joint variation <b>OR</b> writing the equation connecting $y, x$ and $z$ . (1)	Partially correct response (0.5)	Wrong answer (0)		
		(b) Correctly finding the value of constant $k$ . (1)	Partially correct response (0.5)	Wrong answer (0)			
		(c) Correctly finding the value of $y$ . (1)	Partially correct response (0.5)	Wrong answer (0)			
2(vii)	Resolving the expression into partial fractions.	Correctly stating the given expression as an identity. (1)	Partially correct response (0.5)	Wrong answer (0)			
		Correctly finding values of all three unknown constants. (3)	Correctly finding values of any two unknown constants. (2)	Correctly finding values of any one unknown constant. (1)	Partially correct response (0.5)	Wrong answer (0)	

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2(viii)	Finding $A \times A$ , developing a relation R and writing domain and range of R.	(a)Correctly finding $A \times A$ (1.5)	Partially correct response (1)	Wrong answer (0)			
		(b)Correctly developing relation R. (1.5)	Partially correct response (1)	Wrong answer (0)			
		(c)Correctly finding domain of R <b>AND</b> range of R. (1)	Correctly finding domain of R <b>OR</b> range of R. (0.5)	Wrong answer (0)			
2(ix)	Verifying the trigonometric identity.	Correctly taking L.C.M on L.H.S (2)	Partially correct response. (1)	Wrong answer (0)			
		Correctly applying the trigonometric identity <b>AND</b> correctly proving. (2)	Either correctly applying the trigonometric identity <b>OR</b> correctly proving. (1)	Partially correct response (0.5)	Wrong answer (0)		
2(x)	Calculating length of $\overline{BC}$ by using the given theorem.	Correctly finding the value of $ AD $ . (2)	Partially correct response (1)	Wrong answer (0)			
		Correctly finding the value of $ BC $ . (2)	Partially correct response (1)	Wrong answer (0)			
2(xi)	Proving that perpendicular from the center of a circle on a chord bisects it. <b>(Award zero marks without /wrong figure)</b>	Correctly writing all four sections Figure, Given, To Prove and Construction. (2)	Any three correctly shown aspects. (1.5)	Any two correctly shown aspects. (1)	Any one correct shown aspect. (0.5)	No correct aspect. (0)	
		Correctly writing the Proof section (correct Statements and correct Reasons) (2)	Writing correct Statements with partially correct Reasons. (1.5)	Writing partially correct Statements <b>AND</b> partially correct Reasons. (1)	Partially correct response. (0.5)	Writing the Proof section wrong. (0)	

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2(xii)	Finding Harmonic Mean from the grouped data.	(a). Correctly finding Mid value column ( $x$ ) <b>AND</b> $\Sigma f$ . (1.5)	Correctly finding Mid value column ( $x$ ) <b>AND</b> incorrect $\Sigma f$ . (1)	Finding incorrect Mid value column ( $x$ ) <b>AND</b> correct $\Sigma f$ . (0.5)	Wrong answer (0)		
		(b). Correctly finding the $\frac{f}{x}$ column and $\Sigma \left(\frac{f}{x}\right)$ . (1.5)	Correctly finding $\left(\frac{f}{x}\right)$ column <b>AND</b> incorrect $\Sigma \left(\frac{f}{x}\right)$ . (1)	Finding incorrect $\left(\frac{f}{x}\right)$ column <b>AND</b> correct $\Sigma \left(\frac{f}{x}\right)$ . (0.5)	Wrong answer (0)		
		(c). Correctly finding the value of H.M. (1)	Partially correct response (0.5)	Wrong answer (0)			
2(xiii)	Finding the length of chord.	Correctly applying the Pythagoras' Theorem <b>AND</b> Finding the correct value of $x$ . (2)	Correctly applying the Pythagoras' Theorem <b>AND</b> Finding the partially correct value of $x$ . (1.5)	Correctly applying the Pythagoras' Theorem <b>AND</b> Finding the incorrect value of $x$ . (1)	Partially correct response (0.5)	Wrong answer (0)	
		Correctly applying the property of a chord to a circle <b>AND</b> finding the correct length of the chord $\overline{AB}$ . (2)	Correctly applying the property of a chord to a circle <b>AND</b> finding the incorrect length of the chord $\overline{AB}$ . (1)	Partially correct response (0.5)	Wrong answer (0)		
2(xiv)	Drawing a circle passing through two points.	Correctly constructing a circle of radius 5 cm. (2)	Partially correct construction (1)	Wrong construction (0)			
		Correctly locating two points on the circle 6 cm apart. (2)	Partially correct construction (1)	Wrong construction (0)			

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3	Solving the given system of equations.	Correctly generating a linear equation from the given system of quadratic equations. (2)	Partially correct response (1)	Wrong answer (0)			
		Correctly developing a linear-quadratic system of equations. (2)	Partially correct response (1)	Wrong answer (0)			
		Correctly solving the linear-quadratic system with two correct roots (ordered pairs) (4)	Correctly solving the linear-quadratic system with one correct root (ordered pair). (2)	Partially correct solution of the linear-quadratic system. (1)	Wrong solution (0)		
4	Verifying the De-Morgan's Laws.	(i)Correctly finding $(A \cup B), (A \cup B)', A' \text{ and } B', A' \cap B'$ (4)	Any three correctly shown aspects. (3)	Any two correctly shown aspects. (2)	Any one correctly shown aspect. (1)	No correct aspect (0)	
		(ii)Correctly finding $(A \cap B), (A \cap B)', A' \text{ and } B', A' \cup B'$ (4)	Any three correctly shown aspects. (3)	Any two correctly shown aspects. (2)	Any one correctly shown aspect. (1)	No correct aspect (0)	
5	Finding height of the cliff.	Correctly describing the data in figure. (2)	Partially correct (1)	Wrong answer (0)			
		Correctly developing a relation between distance between man and cliff elevating $45^\circ$ . (2)	Developing a partially correct relation between distance between man and cliff elevating $45^\circ$ . (1)	Wrong answer (0)			
		Correctly developing a relation between distance between man and cliff elevating $30^\circ$ . (2)	Developing a partially correct relation between distance between man and cliff elevating $30^\circ$ . (1)	Wrong answer (0)			
		Correctly finding height of the cliff.	Partially correct response	Wrong answer (0)			

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		(2)	(1)				
6	Proving that measure of a central angle of a minor arc of a circle is double that of the angle subtended by the corresponding major arc. <b>(Award zero marks without /wrong figure)</b>	Correctly writing all four sections Figure, Given, To Prove and Construction. (4)	Any three correctly shown aspects. (3)	Any two correctly shown aspects. (2)	Any one correctly shown aspect. (1)	All wrong aspects. (0)	
		Correctly writing the Proof section (correct Statements and correct Reasons) (4)	Writing correct Statements with partially correct Reasons (3)	Writing Partially correct Statements AND partially correct Reasons (2)	Partially correct response. (1)	Writing the Proof section incorrectly (0)	
7	Circumscribing and inscribing circles about the given square and finding the radii.	Correctly constructing a square of side 8cm AND correctly finding center by drawing diagonals. (2)	Correctly constructing a square of side 8cm OR correctly finding center by drawing diagonals. (1)	Partially correct construction. (0.5)	Wrong construction (0)		
		Correctly constructing circum-circle AND correctly measuring its radius. (2)	Correctly constructing circum-circle OR correctly measuring its radius. (1)	Partially correct construction. (0.5)	Wrong construction (0)		
		Correctly constructing in-circle AND correctly measuring its radius. (2)	Correctly constructing in-circle OR correctly measuring its radius. (1)	Partially correct construction. (0.5)	Wrong construction (0)		
		Correctly writing the construction steps. (2)	Partially correct construction steps (1)	No construction steps (0)			

**Note: All the markers must know the solutions of all the question items of the question paper before starting marking.**