RUBRIC: SSC 1st ANNUAL EXAMINATION 2023
SUBJECT: MATHEMATICS - II (L)

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 applying the formula **AND** correctly finding sum of the roots. (1)	Correctly applying the formula **OR** correctly finding sum of the roots. (0.5)	Wrong response (0)			
		(b). Correctly applying the formula **AND** correctly finding product of the roots (1)	Correctly applying the formula **OR** correctly finding product of the roots. (0.5)	Wrong response (0)			
		(c). Correctly converting	Correctly converting	Correctly converting	Partially correct	Wrong	

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		the expression in the form of sum and product of roots **AND** Simplifying for the correct answer. (2)	the expression in the form of sum and product of roots **AND** Showing partially correct simplification. (1.5)	the expression in the form of sum and product of roots **AND** showing incorrect simplification. (1)	response (0.5)	answer (0)	
$2(iv)$	Proving the given equation by using properties of cube roots of unity.	Correctly reducing in two multiplicative factors **AND** Correctly applying the properties of cube roots of unity. (2)	Correctly reducing in two multiplicative factors **AND** Applying the incorrect properties of cube roots of unity (1)	Partially correct response (0.5)	Wrong answer (0)		
		Correctly simplifying **AND** proving for R.H.S. (2)	Correctly simplifying **AND** proving incorrectly for R.H.S. (1)	Partially correct response (0.5)	Wrong answer (0)		
$2(v)$	Proving the equation by k-method	Correctly finding the values of a and c in terms of k and correctly substituting the values in the given equation. (2)	Either correctly finding the values of a and c in terms of k **OR** correctly substituting the values in the given equation (1)	Partially correct response (0.5)	Wrong answer (0)		
		Correctly simplifying the equation and proving it for R.H.S. (2)	Correctly simplifying the equation **AND** proving incorrectly (1)	Partially correct response (0.5)	Wrong answer (0)		
$2(vi)$	Finding the unknowns by joint variation	Correctly expressing the joint variation and writing the equation connecting I, E and R (2)	Correctly expressing the joint variation **OR** writing the equation connecting I, E and R (1)	Partially correct response (0.5)	Wrong answer (0)		
		Correctly finding the values of constant k and of I. (2)	Correctly finding the value of k **AND** finding partially correct value of I.	Correctly finding the value of k **AND** finding incorrect value of I. (1)	Partially correct response (0.5)	Wrong answer (0)	

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			(1.5)				
$2(vii)$	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)	
$2(viii)$	Finding Arithmetic Mean by step deviation method.	Correctly finding Mid value column (x), deviation column(D), $\sum f$ and $\sum fD$. (2)	Correctly finding any three aspects. (1.5)	Correctly finding any two aspects. (1)	Correctly finding any one aspect. (0.5)	Wrong answer (0)	
		Correctly applying the formula **AND** finding the correct value of A.M. (2)	Correctly applying the formula **AND** finding the partially correct value of A.M. (1.5)	Correctly applying the formula **AND** finding the incorrect value of A.M. (1)	Partially correct response (0.5)	Wrong answer (0)	
$2(ix)$	Finding the length of chord.	Correctly applying the Pythagoras' Theorem **AND** finding the correct value of x. (3)	Correctly applying the Pythagoras' Theorem **AND** Finding the partially correct value of x. (2)	Correctly applying the Pythagoras' Theorem **AND** Finding the incorrect value of x. (1)	Wrong answer (0)		
		Correctly finding the length of chord $\overline{AB}$. (1)	Wrong answer (0)				
$2(x)$	Finding $X \times X$, developing a relation R and writing domain and range of R.	(a). Correctly finding $X \times X$ (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 **AND** range of R.	Correctly finding domain of R **OR** range of R.	Wrong answer (0)			

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		(1)	(0.5)				
$2(x\text{i})$	Verifying the trigonometric identity.	Correctly expressing $\tan\theta$ and $\cot\theta$ in the ratio of $\sin\theta$ and $\cos\theta$ (2)	Either correctly expressing $\tan\theta$ **OR** $\cot\theta$ in the ratio of $\sin\theta$ and $\cos\theta$ (1)	Wrong answer (0)			
		Correctly applying LCM and simplifying to prove the identity (2)	Either correctly applying LCM **OR** simplifying to prove the identity. (1)	Partially correct response (0.5)	Wrong answer (0)		
$2(xii)$	Calculating length of $\overline{BC}$ by using the given theorem.	Correctly finding the value of x. (2)	Partially correct response (1)	Wrong answer (0)			
		Correctly finding the value of $\lvert BC\rvert$. (2)	Partially correct response (1)	Wrong answer (0)			
$2(xiii)$	Proving that two tangents drawn to a circle from point outside it are equal in length. **(Award zero marks without /wrong figure)**	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 **AND** partially correct Reasons. (1)	Partially correct response. (0.5)	Writing the Proof section wrong. (0)	
$2(xiv)$	Circumscribing a square about a circle.	Correctly constructing a circle of radius 5 cm. (1)	Partially correct response (0.5)	Wrong construction (0)			
		Correctly constructing four tangents at the diameters. (2)	Correctly constructing three tangents at the diameters. (1.5)	Correctly constructing two tangents at the diameters. (1)	Correctly constructing one tangent at the diameter. (0.5)	Wrong construction (0)	
		Correctly circumscribing a square.	Partially correct response	Wrong construction (0)			

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		(1)	(0.5)				
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	Finding the distance between two men.	Correctly describing the data in figure. (2)	Partially correct (1)	Wrong answer (0)			
		Correctly finding distance between man and tower elevating $30°$ (2)	Finding partially correct distance between man and tower elevating $30°$. (1)	Wrong answer (0)			
		Correctly finding distance between man and tower elevating $20°$. (2)	Finding partially correct distance between man and tower elevating $20°$. (1)	Wrong answer (0)			
		Correctly finding distance between men (2)	Partially correct response (1)	Wrong answer (0)			
5	Verifying the De-Morgan's Laws.	(i)Correctly finding $(A \cup B), (A \cup B)',$ $A' and B', A' \cap B'$ (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 $(A \cap B),\ (A \cap B)',$	Any three correctly shown aspects.	Any two correctly shown aspects.	Any one correctly shown aspect.	No correct aspect	

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		$A'andB', A' \cup B'$ (4)	(3)	(2)	(1)	(0)	
6	Proving that if two chords of a circle are congruent, then they will be equidistant from the center. **(Award zero marks without /wrong figure)**	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	Drawing two common tangents to a pair of circles 10 cm a part.	Correctly drawing a line segment of measure 10 cm **AND** correctly drawing two circles 10 cm apart. (2)	Correctly drawing a line segment of measure 10 cm **AND** correctly drawing any one circle. (1.5)	Drawing a line segment partially correct **AND** drawing both circles incorrectly. (1)	Wrong construction (0)		
		Correctly drawing two diameters ⊥ to the ends of the line segment. (2)	Correctly drawing one diameter ⊥ to the end of the line segment. (1)	Partially correct construction. (0.5)	Wrong construction (0)		
		Correctly drawing two common tangents at the end of the diameters. (2)	Correctly drawing one common tangent to any one end of the line segment. (1)	Partially correct construction. (0.5)	Wrong construction (0)		
		Correctly writing the construction steps. (2)	Writing construction steps partially correct. (1)	Wrong answer. (0)			

<u>Note:</u> All the markers must know the solutions of all the question items of the question paper before starting marking.