

ASSESSMENT FRAMEWORK AND MODEL QUESTION PAPER

MATHEMATICS

Grade IX

NATIONAL CURRICULUM

2022-23



50% MCQs & 50% Descriptive
INCLUSIVE SCHEME OF STUDIES 2024



FEDERAL BOARD OF
INTERMEDIATE AND
SECONDARY EDUCATION,
ISLAMABAD



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**FEDERAL BOARD OF INTERMEDIATE AND
SECONDARY EDUCATION**

H-8/4, ISLAMABAD



**ASSESSMENT FRAMEWORK
FOR
MATHEMATICS GRADE-IX
CURRICULUM 2022-23
SCHEME OF STUDIES 2024**

ACKNOWLEDGEMENT

It is a great honour that we, at the Federal Board of Intermediate and Secondary Education, have developed the Assessment Framework (AF) for the subject of Mathematics for Grade-IX. The primary objective of the AF is to optimize the current curriculum 2022-23. This comprehensive framework has been crafted meticulously by subject matter and assessment experts who conducted an in-depth review of all learning outcomes for Grade-IX Mathematics curriculum. They evaluated these outcomes in terms of their scope, cognitive level, and progression across the grade.

This significant undertaking was the result of a series of extensive meetings and collaborative efforts of the subject and assessment experts. Their dedication and expertise have been instrumental in bringing this framework to fruition.

The Assessment Framework will serve as a guiding document for students, teachers and paper setters. Students will receive clear directions for preparing themselves for the annual examination. Similarly, teachers will use it as a guide to understand what to teach in class and to prepare students for the final examinations accordingly. Similarly paper setters will also seek guidance from this document.

Following subject as well as assessment experts/committee members remained constantly engaged in the development of the AF:

1. Dr. Khalid Mehmood, Area Education Officer, Nilore Sector, Islamabad
2. Dr Javed Iqbal, Principal, OPF Boys College, H-8, Islamabad
3. Mr. Anwar ul Haq, Vice Principal, Bahria College, Naval Complex, E-8, Islamabad
4. Mrs. Zohra Yousaf, HOD Math, Army Public School & College, Hamza Camp Rawalpindi
5. Dr. Tahir Ullah, Assistant Professor, Islamabad Model College for Boys, G-10/4, Islamabad
6. Ms. Memoni Tabbasam, Subject Experts, APSAC Secretariat Rawalpindi

The whole work was successfully accomplished under the able supervision and guidance of Dr. Ikram Ali Malik, Chairman, FBISE and due to the hard work and dedication of the staff of Research Section of FBISE, in particular, Syed Zulfiqar Shah, Deputy Secretary, Research and Academics who played a pivotal and leading role in finalizing the Assessment Framework.

MIRZA ALI
Director
FBISE, Islamabad

ASSESSMENT FRAMEWORK FOR MATHEMATICS GRADE-IX, CURRICULUM 2022-23

To ensure clarity and precision in assessment, the learning outcomes have been categorized into two distinct groups: formative and summative. This classification helps in effectively measuring student progress and understanding. Each Student learning outcome (SLO) has been carefully marked as either formative or summative within the newly developed Assessment Framework. SLOs of Summative Assessment Format will be part of the Final Examination while SLOs of Formative Assessment will although be part of the teaching-learning activity but they will **NOT** be part of Final Examinations. Estimated cognitive levels i.e Knowledge (K), Understanding (U) and Application (A) of all the SLOs have also been indicated. It may be noted that all the higher cognitive levels have been collectively accumulated in the cognitive level of 'Application'. In subjects involving Practicals (Lab work), it has been mentioned categorically whether an SLO is summative for theory or summative for Practical Based Assessment (PBA). If an SLO is summative for PBA, it means that Laboratory work is required in the teaching-learning activity and it will be part of the Practical Examination/ Practical Based Assessment.

The Assessment Framework will act as a comprehensive guide for students, teachers and paper setters. Students will have clear instructions on how to prepare for the annual examinations. Teachers will use the framework to understand the curriculum and effectively prepare their students for the final examination. Additionally, paper setters will refer to this document for guidance in setting examination papers.

A model question paper has also been developed to provide a clear structure and format for upcoming examinations. The model question paper ensures consistency and fairness, offering students a comprehensive understanding of what to expect in their examinations. By aligning the paper with the Student Learning Outcomes (SLOs) of the curriculum, we ensured that the questions accurately reflect the skills and knowledge that students are expected to acquire.

A detailed Table of Specifications (ToS) has been created to ensure equitable coverage of cognitive levels and content domains in order to generate a balanced question paper. The ToS serves as drawing scale and action plan for the question paper, ensuring that all important areas of the curriculum are adequately and proportionately assessed.

FORMATIVE ASSESSMENT: AN ESSENTIAL COMPONENT OF EFFECTIVE LEARNING

Formative assessment is a pivotal element in the educational process, distinguished by its role in providing ongoing feedback to both students and educators. Unlike summative assessments, which evaluate student learning at the end of an instructional period, formative assessments are integrated into the learning process to monitor student understanding and guide instructional decisions.

The primary objective of formative assessment is to identify learning gaps and misunderstandings as they occur, enabling timely interventions. This dynamic approach allows teachers to adjust their teaching strategies to better meet the needs of their students. For instance, if a teacher notices through a quick quiz or class discussion that a significant portion of the class struggles with a particular concept, they can revisit that topic, providing additional explanations or alternative methods of instruction. This adaptability is crucial for fostering a deeper understanding of the material.

Formative assessments come in various forms, ranging from informal methods like classroom discussions, observations, and questioning, to more structured approaches such as quizzes, peer assessments, and self-reflections. These methods are not limited to paper-and-pencil tasks but can include digital tools that provide instant feedback. The versatility of formative assessments allows educators to cater to diverse learning styles and preferences, ensuring that all students are engaged and supported in their learning journey.

Formative assessment plays a significant role in creating a supportive classroom environment. It shifts the focus from merely achieving grades to understanding the learning process. This approach reduces the pressure on students, as they perceive assessments not as a final judgment of their abilities but as a part of their learning journey. Consequently, formative assessment can lead to increased student motivation and engagement.

In conclusion, formative assessment is a powerful tool that, when effectively implemented, can significantly enhance the learning experience. It provides invaluable insights for both teachers and students, promotes a growth-oriented learning environment, and supports the continuous development of essential skills. As education evolves, the role of formative assessment will undoubtedly continue to be central in fostering successful and meaningful learning experiences.

SUMMATIVE ASSESSMENT: EVALUATING LEARNING OUTCOMES IN THE FORM OF TERMINAL/FINAL EXAMINATION

Summative assessment is a fundamental component of the educational process, designed to evaluate student learning at the conclusion of an instructional period. Unlike formative assessment, which provides ongoing feedback during the learning process, summative assessment serves as a final measure of what students have learned. Typically administered at the end of a unit, course, or academic year. Summative assessment aims to determine the extent to which educational objectives have been achieved.

The primary purpose of summative assessment is to assess the overall effectiveness of instruction and learning. It provides a conclusive evaluation of student performance, often in the form of tests, final projects, or standardized exams. These assessments generate grades or scores that reflect a student's achievement in a given subject area over a specific period or time duration.

Summative assessment is often used to make critical decisions regarding student progression, certification, or placement in subsequent educational levels. Additionally, summative assessments provide valuable data that inform curriculum development and instructional strategies. By analyzing summative assessment results, educators can identify trends, strengths, and weaknesses within their instructional approaches, allowing for improvements in future teaching.

In conclusion, summative assessment plays a critical role in the educational process by providing a final evaluation of student learning. While it differs from formative assessment in its focus and application, it is an essential tool for measuring academic achievement. When balanced with formative assessments, summative assessments contribute to a well-rounded and effective approach to evaluating and supporting student learning.

National Curriculum of Pakistan 2022-23

Assessment Framework

MATHEMATICS Grade-IX (SSC-I)

Details of Content Areas/ SLOs

Content Domain / Area	Topics	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
Domain A: Numbers and Algebra	Real Numbers	[SLO: M-09-A-01]: Explain, with examples, that civilizations throughout history have systematically studied living things [e.g., the history of numbers from Sumerians and its development to the present Arabic system.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	23
		[SLO: M-09-A-02]: Describe the set of real numbers as a combination of rational and irrational numbers.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	
		[SLO: M-09-A-03]: Demonstrate and verify the properties of equality and inequality of real numbers.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	
		[SLO: M-09-A-04]: Apply laws of indices to simplify radical expressions.	Summative	A	Question(s) will be asked in the annual examination.	

		[SLO: M-09-A-05]: Express a number in scientific notations and vice versa.	Summative	U	Question(s) will be asked in the annual examination	
		[SLO: M-09-A-06]: Describe logarithm of a number.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	
		[SLO: M-09-A-07]: Differentiate between common and natural logarithm.	Summative	K	Question(s) will be asked in the annual examination	
		[SLO: M-09-A-08]: Apply laws of logarithm to real life situations such as growth and decay, loudness of sound.	Summative	A	Question(s) will be asked in the annual examination	
		[SLO: M-09-A-09]: Apply concepts of rational numbers to real word problems (such as inventory (stock taking), temperature, banking, measures of gain and loss, sources of income and expenditure).	Summative	A	Question(s) will be asked in the annual examination	
	Sets and Functions	[SLO: M-09-A-10]: Describe mathematics as the study of pattern, structure, and relationships.	Summative	U	Question(s) will be asked in the annual examination	21
		[SLO: M-09-A-11]: Identify sets and apply operations on three sets (Subsets, overlapping sets and disjoint sets), using Venn diagrams	Summative	A	Question(s) will be asked in the annual examination	
		[SLO: M-09-A-12]: Solve problems on classification and cataloguing by using Venn diagrams for Scenarios involving two sets and three sets. Further application of sets.	Formative	U	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	
		[SLO: M-09-A-13]: Verify and apply properties/laws of union and intersection of three sets through analytical and Venn diagram method.	Summative	A	Question(s) will be asked in the annual examination	

		[SLO: M-09-A-14]: Apply concepts from set theory to real world problems (such as in demographic classification, categorizing products in shopping malls and music playlist by genre) Relation.	Summative	A	Question(s) will be asked in the annual examination	
		[SLO: M-09-A-15]: Explain product, Binary Relations and its domain and range.	Summative	K	Question(s) will be asked in the annual examination	
		[SLO: M-09-A-16]: Recognize that a relation can be represented by table, order pair and graphs.	Summative	A	Question(s) will be asked in the annual examination	
	Factorization	[SLO: M-09-A-17]: Identify common factors, trinomial factoring, concretely, pictorially and symbolically.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	21
		[SLO: M-09-A-18]: Factorize quadratic and cubic algebraic expressions. • $a^4 + a^2b^2 + b^4$ or $a^4 + b^4$ • $x^2 + px + q$ • $ax^2 + bx + c$ • $(ax^2 + bx + c)(ax^2 + bx + d) + k$ • $(x + a)(x + b)(x + c) + k$ • $(x + a)(x + b)(x + c)(x + d) + kx^2$ • $a^3 + 3a^2b + 3ab^2 + b^3$ • $a^3 - 3a^2b + 3ab^2 - b^3$ • $a^3 \pm b^3$	Summative	U	Question(s) will be asked in the annual examination	
		[SLO: M-09-A-19]: Find highest common factor and least common multiple of algebraic expressions and know relationship of LCM and HCF.	Summative	U/K	Question(s) will be asked in the annual examination	
		[SLO: M-09-A-20]: Find square root of algebraic expression by factorization and division.	Summative	U/K	Question(s) will be asked in the annual examination	

		[SLO: M-09-A-21]: Apply the concepts of factorization of quadratic and cubic algebraic expressions to real world problems (such as engineering, physics, and finance.)	Summative	A	Question(s) will be asked in the annual examination	
	Linear Equations and Inequalities in one variable	[SLO: M-09-A-22]: Solve linear equations and inequalities with rational coefficients and represent the solution set on a real line.	Summative	U	Question(s) will be asked in the annual examination	21
		[SLO: M-10-A-23]: Solve two linear inequalities with two unknowns simultaneously	Formative	U	Question(s) will not be asked in the annual examination (This SLO will be taught in Class X)	
Domain B: Geometry	Coordinate Geometry	[SLO: M-09-B-01]: Derive distance formula by locating the position of two points in coordinate plane	Summative	U	Question(s) will be asked in the annual examination	21
		[SLO: M-09-B-02]: Calculate the midpoint of a line segment	Summative	K	Question(s) will be asked in the annual examination	
		[SLO: M-09-B-03]: Find the gradient of a straight line when coordinates of two points are given.	Summative	K	Question(s) will be asked in the annual examination	
		[SLO: M-09-B-04]: Find the equation of a straight line in the form $y = mx + c$	Summative	K	Question(s) will be asked in the annual examination	
		[SLO: M-09-B-05]: Find the gradient of parallel and perpendicular lines.	Summative	U	Question(s) will be asked in the annual examination	
		[SLO: M-09-B-06]: Apply distance and midpoint formulas to solve real life situations such as physical measurements or distances between locations.	Summative	A	Question(s) will be asked in the annual examination	

		[SLO: M-09-B-07]: Apply concepts from coordinate Geometry to real world problems (such as, aviation and navigation, landscaping, map reading, longitude and latitude).	Summative	A	Question(s) will be asked in the annual examination	
		[SLO: M-09-B-08]: Derive equation of a straight line in slope-intercept form, point-slope form, two-point form, intercepts form, symmetric form, normal form.	Summative	U	Question(s) will be asked in the annual examination	
		[SLO: M-09-B-09]: Show that a linear equation in two variables represents a straight line and reduce the general form of the equation of a straight line to the other standard forms.	Summative	U	Question(s) will be asked in the annual examination	
	Angle Between Lines	[SLO: M-09-B-10]: Find the angle between two coplanar intersecting straight lines.	Summative	K	Question(s) will be asked in the annual examination	10
		[SLO: M-09-B-11]: Find the equation of the family of lines passing through the point of intersection of two given lines.	Summative	U/K	Question(s) will be asked in the annual examination	
		[SLO: M-09-B-12]: Calculate angles of the triangle when the slopes of the sides are given.	Summative	K	Question(s) will be asked in the annual examination	
	Logic	[SLO: M-09-B-13]: Differentiate between a mathematical statement and its proof.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	11
		[SLO: M-09-B-14]: Differentiate between an axiom, conjecture and theorem.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	

		[SLO: M-09-B-15]: Formulate simple deductive proofs [algebraic proofs that require showing the LHS to be equal to the RHS. E.g., showing $(x - 3)^2 + 5 = x^2 - 6x$	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	
	Similar Figures	[SLO: M-09-B-16]: Identify similarity of polygons. Area and Volume of Similar Figures	Summative	K	Question(s) will be asked in the annual examination	11
		[SLO: M-09-B-17]: Solve problems using the relationship between areas of similar figures and volume of different solids	Summative	U	Question(s) will be asked in the annual examination	
	Geometrical Properties of regular Polygons, Triangles and Parallelograms	[SLO: M-09-B-18]: Solve real life problems that involve the properties of regular polygons, triangles and parallelograms (such as building architectural structures, fencing, tiling, painting, carpeting a room).	Summative	A	Question(s) will be asked in the annual examination	21
	Loci	[SLO: M-09-B-19]: Solve real life problems using the following loci and the method of intersecting loci for sets of points in two dimensions which are: at a given distance from a given point, at a given distance from a given straight line, equidistant from two given points equidistant from two given intersecting straight lines.	Summative	A	Question(s) will be asked in the annual examination	11
	Trigonometry	[SLO: M-09-B-20]: Identify angles in standard position, expressed in degrees and radians.	Summative	K	Question(s) will be asked in the annual examination	21
		[SLO: M-09-B-21]: Apply Pythagoras' theorem and the sine, cosine and tangent ratios for acute angles to find a side or of an angle of a right-angled triangle.	Summative	A	Question(s) will be asked in the annual examination	
		[SLO: M-09-B-22]: Solve real life trigonometric problems in two dimensions involving angles of elevation and depression.	Summative	A	Question(s) will be asked in the annual examination	

	Trigonometric Identities	[SLO: M-09-B-23]: Prove the trigonometric identities and apply them to show different trigonometric relations.	Summative	K/A	Question(s) will be asked in the annual examination	11
		[SLO: M-09-B-24]: Solve real life problems involving trigonometric identities.	Summative	A	Question(s) will be asked in the annual examination	
	Bearing	[SLO: M-09-B-25]: Interpret and use three figure bearings.	Summative	K	Question(s) will be asked in the annual examination	10
		[SLO: M-09-B-26]: Solve problems involving bearing.	Summative	U	Question(s) will be asked in the annual examination	
		[SLO: M-09-B-27]: Apply the concepts of trigonometry	Summative	A	Question(s) will be asked in the annual examination	
	Construction of Triangle	[SLO: M-09-B-28]: Construct a triangle having given two sides and the included angle.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	21
		[SLO: M-09-B-29]: Construct a triangle having given one side and two of the angles.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	
		[SLO: M-09-B-30]: Construct a triangle having given two of its sides and the angle opposite to one of them (with all the three possibilities).	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	
		[SLO: M-09-B-31]: Draw angle bisectors, perpendicular bisectors, medians, altitudes of a given triangle and verify their concurrency.	Summative	U	Question(s) will be asked in the annual examination	

Domain C: Information Handling	Frequency Distribution	[SLO: M-09-C -01]: Construct a grouped frequency table, histogram (with unequal class intervals) and frequency polygon.	Formative	K	Question(s) will not be asked in the annual examination; however, it will be part of regular teaching practice.	11
	Measure of Central Tendency	[SLO: M-09-C -02]: Calculate the mean modal class and median of a grouped frequency distribution.	Summative	U	Question(s) will be asked in the annual examination	21
		[SLO: M-09-C -03]: Solve real life situations involving mean, weighted mean, median, and mode for given data (such as allocation of funds in different projects, forecasting future demographics, marketing, forecasting government budgets).	Summative	A	Question(s) will be asked in the annual examination	
	Probability	[SLO: M-09-C -04]: Calculate the probability of a single event and the probability of event not occurring	Summative	K	Question(s) will be asked in the annual examination	10
		[SLO: M-09-C -05]: Solve real life problems involving probability	Summative	A	Question(s) will be asked in the annual examination	
	Relative and expected frequencies	[SLO: M-09-C -06]: Calculate relative frequency as an estimate of probability.	Summative	K	Question(s) will be asked in the annual examination	11
		[SLO: M-09-C -07]: Calculate expected frequencies.	Summative	U/K	Question(s) will be asked in the annual examination	
		[SLO: M-09-C -08]: Solve real life problems involving relative and expected frequencies.	Summative	A	Question(s) will be asked in the annual examination	

FINAL CONCEPTUAL PATTERN OF SSC-I & II

Mathematics

Total Marks: 75 Marks

Components	Detail
Marks Allocated to MCQs	36
Total MCQs	48
Marks per MCQ	0.75
Objective Portion – MCQs (36 Marks)	(Time Allowed: 1:10 hours) Section-A 32 straight MCQs ($32 \times 0.75 = 24$ marks) 16 MCQs with (stimulus/situations/scenario) ($16 \times 0.75 = 12$ marks)
Subjective Portion – SRQs & ERQs (39 Marks)	(Time Allowed: 1:50 hours) Section-B (SRQs) Section B having 7 questions. Each question has internal choice. Each question having 3 marks. ($3 \times 7 = 21$ marks) Section –C (ERQs) Section C having 3 questions. Each question has internal choice. Each question having 6 marks. ($3 \times 6 = 18$ marks)
Subjective Portion Structure	5 straight SRQs (with no sub parts) 2 split SRQs (with sub parts) 3 straight ERQs (with no sub parts)

Important Note:

- Summative SLOs of NCP Mathematics 2022-23 for grades IX or X will only be included.
- Ensure balanced domain coverage using the Table of Specifications (ToS).

Mathematics SSC-I

To be filled-in by the Candidate

PAPER VERSION	(A)	(B)	(C)	(D)	(E)
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CORRECTLY FILLED



WRONG METHOD

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Time Allowed: 1:10 Hours

Total Marks: 36

Candidate Sign. _____

Invigilator Sign. _____

Question Booklet No. _____

Roll No. _____

FILL ONLY ONE BUBBLE FOR EACH CORRECT ANSWER. USE BLACK BALL POINT/MARKER

1	(A)	(B)	(C)	(D)	13	(A)	(B)	(C)	(D)	25	(A)	(B)	(C)	(D)	37	(A)	(B)	(C)	(D)
2	(A)	(B)	(C)	(D)	14	(A)	(B)	(C)	(D)	26	(A)	(B)	(C)	(D)	38	(A)	(B)	(C)	(D)
3	(A)	(B)	(C)	(D)	15	(A)	(B)	(C)	(D)	27	(A)	(B)	(C)	(D)	39	(A)	(B)	(C)	(D)
4	(A)	(B)	(C)	(D)	16	(A)	(B)	(C)	(D)	28	(A)	(B)	(C)	(D)	40	(A)	(B)	(C)	(D)
5	(A)	(B)	(C)	(D)	17	(A)	(B)	(C)	(D)	29	(A)	(B)	(C)	(D)	41	(A)	(B)	(C)	(D)
6	(A)	(B)	(C)	(D)	18	(A)	(B)	(C)	(D)	30	(A)	(B)	(C)	(D)	42	(A)	(B)	(C)	(D)
7	(A)	(B)	(C)	(D)	19	(A)	(B)	(C)	(D)	31	(A)	(B)	(C)	(D)	43	(A)	(B)	(C)	(D)
8	(A)	(B)	(C)	(D)	20	(A)	(B)	(C)	(D)	32	(A)	(B)	(C)	(D)	44	(A)	(B)	(C)	(D)
9	(A)	(B)	(C)	(D)	21	(A)	(B)	(C)	(D)	33	(A)	(B)	(C)	(D)	45	(A)	(B)	(C)	(D)
10	(A)	(B)	(C)	(D)	22	(A)	(B)	(C)	(D)	34	(A)	(B)	(C)	(D)	46	(A)	(B)	(C)	(D)
11	(A)	(B)	(C)	(D)	23	(A)	(B)	(C)	(D)	35	(A)	(B)	(C)	(D)	47	(A)	(B)	(C)	(D)
12	(A)	(B)	(C)	(D)	24	(A)	(B)	(C)	(D)	36	(A)	(B)	(C)	(D)	48	(A)	(B)	(C)	(D)



Federal Board SSC-I Examination Mathematics Model Question Paper

National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)

(50% MCQs & 50% Descriptive)

SECTION - A (Marks 36)

Time Allowed: 1:10 hours

Section – A is compulsory. All parts of this section are to be answered on the OMR Sheet given in the E-Sheet and handed over to the Centre Superintendent. Deleting/ overwriting is not allowed. Do not use lead pencil.

Roll Number						Paper Version
						A

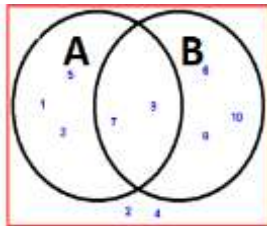
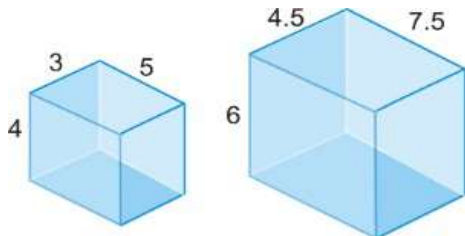
Invigilator Sign. _____

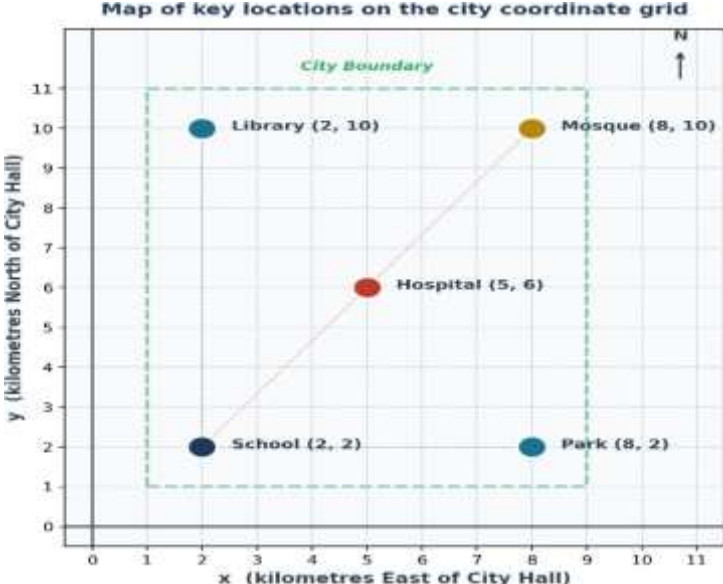
Candidate Sign. _____

Note: Fill the correct bubble for each question on OMR Sheet given in the E-Sheet. Each question carries 0.75 mark.

Sr no.	Question	A	B	C	D
1	The radical form of $2^{\frac{3}{4}} \times 27$ is:	$3 \times \sqrt[3]{2^4}$	$3^3 \times \sqrt[4]{2^3}$	$3^3 \times \sqrt[3]{2^4}$	$3^4 \times \sqrt[4]{2^4}$
2	The scientific notation of 150 million kilometres is:	1.5×10^6	1.5×10^8	1.5×10^{-6}	1.5×10^{-8}
3	The temperature in a freezer was $-\frac{9}{2}^{\circ}\text{C}$. It increased by $\frac{5}{2}^{\circ}\text{C}$. What is the new temperature?	7°C	2°C	-2°C	-7°C
4	For what values of x and y , $(x + y, 4x + 1) = (3, 9)$?	$x = 1,$ $y = 2$	$x = 0.5,$ $y = 8.5$	$x = 2,$ $y = 1$	$x = 2$ $y = 7$
5	If $(x - 1)$ is a factor of $x^3 - 5x^2 + ax + 6$, the value of a is:	-2	-1	0	2
6	If $x^2 - 11x + 30 = (x - a)(x - b)$, then value of $a + b$ is:	-30	-11	11	30
7	The HCF of $6x^2y$ and $9xy^2$ is:	$3x^2y$	$3x^2y^2$	$3xy$	$18x^2y^2$
8	If $\sqrt{x^2 + 6x + 9} = x + k$, the value of k is:	-3	$\pm\sqrt{9}$	3	$\pm\sqrt{3}$
9	The profit of a small business is modelled by $x^2 - 9x + 20$. For a breakeven point the factorized expression is:	$(x - 4)(x - 5)$	$(x - 4)(x + 5)$	$(x + 4)(x - 5)$	$(x + 4)(x + 5)$
10	On solving $\frac{x}{2} - \frac{3}{2} \geq 2$, the value of x is:	$x \leq 5$	$x \geq 5$	$x \geq 7$	$x \leq 7$
11	Which value of y satisfies the equation $0.6y + 1.2 = 3$?	0.3	1.08	3	7
12	What is the midpoint of the line segment joining A (2, 4) and B (6, 10)?	(2,3)	(4,7)	(6,5)	(8,14)
13	What is the gradient of a line passing through points (3, 7) and (3, -5)?	0	-2	$-\frac{1}{3}$	undefined

14	If $y = 2x + c$ passes through the point (3, 10), what is the numerical value of c ?	-17	4	16	23
15	The line $y = 5x + 1$ is perpendicular to another line. What is the gradient of the other line?	5	-5	$-\frac{1}{5}$	$=\frac{1}{5}$
16	Two schools are located at points (2, 3) and (8, 11) on a map. What is the distance between them?	100 units	14 units	10 units	5 units
17	On a toy model car, the length of the door is 3 cm. If the actual car is exactly 40 times larger than the model, what is the length of the door on the actual car?	43 cm	80 cm	120 cm	1200 cm
18	A bakery makes two sizes of similar cube-shaped cakes. The larger cake has sides that are twice as long as the smaller cake. If the small cake requires 1 cup of butter, how many cups of butter are needed for the larger cake?	2 cups	4 cups	8 cups	16 cups
19	Two intersecting roads form supplementary angles where one angle is three times the other. What is the measure of the smaller angle?	22.5°	45°	90°	135°
20	Two sides of a triangle have slopes 1 and -1. What is the angle between them?	45°	90°	135°	180°
21	Two similar triangles have corresponding sides in the ratio 1: 3. What is the ratio of their areas?	1 : 6	6 : 1	9 : 1	1 : 9
22	A cuboid has volume 1000 cm^3 . It is enlarged by a scale factor of 2. What is the volume of the enlarged cuboid?	500 cm^3	2000 cm^3	4000 cm^3	8000 cm^3
23	A goat is tied to a corner of a square field with a 7 m rope. The locus of points it can graze is a:	Quarter circle	Semi-circle	Full circle	Square
24	A dog is tied to a fixed pole in a park with a 5 m rope. The set of all points the dog can reach is a:	Circle	Semi-circle	Square	Rectangle
25	135° in circular system (radians) is:	$\frac{3\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{4}$
26	A person stands 20 m from a building. The angle of elevation to the top is 45°. What is the height of the building?	11.5 m	14.1 m	20 m	34.6 m
27	The value of $\cos^2 100^\circ + \sin^2 100^\circ$ is:	0	0.81	1	1.15
28	A ship sails from port on a bearing of 225°. In which direction is it moving?	North-East	South-East	South-West	North-West

29	In a triangle, the three medians meet at a point called the:	Circumcenter	Orthocenter	Centroid	Incentre				
30	The vertices of a right-angled triangle are (0, 0), (6, 0), and (0, 8). What is the midpoint of the hypotenuse?	(3, 4)	(6, 8)	(3, 0)	(0, 4)				
31	What is the probability of getting M in MATHEMATICS?	$\frac{1}{10}$	$\frac{2}{10}$	$\frac{1}{11}$	$\frac{2}{11}$				
32	A fair coin is tossed 100 times. The expected number of Tails to occur is:	0	1	50	100				
STIMULUS/SITUATION/SCENARIO BASED MCQs									
	Scenario for MCQs 33 to 36	The Venn diagram shows the elements of set A and set 							
33	Which of the elements belong only to set A?	*1,2,4,6, 7+	*1,3,5,7,9+	*1,3,5+	*7,9+				
34	Which of the elements are in the intersection of sets A and B?	*1,3,5, ...,10+	*7,9+	*1,3,5+	*6,8,10+				
35	Which of the elements are not included in either set A or set B?	*1,2,3, ...,10+	*1,3,5+	*2,4+	*6,8,10+				
36	The elements of $A - B$ are:	*1,3,5+	*6,8,10+	*7,9+	*2,4+				
	Scenario for MCQs 37 to 40	The given prisms are similar 							
37	What is the linear scale factor from the smaller cuboid to the larger cuboid?	1.25	1.5	2.0	2.25				
38	The total surface area of the smaller cuboid is 94 cm^2 , what is the total surface area of the larger cuboid?	141 cm^2	211.5 cm^2	317.25 cm^2	423 cm^2				
39	The volume of the smaller cuboid is 60 cm^3 , what is the volume of the larger cuboid?	90 cm^3	135 cm^3	202.5 cm^3	270 cm^3				
40	What is the ratio of the volume of the smaller prism to the volume of the larger prism?	1 : 1.5	1 : 2.25	1 : 3.375	1 : 4.5				
	Scenario for MCQs (41-44)	The table below shows weight distribution (in kg) of students in a class.							

41	What is the size of class interval?	10	11	12	15				
42	What is the value of $\frac{\Sigma f}{2}$?	C-I 20 f 6	30-40 22 6	40-50 10 10	50-60 25 16	60-70 12 12	70-80 28 6		
43	What is the cumulative frequency for the class 50 – 60?	16	26	32	34				
44	Which is the median class?	40 – 50	50 – 60	60 – 70	30 – 40				
	Scenario for MCQs (45-48)	Study the given map and answer the following questions. 							
45	What is the distance between School and Park?	4 km	6 km	8 km	10 km				
46	What is the midpoint of the line segment joining Library and Park?	(4, 5)	(5, 5)	(5, 6)	(6, 5)				
47	What is the slope of the line joining two points (school and mosque)?	$\frac{4}{3}$	$\frac{3}{4}$	$\frac{6}{5}$	$\frac{5}{6}$				
48	Which pair of locations on the map is exactly 8 km apart?	School & Hospital	Park & Hospital	Park & Mosque	Library & Hospital				



Federal Board SSC-I Examination

Model Question Paper Mathematics

National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)

(50% MCQs & 50% Descriptive)

Time allowed: 1:40 hours

Total Marks: 39

Note: Answer all parts from Section 'B' and all questions from Section 'C' on the **E-sheet**.
Write your answers on the allotted/given spaces.

SECTION – B (Marks 21)

(7 × 3 = 21)

Q No.	Question	Marks	Question	Marks
1	Using the laws of exponents, simplify: $\left(\frac{2187 \times a^5 \times b^{17}}{a^{12} \times b^3}\right)^{\frac{1}{7}}$	3	OR A line cuts intercepts on axes such that x -intercept is three times y -intercept and the line pass through (3,2). Write the equation of the line in standard form.	3
2	Solve the equation $ 2x - 3 = x + 5 $	3	OR Two power stations are at $S(2,0)$ and $(8,0)$. A substation is to be built equidistant from S and T . Find locus of possible positions for the substation and its equation.	3
3	Find the acute angle between the line $y = \sqrt{3}x + 2$ and the x -axis.	3	OR Prove that $\frac{\sqrt{1+\cos\theta}}{1+\cos\theta} = \frac{\sin\theta}{1+\cos\theta}$	3
4	The volume of a rectangular box is given by $x^3 + 6x^2 + 11x + 6$ cubic cm. If its height is $(x+1)$ cm, find the product of its length and width.	3	OR Solve the inequality $-5 < \frac{2x+7}{3} \leq 1$ and represent the solution set on the real line.	3
5	In a survey, 200 people were asked if they prefer tea. 85 said yes. Calculate the relative frequency of preferring tea.	3	OR The intensity of sound is measured by $L = 10 \log \left(\frac{\quad}{I_0}\right)$. A machine produces intensity $1000I_0$. Find the value of L .	3
6	Two similar rectangles have lengths 6cm and 9 cm. (a) Find ratio of the corresponding sides. (b) Find ratio of the corresponding areas.	3	OR A ladder reaches a height of 4 m on a wall. The foot of the ladder is 3 m from the wall. If θ is the angle the ladder makes with the ground, (a) Find the values of $\sin \theta$ and $\cos \theta$. (b) Verify that $\sin^2 \theta + \cos^2 \theta = 1$	3
7	Consider the relation $R = \{(2,4), (3,9), (4,16), (5,25)\}$. (a) Find the domain and range of the relation. (b) Identify the rule connecting the elements.	3	OR A scout walks from camp C to a river R on a bearing of 240° . Draw a rough sketch showing the direction. (a) State in which quadrant the bearing lies? (b) Find the acute angle from South.	3

SECTION – C (Marks 18)

(3 × 6 = 18)

Note: Attempt all questions. Marks of each question are given.

Q. No.	Question	Marks	Question	Marks										
8	Verify the Associative Laws of union for three sets A, B, C using the analytical method.	6	OR Two similar metal spheres have radii in the ratio 5 : 2. Find the ratio of their surface areas and volumes. If the smaller sphere has volume $40\pi\text{cm}^3$, find the larger sphere's volume.	6										
9	If $A = 12x^3y^2(x^2 - 9)$, $B = 18x^2y^3(2x^2 + 5x - 3)$ Factorize both expressions completely, then determine their HCF and LCM. Also verify that $A \times B = \text{HCF} \times \text{LCM}$	6	OR From the top of a 100 m high building, the angle of depression to the bottom of a second building is 30° and the angle of elevation to the top of the second building is 20° . Calculate the height of the second building.	6										
10	Draw a triangle ABC with $AB = 4$ cm, $BC = 5$ cm, and $CA = 6$ cm. Construct all three medians of the triangle. Verify that they are concurrent. Name the point of concurrency, and state whether it lies inside, on, or outside the triangle.	6	OR A school principal wants to allocate funds to different departments based on student enrolment. The number of students in each department is tabulated as under. <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <td>Subject</td><td>x</td><td>Science</td><td>Maths</td><td>English</td></tr> <tr> <td>No. of Students</td><td>f</td><td>200</td><td>150</td><td>180</td></tr> </table> If the total available fund is Rs. 700,000, calculate the amount each department should receive if funds are distributed equally per student.	Subject	x	Science	Maths	English	No. of Students	f	200	150	180	6
Subject	x	Science	Maths	English										
No. of Students	f	200	150	180										

Federal Board SSC-I Examination
Mathematics Model Question Paper

(Curriculum 2022-23)

Alignment of Questions with Student Learning Outcomes

OBJECTIVE PART
SECTION A

Q. No.	Content Area/ Domain	Student Learning Outcomes	Cognitive Level *	Allocated Marks
Q1(1)	Domain A	[SLO M-09-A-04]: Apply laws of indices to simplify radical expressions.	A	0.75
Q1(2)	Domain A	[SLO: M-09-A-05]: Express a number in scientific notations and vice versa.	U	0.75
Q1(3)	Domain A	[SLO: M-09-A-09]: Apply concepts of rational numbers to real word problems (such as inventory (stock taking), temperature, banking, measures of gain and loss, sources of income and expenditure).	U	0.75
Q1(4)	Domain A	[SLO M-09-A-15]: Explain product, Binary Relations and its domain and range.	K	0.75
Q1(5)	Domain A	[SLO: M-09-A-18]: Factorize quadratic and cubic algebraic expressions.	A	0.75
Q1(6)	Domain A	[SLO: M-09-A-18]: Factorize quadratic and cubic algebraic expressions.	U	0.75
Q1(7)	Domain A	[SLO: M-09-A-19]: Find highest common factor and least common multiple of algebraic expressions and know relationship of LCM and HCF.	K	0.75
Q1(8)	Domain A	[SLO: M-09-A-20]: Find square root of algebraic expression by factorization and division.	U	0.75
Q1(9)	Domain A	[SLO: M-09-A-21]: Apply the concepts of factorization of quadratic and cubic algebraic expressions to real world problems (such as engineering, physics, and finance.)	K	0.75
Q1(10)	Domain A	[SLO: M-09-A-22]: Solve linear equations and inequalities with rational coefficients and represent the solution set on a real line.	U	0.75
Q1(11)	Domain A	[SLO: M-09-A-22]: Solve linear equations and inequalities with rational coefficients and represent the solution set on a real line.	K	0.75
Q1(12)	Domain B	[SLO: M-09-B-02]: Calculate the midpoint of a line segment	K	0.75
Q1(13)	Domain B	[SLO: M-09-B-03]: Find the gradient of a straight line when coordinates of two points are given.	K	0.75
Q1(14)	Domain B	[SLO: M-09-B-04]: Find the equation of a straight line in the form $y = mx + c$	U	0.75
Q1(15)	Domain B	[SLO: M-09-B-05]: Find the gradient of parallel and perpendicular lines.	U	0.75
Q1(16)	Domain B	[SLO: M-09-B-06]: Apply distance and midpoint formulas to solve real life situations such as physical measurements or distances between locations.	U	0.75
Q1(17)	Domain B	[SLO: M-09-B-18]: Solve real life problems that involve the properties of regular polygons, triangles and parallelograms (such as building architectural structures, fencing, tiling, painting, carpeting a room).	U	0.75

Q1(18)	Domain B	[SLO: M-09-B-31]: Draw angle bisectors, perpendicular bisectors, medians, altitudes of a given triangle and verify their concurrency.	U	0.75
Q1(19)	Domain B	[SLO: M-09-B-10]: Find the angle between two coplanar intersecting straight lines.	U	0.75
Q1(20)	Domain B	[SLO: M-09-B-12]: Calculate angles of the triangle when the slopes of the sides are given.	U	0.75
Q1(21)	Domain B	[SLO: M-09-B-16]: Identify similarity of polygons. Area and volume of similar figures.	U	0.75
Q (22)	Domain B	[SLO: M-09-B-17]: Solve problems using the relationship between areas of similar figures and volume of different solids.	A	0.75
Q1(23)	Domain B	[SLO: M-09-B-19]: Solve real life problems using the following loci and the method of intersecting loci for sets of points in two dimensions which are: at a given distance from a given point, at a given distance from a given straight line, equidistant from two given points equidistant from two given intersecting straight lines.	U	0.75
Q1(24)	Domain B	[SLO: M-09-B-19]: Solve real life problems using the following loci and the method of intersecting loci for sets of points in two dimensions which are: at a given distance from a given point, at a given distance from a given straight line, equidistant from two given points equidistant from two given intersecting straight lines.	K	0.75
Q1(25)	Domain B	[SLO: M-09-B-20]: Identify angles in standard position, expressed in degrees and radians.	U	0.75
Q1(26)	Domain B	[SLO: M-09-B-22]: Solve real life trigonometric problems in two dimensions involving angles of elevation and depression.	U	0.75
Q1(27)	Domain B	[SLO: M-09-B-23]: Prove the trigonometric identities and apply them to show different trigonometric relations.	K	0.75
Q1(28)	Domain B	[SLO: M-09-B-25]: Interpret and use three figure bearings.	K	0.75
Q1(29)	Domain B	[SLO: M-09-B-31]: Draw angle bisectors, perpendicular bisectors, medians, altitudes of a given triangle and verify their concurrency.	K	0.75
Q1(30)	Domain B	[SLO: M-09-B-31]: Draw angle bisectors, perpendicular bisectors, medians, altitudes of a given triangle and verify their concurrency.	U	0.75
Q1(31)	Domain C	[SLO: M-09-C -04]: Calculate the probability of a single event and the probability of event not occurring.	A	0.75
Q1(32)	Domain C	[SLO: M-09-C -07]: Calculate expected frequencies.	K	0.75
Q1(33)	Domain A	[SLO: M-09-A-11]: Identify sets and apply operations on three sets (Subsets, overlapping sets and disjoint sets), using Venn diagrams.	K	0.75
Q1(34)	Domain A	[SLO: M-09-A-11]: Identify sets and apply operations on three sets (Subsets, overlapping sets and disjoint sets), using Venn diagrams.	U	0.75
Q1(35)	Domain A	[SLO: M-09-A-11]: Identify sets and apply operations on three sets (Subsets, overlapping sets and disjoint sets), using Venn diagrams.	U	0.75
Q1(36)	Domain A	[SLO: M-09-A-11]: Identify sets and apply operations on three sets (Subsets, overlapping sets and disjoint sets), using Venn diagrams.	A	0.75

Q1(37)	Domain B	[SLO: M-09-B-17]: Solve problems using the relationship between areas of similar figures and volume of different solids.	U	0.75
Q1(38)	Domain B	[SLO: M-09-B-17]: Solve problems using the relationship between areas of similar figures and volume of different solids.	A	0.75
Q1(39)	Domain B	[SLO: M-09-B-17]: Solve problems using the relationship between areas of similar figures and volume of different solids.	U	0.75
Q1(40)	Domain B	[SLO: M-09-B-17]: Solve problems using the relationship between areas of similar figures and volume of different solids.	A	0.75
Q1(41)	Domain C	[SLO: M-09-C -03]: Solve real life situations involving mean, weighted mean, median, and mode for given data (such as allocation of funds in different projects, forecasting future demographics, marketing, forecasting government budgets).	K	0.75
Q1(42)	Domain C	[SLO: M-09-C -03]: Solve real life situations involving mean, weighted mean, median, and mode for given data (such as allocation of funds in different projects, forecasting future demographics, marketing, forecasting government budgets).	K	0.75
Q1(43)	Domain C	[SLO: M-09-C -03]: Solve real life situations involving mean, weighted mean, median, and mode for given data (such as allocation of funds in different projects, forecasting future demographics, marketing, forecasting government budgets).	U	0.75
Q1(44)	Domain C	[SLO: M-09-C -03]: Solve real life situations involving mean, weighted mean, median, and mode for given data (such as allocation of funds in different projects, forecasting future demographics, marketing, forecasting government budgets).	U	0.75
Q1(45)	Domain B	[SLO: M-09-B-07]: Apply concepts from coordinate Geometry to real world problems (such as, aviation and navigation, landscaping, map reading, longitude and latitude).	A	0.75
Q1(46)	Domain B	[SLO: M-09-B-07]: Apply concepts from coordinate Geometry to real world problems (such as, aviation and navigation, landscaping, map reading, longitude and latitude).	A	0.75
Q1(47)	Domain B	[SLO: M-09-B-07]: Apply concepts from coordinate Geometry to real world problems (such as, aviation and navigation, landscaping, map reading, longitude and latitude).	A	0.75
Q1(48)	Domain B	[SLO: M-09-B-07]: Apply concepts from coordinate Geometry to real world problems (such as, aviation and navigation, landscaping, map reading, longitude and latitude).	U	0.75

SUBJECTIVE PART
SECTION B & C

Q No.	Content Area/ Domain	Description of Student Learning Outcomes	Cognitive Level *	OR	Content Area/ Domain	Description of Student Learning Outcomes	Cognitive Level *	Allocated Marks
1	Domain A	[SLO: M-09-A-04] Apply laws of indices to simplify radical expressions.	A	OR	Domain B	[SLO: M-09-B-09]: Show that a linear equation in two variables represents a straight line and reduce the general form of the equation of a straight line to the other standard forms.	U	3
2	Domain A	[SLO: M-09-A-18]: Factorize quadratic and cubic algebraic expressions.	U	OR	Domain B	[SLO: M-09-B-19]: Solve real life problems using the following loci and the method of intersecting loci for sets of points in two dimensions which are: at a given distance from a given point, at a given distance from a given straight line, equidistant from two given points equidistant from two given intersecting straight lines.	A	3
3	Domain A	[SLO: M-09-B-10]: Find the angle between two coplanar intersecting straight lines.	K	OR	Domain B	[SLO: M-09-B-23]: Prove the trigonometric identities and apply them to show different trigonometric relations.	U	3
4	Domain A	[SLO: M-09-A-18]: Factorize quadratic and cubic algebraic expressions.	A	OR	Domain B	[SLO: M-09-A-22]: Solve linear equations and inequalities with rational coefficients and represent the solution set on a real line.	U	3
5	Domain A	[SLO: M-09-C -06]: Calculate relative frequency as an estimate of probability.	K	OR	Domain B	[SLO: M-09-A-08] Apply laws of logarithm to real life situations such as growth and decay, loudness of sound.	U	3
6	Domain A	[SLO: M-09-B-16]: Identify similarity of polygons. Area and	U	OR	Domain C	[SLO: M-09-B-24]: Solve real life problems involving	K	3

		Volume of Similar Figures.				trigonometric identities.		
7	Domain B	[SLO: M-09-A-15]: Explain product, Binary Relations and its domain and range.	U	OR	Domain B	[SLO: M-09-B-26]: Solve problems involving bearing.	K	3
8	Domain A	[SLO: M-09-A-13]: Verify and apply properties/laws of union and intersection of three sets through analytical and Venn diagram method.	K	OR	B	[SLO: M-09-B-17]: Solve problems using the relationship between areas of similar figures and volume of different solids.	U	6
9	Domain A	[SLO: M-09-A-19]: Find highest common factor and least common multiple of algebraic expressions and know relationship of LCM and HCF.	U	OR	B	[SLO: M-09-B-22]: Solve real life trigonometric problems in two dimensions involving angles of elevation and depression.	A	6
10	Domain B	[SLO: M-09-B-31]: Draw angle bisectors, perpendicular bisectors, medians, altitudes of a given triangle and verify their concurrency.	U	OR	C	[SLO: M-09-C -03]: Solve real life situations involving mean, weighted mean, median, and mode for given data (such as allocation of funds in different projects, forecasting future demographics, marketing, forecasting government budgets).	K	6

*Cognitive Level

K: Knowledge

U: Understanding

A: Application

Table of Specification

Model Question Paper Mathematics – Grade IX (SSC-I)

Domain Title/ Content Area	Domain A Numbers and Algebra	Domain B Geometry	Domain C Information Handling	Total Marks	Percentage of Cognitive Level
Cognitive Level					
Knowledge	Q1(4), Q1(7), Q1(9), Q1(11), Q1(33), Q3, Q5, Q8. (15.75 marks)	Q1(12), Q1(13), Q1(24), Q1(27), Q1(28), Q1(29), Q7(OR). (7.5 marks)	Q1(32), Q1(41), Q1(42), Q6(OR), Q10(OR). (11.25 marks)	34.5	30%
Understanding	Q1(2), Q1(3), Q1(6), Q1(8), Q1(10), Q1(34), Q1(35), Q2, Q6, Q9. (17.25 marks)	Q1(14), Q1(15), Q1(16), Q1(17), Q1(18), Q1(19), Q1(20), Q1(21), Q1(23), Q1(25), Q1(26), Q1(30), Q1(37), Q1(39), Q1(48), Q7, Q10, Q1(OR), Q3(OR), Q4(OR), Q5(OR), Q8(OR). (38.25 marks)	Q1(43), Q1(44). (1.5 marks)	57	50%
Application	Q1(1), Q1(5), Q1(36), Q1, Q4. (8.25 marks)	Q1(22), Q1(38), Q1(40), Q1(45), Q1(46), Q1(47), Q2(OR), Q9(OR). (13.5 marks)	Q1(31). (0.75 mark)	22.5	20%
Total Marks	41.25	59.25	13.5	114	-
Total Percentages	36%	52%	12%	-	100%

Note:

- 1 This ToS does not reflect policy, but it is particular to this model question paper.
- 2 Proportionate /equitable representation of the content areas may be ensured.
- 3 The percentage of cognitive Level is 30%, 50%, and 20% for knowledge, understanding, and application, respectively with **± 5%** variation. The domain of Application also contains all other higher order Cognitive Levels of Bloom's Taxonomy.
- 4 While selecting alternative questions for Short Response Questions (SRQs) and Extended Response Questions (ERQs), it must be kept in mind that:
 - Difficulty levels of two alternative questions of the internal choice will be same
 - SLOs of the two alternative questions of the internal choice must be different

Key: Paper A (Question Number) marks. Example: **A (2) 0.5**,
Paper B (Question Number, part/first or second choice) marks. Example: **B (2, a /s) 5**



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