



آغا خان یونیورسٹی ایگزامینیشن بورڈ
AGA KHAN UNIVERSITY EXAMINATION BOARD

**Secondary School Certificate
Examination Syllabus**

**GENERAL MATHEMATICS
CLASSES IX-X**

(based on National Curriculum 2007)

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**Secondary School Certificate
Examination Syllabus**

**GENERAL MATHEMATICS
CLASSES IX-X**

**This subject is examined in both
May and September Examination sessions**

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PREFACE

In pursuance of National Education Policy (1998-2010), the Curriculum Wing of the Federal Ministry of Education has begun a process of curriculum reform to improve the quality of education through curriculum revision and textbook development (Preface, National Curriculum documents 2000 and 2002).

AKU-EB was founded in August 2003 with the same aim of improving the quality of education nationwide. As befits an examination board it seeks to reinforce the National Curriculum revision through the development of appropriate examinations for the Secondary School Certificate (SSC) and Higher Secondary School Certificate (HSSC) based on the latest National Curriculum and subject syllabus guidance.

AKU-EB has a mandate by Ordinance CXIV of 2002 to offer such examination services to English and Urdu medium candidates for SSC and HSSC from private schools anywhere in Pakistan or abroad, and from government schools with the relevant permissions. It has been accorded this mandate to introduce a choice of examination and associated educational approach for schools, thus fulfilling a key objective of the National Curriculum of Pakistan: “Autonomy will be given to the Examination Boards and Research and Development cells will be established in each Board to improve the system” (ibid. para. 6.5.3 (ii)).

AKU-EB is committed to creating continuity of educational experience and the best possible opportunities for its students. In consequence it offered HSSC for the first time in September, 2007 to coincide with the arrival of its first SSC students in college or higher secondary school. Needless to say this is not an exclusive offer. Private candidates and students joining AKU-EB affiliated schools and colleges for HSSC Part 1 are eligible to register as AKU-EB candidates even though they have not hitherto been associated with AKU-EB.

This examination syllabus exemplifies AKU-EB’s commitment to national educational goals.

- It is in large part a reproduction, with some elaboration, of the Class IX and X National Curriculum of the subject.
- It makes the National Curriculum freely available to the general public.
- The syllabus recommends a range of suitable textbooks already in print for student purchase and additional texts for the school library.
- It identifies areas where teachers should work together to generate classroom activities and materials for their students as a step towards the introduction of multiple textbooks, another of the Ministry of Education’s policy provisions for the improvement of secondary education (ibid. para. 6.3.4).

This examination syllabus brings together all those cognitive outcomes of the National Curriculum statement which can be reliably and validly assessed. While the focus is on the cognitive domain, particular emphasis is given to the application of knowledge and understanding, a fundamental activity in fostering “attitudes befitting useful and peaceful

citizens and the skills for and commitment to lifelong learning which is the cornerstone of national economic development” (Preface to National Curriculum documents 2000 and 2002).

To achieve this end AKU-EB has brought together university academics, teacher trainers, writers of learning materials and above all, experienced teachers, in regular workshops and subject panel meetings.

AKU-EB provides copies of the examination syllabus to subject teachers in affiliated schools to help them in planning their teaching. It is the syllabus, not the prescribed text book which is the basis of AKU-EB examinations. In addition, the AKU-EB examination syllabus can be used to identify the training needs of subject teachers and to develop learning support materials for students. Involving classroom teachers in these activities is an important part of the AKU-EB strategy for improving the quality of learning in schools.

The Curriculum Wing of the Federal Ministry of Education has recently released new subject specifications and schemes of study to take effect in September, 2008. These documents are a major step forward towards a standards-related curriculum and have been welcomed by AKU-EB. Our current SSC syllabuses have been revised to ensure conformity with the new National Curriculum 2006.

We stand committed to all students entering the SSC course as well as those who have recently embarked upon the HSSC course in facilitating their learning outcome. Our examination syllabus document ensures all possible support.



Dr. Thomas Christie
Director,
Aga Khan University Examination Board
July 2009

1. Aims/Objectives of the National Curriculum (2000)¹

The objectives of teaching Mathematics at the secondary level given in the National Curriculum document (2007) are as follows:

- 1.1 “To enable students to acquire understanding of concepts of Mathematics and apply them to the problems of the world they live in.
- 1.2 To provide the students with a sound basis for specialization in Mathematics at higher stages or to apply it in scientific and technical fields.
- 1.3 To enable the students to reason consistently, to draw correct conclusions for given hypotheses; and to inculcate in them a habit of examining any situation critically and analytically.
- 1.4 To enable the students to communicate their thoughts through symbolic expressions and graphs.
- 1.5 To develop sense of distinction between relevant and irrelevant data.
- 1.6 To give the students basic understanding and awareness of the power of Mathematics in generalization and abstraction.
- 1.7 To foster in students the spirit of exploration and discovery.”

2. Rationale of the AKU-EB Examination Syllabus

2.1 General Rationale

- 2.1.1 In 2007, the Curriculum Wing of the Federal Ministry of Education (MoE) issued a revised part-wise Scheme of Studies. All subjects are to be taught and examined in both classes IX and X. It is therefore important for teachers, students, parents and other stakeholders to know:
 - (a) that the AKU-EB Scheme of Studies for its SSC examination (Annex) derives directly from the 2007 Ministry of Education Scheme of Studies;
 - (b) which topics will be examined in Class IX and in Class X;
 - (c) at which cognitive level or levels (Knowledge, Understanding, Application and other higher order skills) the topics and sub-topics will be taught and examined;

¹ Government of Pakistan (2000), *National Curriculum; General Mathematics Classes IX-X*, Islamabad, Ministry of Education (Curriculum Wing)

- 2.1.2 This AKU-EB examination syllabus addresses these concerns. Without such guidance teachers and students have little option other than following a single textbook to prepare for an external examination. The result is a culture of rote memorization as the preferred method of examination preparation. The pedagogically desirable objectives of the National Curriculum which encourage “observation, creativity and other higher order thinking [skills]” are generally ignored. AKU-EB recommends that teachers and students use multiple teaching-learning resources for achieving the specific objectives of the National Curriculum reproduced in the AKU-EB examination syllabuses.
- 2.1.3 The AKU-EB examination syllabuses use a uniform layout for all subjects to make them easier for teachers to follow. Blank sheets are provided in each syllabus for writing notes on potential lesson plans. It is expected that this arrangement will also be found helpful by teachers in developing classroom assessments as well as by question setters preparing material for the AKU-EB external examinations. The AKU-EB aims to enhance the quality of education through improved classroom practices and improved examinations.
- 2.1.4 The Student Learning Outcomes (SLOs) in Section 3 start with command words such as list, describe, relate, explain, etc. The purpose of the command words is to direct the attention of teachers and students to specific tasks that candidates following the AKU-EB examination syllabuses are expected to undertake in the course of their subject studies. The examination questions will be framed using the same command words or the connotation of the command words, to elicit evidence of these competencies in candidates’ responses. The definitions of command words used in this syllabus are given in Section 7. It is hoped that teachers will find these definitions useful in planning their lessons and classroom assessments.
- 2.1.5 The AKU-EB has classified SLOs under the three cognitive levels Knowledge (K), Understanding (U) and Application of knowledge and skills (A) in order to derive multiple choice questions and constructed response questions on a rational basis from the subject syllabuses ensuring that the intentions of the National Curriculum should be met in full. The weighting of marks to the Multiple Choice and Constructed Response Papers is also derived from the SLOs, command words and cognitive levels. In effect the SLOs derived from the National Curriculum determine the structure of the AKU-EB subject examination set out in Section 4 and 5.
- 2.1.6 Some topics from the National Curriculum have been elaborated and enriched for better understanding of the subject and/or to better meet the needs of students in the twenty-first century.

2.2. Specific Rationale of the AKU-EB General Mathematics Examination Syllabus

- 2.2.1 The teaching of Mathematics at secondary level should focus on improving mathematical skills and logical thinking to enable the students to keep pace with the growing demands of science and technology and the related fields.
- 2.2.2 The current National Curriculum covers a wide array of topics that need to be looked at critically and give more time for deeper conceptual understanding of Mathematics. The mismatch in content weight has been balanced by allocating marks for each cognitive level e.g. Knowledge, Understanding and Application. This guidance will help both teachers and students to prepare for the AKU-EB examination leading to increased student achievements.
- 2.2.3 While the National Curriculum provides a framework for the subject areas, the AKU-EB syllabuses specifically outlines learning objectives for making classroom practices more effective. In order to bring the use of mathematics more closely in line with every day life and to avoid rote learning, students should not be assessed on reproducing theorems. Rather they will be assessed on the application of these theorems.

3. Topics and Student Learning Outcomes of the Examination Syllabus

SSC Part-I (Class IX)

Topics	Student Learning Outcomes		Cognitive level ²		
			K	U	A
1. Percentage, Ratio and Proportion	Candidates should be able to:				
1.1 Percentage	1.1.1	describe percentage;		*	
	1.1.2	convert: i. percentage to a fraction and vice versa ii. percentage to a decimal and vice versa;			*
1.2 Application of Percentages	1.2.1	calculate quantities when percentage is given;			*
	1.2.2	solve simple problems involving percentages(e.g. percentage of marks obtained, percentage of certain element in a chemical compound, increase/decrease in percentage etc);			*
1.3 Ratio	1.3.1	explain the concept that: i. a ratio is a relation between two or more quantities of the same kind ii. a ratio has no units iii. the importance of the order in which the ratio is expressed;		*	
	1.3.2	find the ratio in which a quantity is increased or decreased;			*
	1.3.3	solve real life problems involving ratio;			*
1.4 Proportion	1.4.1	identify that a proportion is an equality of two ratios i.e. $a:b:c:d$ or $\left(\frac{a}{b} = \frac{c}{d}\right)$ where a, d are known as extremes and b, c are called means;	*		
	1.4.2	describe direct, inverse and compound proportion;		*	
	1.4.3	solve problems involving direct, inverse and compound proportion.			*

² K=Knowledge, U=Understanding, A=Application (for explanation see section 8: Definition of command words used in Student Learning Outcomes and in Examination Questions)

NOTES

			K	U	A
2. Zakat, Ushr and Inheritance	Candidates should be able to:				
2.1 Zakat	2.1.1	describe the rate of Zakat (in order to find out how much Zakat is due as per Nisab);		*	
	2.1.2	calculate the amount of Zakat in respect of assets owned by a person;			*
2.2 Ushr	2.2.1	describe the rate of Ushr levied on land owner/land holder (in order to calculate the amount of Ushr in respect of produce of land);		*	
	2.2.2	calculate the amount of Ushr in respect of produce of land;			*
2.3 Inheritance	2.3.1	describe the ratio of shares among legal inheritors of a property;		*	
	2.3.2	calculate amount of share of each legal inheritor of a property.			*
	2.3.3	solve real life problems related to above concepts.			*
3. Business Mathematics	Candidates should be able to:				
3.1 Profit and Loss	3.1.1	define cost price (C.P), selling price(S.P), profit, loss;	*		*
	3.1.2	calculate the cost price ,selling price, profit and profit percentage when $SP > CP$; $Profit = SP - CP$ $SP = profit + CP$ $CP = SP - profit$ $Profit \% = \frac{profit}{CP} \times 100$ $Profit = \frac{CP \times Profit \%}{100}$ $SP = CP \times \left(\frac{100 + Profit \%}{100} \right)$ $CP = \frac{100 \times SP}{100 + Profit \%}$			

NOTES

			K	U	A
	3.1.3	calculate cost price, selling price, loss and loss percentage when $SP < CP$: $Loss = CP - SP$ $SP = CP - loss,$ $CP = loss + SP,$ $Loss \% = \frac{loss}{CP} \times 100,$ $Loss = \frac{CP \times loss \%}{100},$ $SP = CP \times \left(\frac{100 - loss \%}{100} \right),$ $CP = \frac{100 \times SP}{100 - loss \%}.$			*
	3.1.4	solve real life problems involving profit and loss;			*
3.2 Discount	3.2.1 3.2.2	explain marked price or list price or tag price, discount of an article; calculate the following: $Discount = MP - SP$ $SP = MP - Discount$ $Discount \% = \frac{Discount}{MP} \times 100$ $SP = MP \times \left(\frac{100 - Discount \%}{100} \right)$ $MP = \frac{100 \times SP}{100 - Discount \%}$		*	*
	3.2.3	solve related problems;			*
3.3 Business Partnership	3.3.1 3.3.2	explain the meaning of "Business Partnership"; calculate the profit among the Business Partners (at most four partners).		*	*

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			K	U	A
4. Financial Mathematics		Candidates should be able to:			
4.1 Commercial Banking	4.1.1	describe the difference between various types of bank accounts such as PLS saving bank account, current deposit account, PLS term deposit account and foreign currency account;		*	
	4.1.2	describe negotiable instruments like cheque, demand draft and pay order;		*	
	4.1.3	describe on-line banking, transactions through ATM (Auto Teller Machine), debit card and credit card (Visa and Master);		*	
4.2 Exchange of Currencies	4.2.1	convert the value of a given amount of the currency of one country in terms of another currency;			*
4.3 Simple Interest	4.3.1	define simple interest and terms related to it;	*		
	4.3.2	solve problems related to simple interest;			*
4.4 Insurance	4.4.1	define basic concept of insurance;	*		
	4.4.2	describe life insurance and vehicle insurance;		*	
	4.4.3	solve simple real life problems regarding purchase of life and motor vehicle insurance;			*
4.5 Leasing / Financing	4.5.1	explain the following concepts: i. leasing/financing of motor vehicle ii. down payment iii. processing charges iv. payment in monthly instalments;		*	
	4.5.2	solve problems related to leasing/financing of motor vehicle under different conditions.			*

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			K	U	A
5. Consumer Mathematics	Candidates should be able to:				
5.1 Taxes	5.1.1	describe tax, direct tax and indirect tax;		*	
	5.1.2	distinguish between direct tax and indirect tax;		*	
	5.1.3	explain the following basic concepts: i. sales tax ii. excise duty iii. property tax iv. income tax;		*	
	5.1.4	calculate the amount of : i. sales tax, levied on various commodities ii. excise duty, levied on different items iii. property tax, imposed on property iv. income tax, imposed on an individual with fixed income;			*
5.2 Utility Bills	5.2.1	calculate amount of bill for: i. electricity ii. gas iii. telephone when previous and present meter readings are given;			*
5.3 Personal Income	5.3.1	calculate personal income (weekly, monthly and annually) of: i. a worker who is paid on daily basis ii. a worker who is paid for overtime on hourly basis in addition to his daily wages iii. a salesman who is paid for overtime on hourly basis and commission on different sales in addition to his regular pay;			*
	5.3.2	calculate gross income of a salaried person who is paid on the basis of government pay scales or otherwise;			*
	5.3.3	calculate net income taking into account assorted deductions (income tax etc).			*

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			K	U	A
6. Exponents and Logarithms	Candidates should be able to:				
6.1 Radicals and Radicands	6.1.1	identify radicals and radicands;	*		
	6.1.2	distinguish between radical form and exponential form of an expression;		*	
	6.1.3	convert an expression given in radical form to an exponential form and vice versa;			*
6.2 Laws of Exponents/Indices	6.2.1	identify base and exponent;	*		
	6.2.2	apply the laws of exponents to simplify expressions with real exponents;			*
6.3 Scientific Notation	6.3.1	convert a number in ordinary form (common form) to scientific notation and vice versa;			*
6.4 Logarithm	6.4.1	explain meaning of logarithm and exponential form and their relationship with each other (i.e. $a^x = y \Leftrightarrow \log_a y = x, a > 0, y > 0$ and $a \neq 1$);		*	
	6.4.2	convert logarithmic form to exponential form and vice versa;			*
	6.4.3	define a common logarithm, characteristic and mantissa of log of a number;	*		*
	6.4.4	use tables to find the log of a number;			*
	6.4.5	find the antilog of a number by using antilog tables;			*
6.5 Laws of Logarithm	6.5.1	prove the following laws of logarithm: i. $\log_a (mn) = \log_a m + \log_a n$ ii. $\log_a \left(\frac{m}{n}\right) = \log_a m - \log_a n$ iii. $\log_a m^n = n \log_a m$		*	
	6.5.2	apply the above laws to solve related problems.			*

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			K	U	A
7. Arithmetic and Geometric Sequences		Candidates should be able to:			
7.1 Sequence	7.1.1	describe a sequence or progression and its related terms;		*	
	7.1.2	find the general term of a sequence;			*
7.2 Arithmetic Sequence	7.2.1	describe an arithmetic sequence ;		*	
	7.2.2	solve problems involving arithmetic sequence;			*
7.3 Arithmetic Mean	7.3.1	find the arithmetic mean between two numbers;			*
	7.3.2	find n arithmetic means between two numbers, where n is a natural number;			*
7.4 Geometric Sequence	7.4.1	describe a geometric sequence;		*	
	7.4.2	solve problems involving geometric sequence;			*
7.5 Geometric Mean	7.5.1	find the geometric mean between two numbers;			*
	7.5.2	find n geometric means between two numbers, where n is a natural number.			*
8. Sets and Functions		Candidates should be able to:			
8.1 Set and Operations on Sets	8.1.1	identify the sets denoted by N,Z,W,O,P ,Q and by other symbols ;	*		
	8.1.2	identify operations on set ($\cup, \cap, - or \setminus$);	*		
	8.1.3	apply the following operations on sets:			*
		i. union ii. inter-section iii. difference iv. complement;			

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8.2	Properties of Union and Intersection	8.2.1	verify the following fundamental properties of union and intersection of two or three given sets: i. commutative property of union and intersection; ii. associative property of union and intersection;			*
8.3	Venn Diagram	8.3.1	draw a Venn diagram to represent: i. union and intersection of sets, ii. complement of a set;			*
		8.3.2	draw a Venn diagram to verify: i. commutative laws for union and intersection of sets ii. associative laws for union and intersection of sets iii. De Morgan's laws;			*
8.4	Binary Relation	8.4.1	describe binary relation;		*	*
		8.4.2	find the domain and range of binary relation;			
8.5	Functions	8.5.1	define function;	*	*	
		8.5.2	illustrate: i. into function ii. one-one function iii. into and one-one function (injective function) iv. onto function (surjective function) v. one-one and onto function (bijective function);			

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			K	U	A
9. Linear Graphs		Candidates should be able to:			
9.1 Cartesian Plane and Linear Graphs	9.1.1	identify pair of real numbers as an ordered pair;	*		
	9.1.2	describe rectangular or Cartesian plane;		*	
	9.1.3	locate an ordered pair (a, b) as a point in the rectangular plane and recognize i. a as the x -coordinate (or abscissa), ii. b as the y -coordinate (or ordinate);		*	
	9.1.4	draw different geometrical shapes (e.g., line segment, triangle and rectangle, etc.) by joining a set of given points;			*
	9.1.5	construct a table for pairs of values satisfying a linear equation in two variables;		*	
	9.1.6	draw the graph of given linear equations: i. $y = \text{constant}$ ii. $x = \text{constant}$ iii. $y = mx$ iv. $y = mx + c$;			*
9.2 Conversion Graphs	9.2.1	interpret a given graph to develop a relation between quantities corresponding to other quantities;		*	
	9.2.2	use the graph for conversions of i. miles and kilometres ii. acres and hectares iii. degrees Celsius and degrees Fahrenheit iv. Pakistani currency and other currencies (other inter-related quantities);			*

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				K	U	A
10. Basic Statistics		Candidates should be able to:				
10.1	Frequency Distribution and Graphs	10.1.1	construct a grouped frequency table;		*	
		10.1.2	draw and interpret bar charts and histograms with equal class intervals;			*
		10.1.3	draw and interpret a frequency curve and a frequency polygon;			*
		10.1.4	draw and interpret a pie-chart;			*
10.2	Cumulative Frequency Distribution	10.2.1	construct a cumulative frequency table;		*	
		10.2.2	draw a cumulative frequency polygon and frequency curve;			*
10.3	Measures of Central Tendency	10.3.1	calculate arithmetic mean, median and mode for ungrouped and grouped data;			*
		10.3.2	apply the properties of arithmetic mean to solve related problems;			*
		10.3.3	estimate median and mode graphically;			*
10.4	Measures of Dispersion	10.4.1	calculate the range, variance and standard deviation for ungrouped and grouped data.			*

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SSC Part-II (Class X)

			K	U	A
11. Algebraic Formulae and Applications	Candidates should be able to:				
11.1 Algebraic Expressions	11.1.1	define a rational expression as the quotient $\frac{p(x)}{q(x)}$ of two polynomials $p(x)$ and $q(x)$ where $q(x)$ is not the zero polynomial;	*	*	
	11.1.2	discuss whether a given algebraic expression is a i. polynomial or not, ii. rational expression or not;			
	11.1.3	describe $\frac{p(x)}{q(x)}$ as a rational expression in its lowest terms;		*	
	11.1.4	simplify a given rational expression to its lowest terms;			*
	11.1.5	solve problems based on multiplication and division of rational expressions in its lowest terms;			*
	11.1.6	find the value of algebraic expression for a given real number;			*
11.2 Algebraic Formulae	11.2.1	derive the formulae: i. $(a+b)^2 + (a-b)^2 = 2(a^2 + b^2)$ ii. $(a+b)^2 - (a-b)^2 = 4ab$ iii. $a^2 - b^2 = (a-b)(a+b)$;			*
	11.2.2	find the value of $a^2 + b^2$, $a^2 - b^2$, $a+b$, $a-b$ and ab , using the above formulae;			*
	11.2.3	derive the formula $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$;			*
	11.2.4	find the values of $a^2 + b^2 + c^2$, $a+b+c$ and $ab+bc+ca$, when values of any two of these are given in the above formula;			*

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			K	U	A
	11.2.5	derive the following formulae: i. $(a \pm b)^3 = a^3 \pm 3ab(a \pm b) \pm b^3$ ii. $a^3 \pm b^3 = (a \pm b)(a^2 + ab + b^2)$;			*
	11.2.6	solve problems based on the above formulae;			*
	11.2.7	find the continued product by using the formula: (e.g. $(x + y)(x - y)(x^2 + xy + y^2)(x^2 - xy + y^2)$);			*
11.3 Surds and their Application	11.3.1	explain the surds of second order;		*	
	11.3.2	apply basic operations on surds of second order to rationalize the denominators and evaluate it;			*
11.4 Rationalization	11.4.1	rationalize the denominator of real numbers (e.g. $\frac{1}{a + b\sqrt{x}}, \frac{1}{\sqrt{x} + \sqrt{y}}$) and their combinations, where x and y are natural numbers and a and b are integers.			*
12. Factorization		Candidates should be able to:			
12.1 Factorization	12.1.1	factorize the expression of the following types: i. $kx + ky + kz$ ii. $ax + ay + bx + by$ iii. $a^2 \pm 2ab + b^2$, iv. $a^2 - b^2$, v. $(a^2 \pm 2ab + b^2) - c^2$, vi. $a^4 + a^2b^2 + b^4$ or $a^4 + 4b^4$, vii. $ax^2 + bx + c$, viii. $\left\{ \begin{array}{l} a^3 + 3a^2b + 3ab^2 + b^3 \\ a^2 - 3a^2b + 3ab^2 - b^3 \end{array} \right\}$ ix. $a^3 \pm b^3$			*

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				K	U	A
12.2	Remainder Theorem and Factor theorem	12.2.1	apply remainder theorem to find remainder when a polynomial is divided by a linear polynomial;	*		*
		12.2.2	define zeros of a polynomial (the value of the variable for which the value of polynomial becomes zero i.e. $P(x)=0$);			
		12.2.3	apply the concept of zero polynomial;			*
12.3	Factorization of a Cubic Polynomial	12.3.1	apply factor theorem to factorize a cubic polynomial.			*
13. Algebraic Manipulation		Candidates should be able to:				
13.1	Higher Common Factor and Least Common Multiple	13.1.1	find the highest common factor (H.C.F) and the least common multiple (L.C.M) of algebraic expressions;			*
		13.1.2	apply the factor and division method to determine H.C.F and L.C.M;			*
		13.1.3	apply H.C.F, L.C.M and their relationship in solving problems;			*
13.2	Basic Operations on Algebraic Fractions	13.2.1	simplify fractional expressions or rational expressions involving basic operations of $+$, $-$, \times , \div ;			*
13.3	Square Root of Algebraic Expression	13.3.1	calculate the square root of algebraic expression by factorization and division.			*

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14. Linear Equations and Inequalities		Candidates should be able to:				
14.1	Linear Equations	14.1.1	define linear equation in one variable;	*		*
		14.1.2	solve linear equation with real coefficients;			
		14.1.3	convert equations, involving radicals, to simple linear form and find their solutions and their verifications;			
		14.1.4	solve word problems based on the linear equation and verify its solutions;			
14.2	Equations involving Absolute Value	14.2.1	define absolute value;	*		*
		14.2.2	solve the equation involving absolute value in one variable;			
14.3	Linear Inequalities	14.3.1	define inequalities ($>$, $<$) and \geq, \leq ;	*	*	
		14.3.2	describe the properties of inequalities (i.e. trichotomy, transitive, additive and multiplicative);			
14.4	Solving Linear Inequalities	14.4.1	solve linear inequalities with real coefficients in one variable;		*	*
		14.4.2	represent the solution of linear inequalities on the number line.			
15. Quadratic Equations		Candidates should be able to:				
15.1	Quadratic Equation	15.1.1	define quadratic equation;	*	*	
		15.1.2	distinguish between quadratic equation and other equation;			
15.2	Solution of Quadratic Equations	15.2.1	solve a quadratic equation in one variable by: i. factorization method ii. completing the square method;			*

NOTES

			K	U	A
15.3 Quadratic Formula	15.3.1 15.3.2 15.3.3	apply method of completing square to derive quadratic formula; use quadratic formula to solve quadratic equations; solve word problems based on the quadratic equation and verify and validate solutions (e.g. negative value of dimension is not acceptable).			* * *
16. Matrices and Determinants	Candidates should be able to:				
16.1 Introduction to Matrices	16.1.1 16.1.2	define matrix with real entries; define: i. rows and columns of a matrix ii. the order of a matrix iii. equality of two matrices;	* *		
16.2 Types of Matrices (up to order 3×3)	16.2.1 16.2.2	describe row matrix, column matrix, rectangular matrix, square matrix, zero/null matrix, identity matrix, scalar matrix, diagonal matrix, symmetric matrix; find the transpose of a matrix;		*	*
16.3 Addition and Subtraction of Matrices (up to order 3×3)	16.3.1 16.3.2 16.3.3 16.3.4 16.3.5	discuss whether the given matrices are conformable for addition/subtraction; find the addition and subtraction of matrices; verify commutative and associative laws under addition; define the additive identity of a matrix; find the additive inverse of a matrix;	* *	*	* * *
16.4 Multiplication of Matrices (up to order 2×2)	16.4.1 16.4.2 16.4.3 16.4.4 16.4.5 16.4.6 16.4.7	discuss whether the given matrices are conformable for multiplication; find the multiplication of a matrix by a real number; find the multiplication of two (or three) matrices; verify associative law under multiplication; verify distributive laws; verify with the help of examples that commutative law under multiplication does not hold in general (i.e. $AB \neq BA$); verify with the help of examples that $(AB)^t = B^t A^t$.		*	* * * * *

NOTES

			K	U	A
16.5	Multiplicative Inverse of Matrix (up to order 2×2)	16.5.1		*	
		16.5.2			*
		16.5.3	*		
		16.5.4			*
		16.5.5			*
		16.5.6	*		
		16.5.7			*
		16.5.8			*
		16.5.9			*
16.6	Solution of Simultaneous Linear Equations	16.6.1			*
17. Fundamentals of Geometry		Candidates should be able to:			
17.1	Properties of Angles	17.1.1		*	
		17.1.2		*	
17.2	Angles	17.2.1			*
		17.2.2			*

NOTES

			K	U	A
17.3 Parallel Lines	17.3.1	illustrate through figures the following properties of parallel lines: i. two lines which are parallel to the same given line are parallel to each other ii. if three parallel lines are intersected by two transversals in such a way that the two intercepts on one transversal are equal to each other, the two intercepts on the second transversal are also equal. iii. a line through the midpoint of a side of a triangle parallel to another side bisects the third side;		*	
	17.3.2	apply the above properties to solve related problems;			*
	17.3.3	illustrate corresponding angles, alternate angles, interior angles;		*	
	17.3.4	apply the following relations in problem solving: i. pairs of corresponding angles are equal ii. pairs of alternate interior angles are equal iii. pair of interior angles on the same side of transversal is supplementary;			*
17.4 Congruent and Similar Figures	17.4.1	describe congruent and similar figures and symbols used to represent them;		*	
	17.4.2	describe the following properties of congruent triangles: i. $SSS \cong SSS$ ii. $SAS \cong SAS$ iii. $AAS \cong AAS$ iv. $RHS \cong RHS$;		*	
	17.4.3	apply the properties of congruency and similarity in order to find the unknown measurements;			*

NOTES

			K	U	A
17.5 Quadrilaterals	17.5.1	apply the following properties of a square to find the unknown measurements: i. the four sides of a square are equal ii. the four angles of a square are right angles iii. diagonals of a square bisect each other and are equal;			*
	17.5.2	apply the following properties of a rectangle to find the unknown measurements: i. opposite sides of a rectangle are equal. ii. the four angles of a rectangle are right angles iii. diagonals of a rectangle bisect each other;			*
	17.5.3	apply the following properties of a parallelogram to find the unknown measurements: i. opposite sides of a parallelogram are equal ii. opposite angles of a parallelogram are equal iii. diagonals of a parallelogram bisect each other;			*
17.6 Circle	17.6.1	define circle and its parts such as centre, radius, diameter, chord, arc, major and minor arcs, semicircle and segment of the circle;	*		
	17.6.2	describe sector and secant of a circle, concyclic points, tangent to a circle and concentric circles;		*	
	17.6.3	apply the following properties in different geometrical figures: i. the angle in a semicircle is a right angle ii. the angles in the same segment of a circle are equal iii. the central angle of a minor arc of a circle, is double that of the angle subtended by the corresponding major arc.			*

NOTES

			K	U	A
18. Practical geometry		Candidates should be able to:			
18.1 Construction of Triangle	18.1.1	draw a triangle when: i. two sides and the included angle is given, ii. one side and two of the angles is given, iii. two of its sides and the angle opposite to one of them (with all the three possibilities);			*
	18.1.2	draw: i. angle bisectors ii. altitudes iii. perpendicular bisectors iv. medians of a given triangle and verify their concurrency;			*
18.2 Construction of Quadrilateral	18.2.1	draw a rectangle when: i. two adjacent sides are given ii. diagonal and one side are given;			*
	18.2.2	draw a square when its diagonal is given;			*
	18.2.3	draw a parallelogram when two adjacent sides and the angle included between them is given;			*

NOTES

				K	U	A
19. Areas and Volumes		Candidates should be able to:				
19.1	Pythagoras' Theorem	19.1.1	state Pythagoras' theorem;	*		*
		19.1.2	solve right angled triangle using Pythagoras theorem;			
19.2	Areas	19.2.1	find the area of: i. a triangle when three sides are given (apply Heron's formula) ii. a triangle whose base and altitude (height) are given iii. an equilateral triangle when its one side is given iv. a rectangle when its two adjacent sides are given v. a parallelogram when base and altitude (height) are given vi. a square when its one side is given;			*
		19.2.2	find the area of a circle and a semi circle when radius / diameter is given;			*
		19.2.3	find the area enclosed by two concentric circles whose radii are given;			*
		19.2.4	solve problems related with areas of triangle, rectangle, square, parallelogram and circle;			*
19.3	Volumes	19.3.1	find the volume of: i. a cube when its one edge is given, ii. a cuboid when its length, breadth and height are given, iii. a right circular cylinder whose base radius and height are given, iv. a right circular cone whose radius and height are given, v. a sphere and a hemisphere when radius / diameter is given;			*
		19.3.2	solve problems related to volume of cube, cuboid, cylinder, cone and sphere.			*

NOTES

			K	U	A
20. Introduction to Coordinate Geometry		Candidates should be able to:			
20.1 Distance Formula	20.1.1	describe coordinate geometry;		*	
	20.1.2	derive distance formula to find distance between two points given in Cartesian plane;			*
	20.1.3	apply distance formula to find distance between two given points;			*
20.2 Collinear Points	20.2.1	define collinear points;	*		
	20.2.2	distinguish between collinear and non-collinear points;		*	
	20.2.3	apply distance formula to show whether the given points are collinear or non collinear;			*
	20.2.4	apply distance formula to show that the given three non-collinear points form: i. an equilateral triangle ii. an isosceles triangle iii. a right angled triangle iv. a scalene triangle;			*
20.3 Midpoint Formula	20.3.1	apply the formula to find the midpoint of the line segment joining two given points.			*
	20.3.2	solve problems related to midpoint formula.			*

NOTES

4. Scheme of Assessment

Class IX

Table 1: Number of Student Learning Outcomes by Cognitive Level

Topic No.	Topics	No. of Sub-Topics	SLOs			Total
			K	U	A	
1.	Percentage, Ratio and Proportion	4	1	3	6	10
2.	Zakat, Ushr and Inheritance	3	0	3	4	7
3.	Business Mathematics	3	1	2	6	7
4.	Financial Mathematics	5	2	5	4	11
5.	Consumer Mathematics	3	0	3	5	8
6.	Exponents and Logarithms	5	3	3	7	13
7.	Arithmetic and Geometric Sequences	5	0	3	7	10
8.	Sets and Functions	5	3	2	5	10
9.	Linear Graphs	2	1	4	3	8
10.	Basic Statistics	4	0	2	8	10
	Total	39	11	30	55	94
	Percentage		11	31	58	100

Table 2: Allocation of Marks for the Multiple Choice Questions (MCQs), and Constructed Response Questions (CRQs)

Topic No.	Topics	No. of Sub-Topics	Marks		
			Multiple Choice Questions	Constructed Response Questions	Total
1.	Percentage, Ratio and Proportion	4	3	3	6
2.	Zakat, Ushr and Inheritance	3	2	4	6
3.	Business Mathematics	3	3	5	8
4.	Financial Mathematics	5	4	3	7
5.	Consumer Mathematics	3	4	5	9
6.	Exponents and Logarithms	5	3	5	8
7.	Arithmetic and Geometric Sequences	5	3	4	7
8.	Sets and Functions	5	4	5	9
9.	Linear Graphs	2	2	5	7
10.	Basic Statistics	4	2	6	8
	Total	39	30	45	75

Table 3: Paper Specifications

Topic No.	Topics	Marks Distribution		Total Marks
1.	Percentage, Ratio and Proportion	MCQs 3 @ 1 Mark CRQ 1 @ 3 Marks		6
2.	Zakat, Ushr and Inheritance	MCQs 2 @ 1 Mark *CRQs 2 @ 4 Marks each Choose any ONE from TWO		6
3.	Business Mathematics	MCQs 3 @ 1 Mark *CRQs 2 @ 5 Marks each Choose any ONE from TWO		8
4.	Financial Mathematics	MCQs 4 @ 1 Mark CRQ 1 @ 3 Marks		7
5.	Consumer Mathematics	MCQs 4 @ 1 Mark CRQ 1 @ 5 Marks		9
6.	Exponents and logarithms	MCQs 3 @ 1 Mark *CRQs 2 @ 5 Marks each Choose any ONE from TWO		8
7.	Arithmetic and Geometric Sequences	MCQs 3 @ 1 Mark CRQ 1 @ 4 Marks		7
8.	Sets and Functions	MCQs 4 @ 1 Mark *CRQs 2 @ 5 Marks each Choose any ONE from TWO		9
9.	Linear Graphs	MCQs 2 @ 1 Mark CRQ 1 @ 5 Marks		7
10.	Basic Statistics	MCQs 2 @ 1 Mark *CRQs 2 @ 6 Marks each Choose any ONE from TWO		8
	Total Marks	MCQs 30	CRQs 45	75

* There will be TWO questions and the candidates will be required to attempt any ONE by making a choice out of the TWO.

Class X

Table 4: Number of Student Learning Outcomes by Cognitive Level

Topic No.	Topics	No. of Sub-Topics	SLOs			Total
			K	U	A	
11.	Algebraic Formulae and Applications	4	1	3	12	16
12.	Factorization	3	1	0	4	5
13.	Algebraic Manipulation	3	0	0	5	5
14.	Linear Equations and Inequalities	4	3	2	5	10
15.	Quadratic Equations	3	1	1	4	6
16.	Matrices and Determinants	6	5	4	17	26
17.	Fundamentals of Geometry	6	1	7	9	17
18.	Practical geometry	2	0	0	5	5
19.	Areas and Volumes	3	1	0	7	8
20.	Introduction to Coordinate Geometry	3	1	2	6	9
	Total	37	14	19	74	107
	Percentage		13	18	69	100

Table 5: Allocation of Marks for the Multiple Choice Questions (MCQs), and Constructed Response Questions (CRQs)

Topic No.	Topics	No. of Sub-Topics	Marks		
			Multiple Choice Questions	Constructed Response Questions	Total
11.	Algebraic Formulae and Applications	4	3	5	8
12.	Factorization	3	3	5	8
13.	Algebraic Manipulation	3	3	4	7
14.	Linear Equations and Inequalities	4	3	5	8
15.	Quadratic Equations	3	2	5	7
16.	Matrices and Determinants	6	4	5	9
17.	Fundamentals of Geometry	6	4	5	9
18.	Practical geometry	2	1	4	5
19.	Areas and Volumes	3	4	4	8
20.	Introduction to Coordinate Geometry	3	3	3	6
	Total	37	30	45	75

Table 6: Paper Specifications

Topic No.	Topics	Marks Distribution		Total Marks
11.	Algebraic Formulae and Applications	MCQs 3 @ 1 Mark *CRQs 2 @ 5 Marks each Choose any ONE from TWO		8
12.	Factorization	MCQs 3 @ 1 Mark *CRQs 2 @ 5 Marks each Choose any ONE from TWO		8
13.	Algebraic Manipulation	MCQs 3 @ 1 Mark *CRQs 2 @ 4 Marks each Choose any ONE from TWO		7
14.	Linear Equations and Inequalities	MCQs 3 @ 1 Mark CRQ 1 @ 5 Marks		8
15.	Quadratic Equations	MCQs 2 @ 1 Mark *CRQs 2 @ 5 Marks each Choose any ONE from TWO		7
16.	Matrices and Determinants	MCQs 4 @ 1 Mark *CRQs 2 @ 5 Marks each Choose any ONE from TWO		9
17.	Fundamentals of Geometry	MCQs 4 @ 1 Mark CRQ 1 @ 5 Marks		9
18.	Practical Geometry	MCQ 1 @ 1 Mark CRQ 1 @ 4 Marks		5
19.	Areas and Volumes	MCQs 4 @ 1 Mark CRQ 1 @ 4 Marks		8
20.	Introduction to Coordinate Geometry	MCQs 3 @ 1 Mark CRQ 1 @ 3 Marks		6
	Total Marks	MCQs 30	CRQs 45	75

* There will be TWO questions and the candidates will be required to attempt any ONE by making a choice out of the TWO.

- 4.1 Tables 1 and 4 indicate the number and nature of SLOs in each topic in classes IX and X respectively. This will serve as a guide in the construction of the examination paper. It also indicates that more emphasis has been given to the Understanding (31% in IX and 18% in X), Application and higher order skills (58% in IX and 69% in X) to discourage rote memorization. Tables 1 and 4, however, do not translate directly into marks.
- 4.2 There will be two examinations, one at the end of Class IX and one at the end of Class X.
- 4.3 In each class, the theory paper will be in two parts: paper I and paper II. Both papers will be of duration of 3 hours.

- 4.4 Paper I theory will consist of 30 compulsory, multiple choice questions. These questions will involve four response options.
- 4.5 Paper II theory will carry 45 marks and consist of a number of compulsory, constructed response questions. There will be no choice among the topics in constructed response questions but it may be within the topic.
- 4.6 All constructed response questions will be in a booklet which will also serve as an answer script.

5. Teaching-Learning Approaches and Classroom Activities

- 5.1 As the AKU-EB syllabus focuses on understanding and higher order thinking skills, teachers need to encourage activity and problem-based classroom practices.
- 5.2 The following strategies are recommended:

- Demonstration
- Discussion based teaching
- Inquiry approach
- Specialization/Generalization
- Problem Solving
- Seeking relationship
- Investigation
- Open-ended questions
- Presentations
- Brainstorming
- Group discussion
- Concept building through using and developing low/no cost material

6. Recommended Texts and Reference Materials

Recommended Books

1. Malik Muhammad Aslam, Maqsood Raza Ahmed (2012) first edition *General Mathematics 9*. Lahore: Ali Brotheran.
2. Punjab Textbook Board (2007). *Mathematics for Class X*. Lahore: Punjab Textbook Board.

Reference Books

1. Oxford University Press. *New Syllabus D Mathematics Book 1*. Karachi: Oxford University Press.
2. Oxford University Press. *New Syllabus D Mathematics Book 2*. Karachi: Oxford University Press.
3. Oxford University Press. *New Syllabus D Mathematics Book 3*. Karachi: Oxford University Press.
4. Oxford University Press. *New Syllabus D Mathematics addendum Book 4*. Karachi: Oxford University Press.

Reference Materials

- Utility Bills
- Bank Brochures
- Sample debit and credit cards
- Daily Newspapers (For inter conversion of currency value)

Recommended Websites

A+Math	http://www.aplusmath.com/
AAA Math	http://www.aaamath.com/
Academic Info-Mathematics	http://www.academicinfo.net/math.html
Algebra Buster	http://www.algebra-online.com/
Algebra Helper	http://www.algebrahelp.com/index.jsp
Class Zone	http://www.classzone.com/math_middle.cfm
Click on Bricks	http://kathyschrock.net/clickonbricks/index2.htm
Cool Math	http://www.coolmath.com/
Discovery School (Mathematics)	http://school.discovery.com/lessonplans/math.html
Frank Potter's Science Gems- Mathematics	http://www.sciencegems.com/math.html
Funbrain	http://www.funbrain.com/numbers.html
Geometry	http://www.mathleague.com/help/geometry/geometry.htm
Internet Mathematics Library	http://www.mathforum.org/library
MAPLE	http://www.maplesoft.com
Math Archives	http://www.archives.math.utk.edu/
Math Glossary	http://www.harcourtschool.com/glossary/math_advantage
Math Goodies	http://www.mathgoodies.com
Math World	http://www.mathworld.wolfram.com
Math2	http://www.math2.org/
MATHEMATICA	http://www.wolfram.com/products/mathematica/index.htm
Mathematical Interactivities	http://mathematics.hellam.net/
MathStories	http://www.mathstroies.com
Mega Mathematics	http://www.c3.lanl.gov/mega-math/
Purplemath	http://www.purplemath.com/internet.htm
S.O.S. Mathematics	http://www.sosmath.com
Superkids Educational Software Review	http://www.superkids.com/aweb/tools/math/index.shtml
Teaching madeEasier	http://www.teachingmadeasier.com/math.html
The MathWorks (MATLAB)	http://www.mathworks.com
Webmath	http://www.webmath.com/

7. Definition of Cognitive Levels and Command Words

7.1 Definition of Cognitive Levels

Knowledge

This requires knowing and remembering facts and figures, vocabulary and contexts, and the ability to recall key ideas, concepts, trends, sequences, categories, etc. It can be taught and evaluated through questions based on: who, when, where, what, list, define, identify, label, tabulate, quote, name, state, etc.

Understanding

This requires understanding information, grasping meaning, interpreting facts, comparing, contrasting, grouping, inferring causes/reasons, seeing patterns, organizing parts, making links, summarizing, identifying motives, finding evidence, etc. It can be taught and evaluated through questions based on: why, how, show, demonstrate, paraphrase, interpret, summarize, explain, prove, predict, compare, distinguish, discuss, chart the course/direction, report, etc.

Application

This requires using information or concepts in new situations, solving problems, organizing information and ideas, using old ideas to create new ones, generalizing from given facts, analyzing relationships, relating knowledge from several areas, drawing conclusions, evaluating worth, etc. It can be taught and evaluated through questions based on: differentiate, analyze, show relationship, propose an alternative, prioritize, give reasons for, categorize, corroborate, compare and contrast, create, design, solve, formulate, integrate, rearrange, reconstruct/recreate, reorganize, predict consequences, etc.

7.2 Definition of Command Words

Knowledge

Define:	Only a formal statement or equivalent paraphrase is required. No examples need to be given.
Identify:	Pick out, recognizing specified information from a given content or situation.
State:	To express the particulars of; to set down in detail or in gross; to represent fully in words; to narrate; to recite; as, to state the facts of a case, one's opinion, etc.
Write:	To compose, execute or produce in words, characters or figures.

Understanding

Construct:	To set in order or something formulated or built systematically or frame a concept, model, or schematic idea.
Describe:	To state in words (using diagrams where appropriate) the main points of the topic.
Discuss:	To give a critical account of the points involved in the topic.
Distinguish:	To identify those characteristics which always or sometimes distinguish between two categories.
Explain:	To give reason or use some reference to theory, depending on the context.
Illustrate:	To give clear examples to state, clarify or synthesize a point of view.
Interpret:	To translate information from observation, charts, tables, graphs, and written material in a supportable manner.
Locate:	To place or to set in a particular spot or position.

Application

Apply:	To use the available information in different contexts to relate and draw conclusions.
Calculate:	Is used when a numerical answer is required. In general, working should be shown, especially where two or more steps are involved.
Convert:	To change or adapt from one system or units to another.
Derive:	To arrive at a general formula by calculating step by step.
Draw:	To make a simple freehand sketch or diagram. Care should be taken with proportions and the clear labelling of parts.
Estimate:	To calculate approximately (the amount, extent, magnitude, position, or value of something).
Factorize:	To resolve or break integers or polynomials into factors.

Find:	Is a general term that may variously be interpreted as calculate, measure, determine, etc.
	In other contexts, describe and give an account of should be interpreted more generally, i.e. the candidate has greater discretion about the nature and the organization of the material to be included in the answer. Describe and explain may be coupled in a similar way to state and explain.
Rationalize:	The simplification of an expression or equation by eliminating radicals without changing the value of the expression or the roots of the equation.
Simplify:	To reduce (an equation, fraction, etc.) to a simple form by cancellation of common factors, regrouping of terms in the same variables, etc.
Solve:	To work out systematically the answer of a given problem.
Use:	To deploy the required attribute in a constructed response.
Verify:	To check or determine the correctness and accuracy of Laws or rules by investigation.

SSC Scheme of Studies³

AKU-EB as a national board offers SSC and HSSC qualifications for both English and Urdu medium schools. The revised SSC Scheme of Studies issued by the Curriculum Wing was implemented from September 2007. Accordingly, each SSC subject will be taught across both the classes IX and X. The Science and Humanities group subjects are offered at SSC level. The marks allocated to subjects in the revised National Scheme of Studies of September 2007 have been followed.

SSC I and II (Class IX and X) subjects on offer for examination

SSC Part-I (Class IX) Science Group

Subjects	Marks			Medium
	Theory	Practical	Total	
English Compulsory-I	75	-	75	English
Urdu Compulsory-I OR Urdu Aasan ^a OR History and Geography of Pakistan-I ^b	75	-	75	Urdu Urdu English
Islamiyat-I OR Ethics-I ^c	*30	-	*30	English / Urdu
Pakistan Studies-I	*45	-	*45	English / Urdu
Mathematics-I	75	-	75	English / Urdu
Physics-I	65	10	75	English / Urdu
Chemistry-I	65	10	75	English / Urdu
Biology-I OR Computer Science-I	65	10	75	English / Urdu English
Total:	*495	30	*525	

SSC Part-II (Class X) Science Group

Subjects	Marks			Medium
	Theory	Practical	Total	
English Compulsory-II	75	-	75	English
Urdu Compulsory-II OR Sindhi ^a OR History and Geography of Pakistan-II ^b	75	-	75	Urdu Sindhi English
Islamiyat-II OR Ethics-II ^c	*45	-	*45	English / Urdu
Pakistan Studies-II	*30	-	*30	English / Urdu
Mathematics-II	75	-	75	English / Urdu
Physics-II	65	10	75	English / Urdu
Chemistry-II	65	10	75	English / Urdu
Biology-II OR Computer Science-II	65	10	75	English / Urdu English
Total:	*495	30	*525	

- Candidates from the province of Sindh may appear in "Urdu Aasan" in SSC Part I and in "Sindhi" in Part II examination.
- Foreign students may opt HISTORY and GEOGRAPHY OF PAKISTAN in lieu of Urdu Compulsory, subject to the Board's approval.
- For non-Muslim candidates only.
- * The above will be implemented in
SSC Part I 2013 Examinations and onwards
SSC Part II 2014 Examinations and onwards

³ Government of Pakistan September 2007. *Scheme of Studies for SSC and HSSC (Classes IX-XII)*. Islamabad: Ministry of Education, Curriculum Wing.

SSC Part-I (Class IX) Humanities Group

Subjects	Marks	Medium
English Compulsory-I	75	English
Urdu Compulsory-I OR Urdu Aasan ^a OR History and Geography of Pakistan-I ^b	75	Urdu Urdu English
Islamiyat-I OR Ethics-I ^c	*30	English / Urdu
Pakistan Studies-I	*45	English / Urdu
General Mathematics-I	75	English / Urdu
Any three of the following Elective Subjects	225 (75 each)	
1. **Geography-I		English / Urdu
2. General Science-I		English / Urdu
3. Computer Science-I (65+10 practical)		English
4. Economics-I		English / Urdu
5. Civics-I		English / Urdu
6. **History of Pakistan-I		English / Urdu
7. **Elements of Home Economics-I		English / Urdu
8. **Food and Nutrition-I (65+10 practical)		English / Urdu
9. **Art & Model Drawing-I		English
10. **Business Studies-I		English
11. **Environmental Studies-I		English
Total:	*525	

SSC Part-II (Class X) Humanities Group

Subjects	Marks	Medium
English Compulsory-II	75	English
Urdu Compulsory-II OR Sindhi ^a History and Geography of Pakistan-II ^b OR	75	Urdu Sindhi English
Islamiyat-II OR Ethics-II ^c	*45	English / Urdu
Pakistan Studies-II	*30	English / Urdu
General Mathematics-II	75	English / Urdu
Any three of the following Elective Subjects	225 (75 each)	
1. **Geography-II		English / Urdu
2. General Science-II		English / Urdu
3. Computer Science-II (65+10 practical)		English
4. Economics-II		English / Urdu
5. Civics-II		English / Urdu
6. **History of Pakistan-II		English / Urdu
7. **Elements of Home Economics-II		English / Urdu
8. **Food and Nutrition-II (65+10 practical)		English / Urdu
9. **Art & Model Drawing-II		English
10. **Business Studies-II		English
11. **Environmental Studies-II		English
Total:	*525	

SSC Part-I and Part-II (Class IX-X) (Additional Subjects)

SSC Part I	SSC Part II	Marks	Medium
1. **Literature in English-I ^d	1. **Literature in English-II ^d	75 each	English
2. **Commercial Geography-I ^d	2. **Commercial Geography-II ^d		English
3. **Additional Mathematics-I ^d	3. **Additional Mathematics-II ^d		English

a. Candidates from the province of Sindh may appear in "Urdu Aasan" in SSC Part I and in "Sindhi" in Part II examination.

b. Foreign students may opt HISTORY and GEOGRAPHY OF PAKISTAN in lieu of Urdu Compulsory, subject to the Board's approval.

c. For non-Muslim candidates only.

d. Subject will be offered as Additional Subject.

* The above will be implemented in

SSC Part I 2013 Examinations and onwards

SSC Part II 2014 Examinations and onwards

****These subjects are offered ONLY in the May examination.**