

ASSESSMENT FRAMEWORK AND MODEL QUESTION PAPER

COMPUTER SCIENCE

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
COMPUTER SCIENCE 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 Computer Science 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 Computer Science 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. Ms. Rozina Faheem, Principal, FG College of Home economic and Management Sciences, F-11/1 IBD
2. Ms. Sadaf Zehra, Associate Professor, Islamabad Model College for Girls, F-7/2, Islamabad
3. Ms. Sadia Mujaba, Assistant Professor, Islamabad Model College for Girls, I-8/4 Islamabad
4. Dr. Saghir Ahmad, Lecturer, Islamabad Model College for Girls, F-6/2, Islamabad
5. Dr. Nauman Zahid, 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 COMPUTER SCIENCE 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
COMPUTER SCIENCE Grade-IX (SSC-I)
Details of Content Areas/ SLOs

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
A: Computer Systems	[SLO CS-09-A-01] Students will define and describe types of systems (artificial, natural), computer hardware components such as computer architecture (CPU, microprocessors, etc.) Student will understand that • Brief history of computer systems and generation of computers • Basic concept of a system, types of systems • Name and identify the core components of a computer (input/output devices, system unit(motherboard, memory, CPU, power supply, etc.), and data storage devices • Understand and identify Von Neumann Architecture • Computer architecture How data is transmitted within a computer system • What are some of the requirements for a functioning computer systems and what are some key concepts • The core parts of a computer system and how they all work together, including definitions and key functions of computer architecture such as central processing unit (CPU), arithmetic logic unit (ALU), control unit (CU),	Summative for Theory and Practical Based Assessment	Knowledge/ Understanding	Question(s) will be asked in the Annual theory paper as well as Lab work will be assessed in the Practical Based Assessment	40

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	memory, operating system and application software, and data representation in computers (bit, byte, binary, denary/ decimal, hexadecimal) • Difference between hardware engineering and software engineering • Difference between natural and artificial systems • Types and hierarchy of memory with respect to their volatility/retention, speed, storage capacity, cost • Difference between necessary and auxiliary components of a computer system Students will be able to • Recognize and describe key components of a computer system, such as: ○ Differentiate between natural and artificial systems ○ Outline the architecture of the central processing unit (CPU) and the functions of the arithmetic logic unit (ALU) and the control unit(CU) and the registers within the CPU. ○ Differentiate between primary memory, cache, and secondary memory. ○ Describe the main functions of operating systems and application systems. • Explain how the various components interact together to transmit data and instructions • Illustrate the hierarchy of memory and storage devices with respect to their volatility/retention, speed, storage capacity, cost				

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	Differentiate between necessary and auxiliary components of a computer system				
	[SLO CS-09-A-02] Students will be able to identify and explain system software, application software, low-level and high-level programming languages, and their uses. Students will understand that - The main functions of systems software with some examples - The main functions of operating systems and application software - Outline the uses of various application software. Students will be able to - Select an appropriate medium to create artifacts (Planning the document / information flow, editing and alignment of page, paragraphs, text, tables, and graphics) to communicate ideas in various digital tools such as: - Image processing tools (like Photoshop, Canva.com, GIMP etc.) - Word processors (like MS Word, Google Docs etc.) - Presentations (like MS PowerPoint or Google Slides etc.) - Spreadsheets (like MS Excel or Google Sheets)	Summative for Theory and Practical Based Assessment	Knowledge / Understanding/ Application	Question(s) will be asked in the Annual theory paper as well as Lab work will be assessed in the Practical Based Assessment	

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	[SLO CS-09-A-03] Students will be able to identify and analyze data communication, computer networks, networking devices, basic networking systems and understand how data is transmitted and key concepts such as protocols, speeds, etc. Students will understand • How data is transmitted across a computer network for example circuit switching, packet switching, layering, encapsulation, and protocols • Common network topologies and transmission modes • Outline the advantages and disadvantages of wireless networks • Outline the advantages and evolution of the Internet • Outline common applications of the Internet • The internet is the largest computer network ever built and learn how it works • Identify common network problems and provide possible solutions	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	
B: Computational Thinking and Algorithms	[SLO CS-09-B-01] Understand and apply techniques to decompose problems. [SLO CS-09-B-02] Solve simple and complex problems computationally. Students will understand • The importance of computational thinking and problem-solving in computer science. • Principles of computational thinking:	Summative for Theory and Practical Based Assessment	Knowledge / Understanding/ Application	Question(s) will be asked in the Annual theory paper as well as Lab work will be assessed in the Practical Based Assessment	25

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	a) Logical thinking b) Algorithmic thinking • How to identify steps in identifying a computing problem • How to identify the inputs, processes, and outputs of a problem • Different methods to design and construct a solution to a simple problem, such as flow charts, and/or concept maps • Steps to produce simple diagrams to show: a) The structure of a problem b) Subsections and their links to other subsections Students will be able to • Explain the role of computational thinking in computer science • Read and interpret simple computational problems • Apply computational thinking principles to define and refine problems • Identify the procedure appropriate to solving a problem • Evaluate whether the order in which activities are undertaken will result in the required outcome. • Identify the inputs and outputs required in a solution				
C: Programing Fundamentals	[SLO CS-09-C-01] Students will understand web development and differentiate between a website and a web application. Students will • Grasp the basic concepts and principles of web development, including the technologies, languages, and	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	40

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	frameworks commonly used in building websites and web applications. - Understand the distinctive features of web applications. They should learn that web applications are dynamic in nature, offering interactive functionalities, data processing, user authentication, and real-time updates. - Comprehend that websites primarily provide information and content to users, while web applications offer more complex functionality, such as user input, data manipulation, and task execution. Students will be able to... - Distinguish between front end and back-end development - Determine which technology is appropriate for making static and dynamic web pages and web applications - Identify and describe the features and characteristics of a website. This may include static content, informational pages, navigation menus, multimedia elements, and contact forms. - Distinguish between websites and web applications based on specific criteria.				
	[SLO CS-09-C-02] Students should be able to create a static website using HTML/CSS in an appropriate environment. Students will know - What is HTML - What is CSS - What is JavaScript	Summative for Theory and Practical Based	Knowledge / Understanding/ Application	Question(s) will be asked in the Annual theory paper as well as Lab work will be assessed in the Practical Based Assessment	

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	Students will understand • Characteristics, examples, similarities & differences between of static and dynamic website • The purpose of HTML i.e. to display text and image content over the Internet • The capability of HTML documents to hyperlink to other documents/pages • The structure of an HTML document including the underlying DOM tree (Document Object Model) • How JavaScript is used to modify a website Students will be able to • Differentiate between a static and dynamic website • Create a static website using HTML & CSS in an IDE like Visual Studio, NetBeans etc.	Assessment			
	[SLO CS-09-C-03] Students should be able to create dynamic websites using JavaScript as the frontend scripting. Students will understand • Variables, Data Types and Arrays in JavaScript • Variable assignment in JavaScript • What aspects of HTML can be changed with JavaScript • What aspects of CSS can be changed with JavaScript Students will be able to • Use JavaScript to modify an HTML website to create a dynamic website	Summative for Theory and Practical Based Assessment	Knowledge / Understanding/ Application	Question(s) will be asked in the Annual theory paper as well as Lab work will be assessed in the Practical Based Assessment	
	[SLO CS-09-C-04] Students should be able to implement common algorithms that use sequence, selection, and repetition in JavaScript.	Summative for Theory and	Knowledge / Understanding/ Application	Question(s) will be asked in the Annual theory paper as well as Lab work will be	

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	Students will understand • An algorithm is a set of instructions • How the sequence of instructions affects the result • Sequence, Selection and Repetition in JavaScript • Arrays in JavaScript • Students will be able to • Construct an array and populate its values using a loop in JavaScript	Practical Based Assessment		assessed in the Practical Based Assessment	
	[SLO CS-09-C-05] Students will determine ways of debugging their code in JavaScript Students will understand • Code written outside of a function is hard to test • Code written inside a function can be tested • That they can write code that calls functions to ensure the results are correct • Using a debugger allows programmers to set a breakpoint to stop execution of their code to see the state of variables mid-execution for the purpose of discovering errors in their code Students will be able to • Write code to invoke functions and check their return values for correctness • Set a breakpoint to debug mistakes in their code	Summative for Theory and Practical Based Assessment	Knowledge / Understanding/ Application	Question(s) will be asked in the Annual theory paper as well as Lab work will be assessed in the Practical Based Assessment	
D: Data and Analysis	[SLO CS-09-D-01] Students will explain the scope of the data science field as an interdisciplinary field (computer sciences, mathematics & statistics, and business knowledge	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	25

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	& understanding). - Students will understand the key concepts and principles of data science - Students will know definitions of key terms: data science, data analytics, computer science, mathematics, statistics, and business knowledge & understanding Students will be able to: - Identify the difference between data science, data analytics, computer science, mathematics, statistics, and business knowledge & understanding - Students will develop analytical thinking skills by reading case studies on data science applications - Read a case study or a newspaper article or online paper to identify a problem that can be solved using data science				
	[SLO CS-09-D-02] Students will define and explain data types, data collection, and data storage. Students will understand: - Data is observations or measurements represented as numbers, text, or multimedia(image, sound, video, etc.)and the dataset is a collection of this data that is related in some context. - Different sources of data like sensors - The concept of dataset - Table (relation) - Rows (record, tuple, object) - Column (object attributes, properties)	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	- Types Object attributes or properties: Categorical or Qualitative Attribute - Nominal - Binary - Ordinal - Numeric or Quantitative - Interval-scaled, - Ratio-scaled, - Discrete - Continuous - Data collection, analysis, and visualization. - Students will know how to use summary statistics to formulate sentences and describe the data, data collection methodology, how the data will be used Students will be able to: - Explain how data, information, and knowledge are represented for computational use. - Collect, upload, and share personal data collected in class(e.g., Stick Figure exercise in Learning Activity#2) - Learn about different representations of distributions using software. - Utilize software to begin to analyze plots of data collected - Interpret different types of data: Numerical and graphical summaries. - Understand that rows and columns area form of data structure. - Explain why the relationship between the variables might exist, or, if there is no relationship, why that might be so				

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	- Construct and interpret a frequency table. (Advanced) Load data into RStudio. Students will be able to: - Distinguish between data and dataset - Collect data from different sources - Identify missing data in a dataset - Construct summary statements about the data, how it is collected, how it is used, and how to work with it - Explain why the relationship between the variables might exist, or if there is no relationship, why that might be so. (Advanced) Construct and interpret a frequency table (Advanced) Understand the connection of databases to machine learning. (Advanced) Understand the differences between structured and unstructured data, quantitative and qualitative data)				
	[SLO CS-09-D-03] Students will be able to define and explain big data, and applications of big data in real-world business Students will understand - What insights big data can provide to businesses - What tools and systems are used by big data scientists and engineers - How predictive modeling and graph analytics can be leveraged to model problems? (Advanced) Be able to ask the right questions about data and do basic exploration of large, complex datasets.	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	- Students will know... - Applications of bigdata - What makes big data valuable? - Characteristics of big data - How data science gets value out of big data - Introduction to concepts such as the Internet of Things(IoT) and the role of the cloud. Students will be able to - Identify the different types of big data - Recognize if big data is used to solve a business problem - Read and critique published stories by interpreting the visualizations and experimental conclusions - Formulate questions, identify existing or similar business cases, and evaluate how the new business solutions that leverage big data stack up against the old.				
E: Applications of Computer Science	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing Students will understand... - What is AI and Machine learning and the kind of problems each is able to solve - Different areas of AI–Speech recognition, Computer Vision, Natural Language Processing, and Expert Systems. - Different applications of AI in domains like health care, education, gaming, agriculture. - What is cloud computing and the need for it	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	10

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	Students will be able to... - Identify applications that can be solved using these technologies and techniques - Identify different applications of AI				
	[SLO CS-09-E-02] Students will be able to discuss the social implication of the usage of AI in decision making that affects humans Students will understand... - AI algorithms make decisions that work for most people but harm or disadvantage others. - Designers to AI algorithms should keep their focus on benefiting people Students will know... - Ethical issues in some popular AI tools Students will be able to... - Explain what some ethical issues are when computers make decisions for humans - Identify decisions that might harm humanity - Identify decisions that might be biased towards are certain group of individuals	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	
F: Impacts of Computing	[SLO CS-09-F-01] Understand and apply safe and responsible use of computers (responsible use of hardware, appropriate use of software, and safe use of digital platforms like data searches, social networking, etc.) Students will understand...	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	15

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	- The selection and use different hardware, software, and digital platforms for safe use depending on the tasks to be executed - The need for laws to protect user privacy and intellectual property Students will know... - What is meant by the key concepts of data ethics and intellectual property rights - How to safely use data searches and social networking sites - Legal issues related to computing such as software piracy laws Students will be able to... - Discuss how ethics are guidelines that dictate the responsible use of computing systems - Identify computer related laws - Interpret software agreements, licenses, and application terms				
	[SLO CS-09-F-02] Analyse the beneficial and harmful effects of computing innovations such as social networking, fake news, etc. Students will understand... - Every computing innovation will solve a need but can cause harm to users as well - Benefits can be the need being solved and the societal & user benefits - Harmful effects of computing innovations on users,	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	society, environment, etc. - The tradeoffs between information privacy, system security and usability - The importance of designing computing systems that will protect user privacy and increase system security Students will know... - What is meant by key concepts and be able to differentiate between them: scams, software piracy, freeware, shareware, opensource, malware, phishing, hacking - The tensions between censorship of internet and freedom of speech - Common types of security problems such as spam, spyware, pharming, cookies etc. Students will be able to... - Explain basics of reliable and unreliable sources of information - Distinguish between fake news and credible sources of information - Identify malicious internet scams, phishing, pharming, fraudulent activity, fake websites - Evaluate designs of computing technologies(e.g. social media, generative AI etc.) based on their user privacy policies and agreements				
	[SLO CS-09-F-03] Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices. Students will understand... Environmental impacts of computing	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	- Computing has changed the way we live and conduct business - Impact of computing on globalization and e-commerce Students will know... - The key terms: patents, trademarks, copyrights Students will be able to... - Strategize on how to minimize the environmental impacts of computing - Search and identify patents, trademarks, and copyright information for computing applications - Determine if technology design maybe infringing on intellectual property - Evaluate designs of computing technologies in terms of personal, environmental, ethical, legal, social, economic, and cultural impacts				
G: Digital Literacy	-	-	-	Not applicable for grade 9.	-
H: Entrepreneurship in the digital age	[SLO EN-09-H-01]: Students identify a problem and create a business using design thinking Students will understand: - Skills needed for problem solving: 4Cs of the 21st century (collaboration, critical thinking, creativity, communication) - Define design thinking as a process which includes: - Empathizing to discover the problem - Defining or interpreting the problem	Summative for Theory	Knowledge / Understanding	Question(s) will be asked in the Annual theory paper	10

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	○ Ideating on how to solve the problem ○ Experimenting or prototyping the solution ○ Evolving the solution as insights redefine the problem ● How to define & articulate an entrepreneurial solution to address a local or global problem ● Sustainable development goals(SDGs) as the world's development goals, and linking these SDGs to potential problems that need resolving ● Growth mindset vs. Fixed mindset Students will be able to: ● Define a problem in their local context ● Categorize the problem according to SDGs ● Use design thinking to create a solution ● Identify advantages of having a growth mindset in entrepreneurship				
	[SLO EN-09-H-02]: Students will use digital tools to create and present a business plan for an entrepreneurial solution. Students will understand: ● Key elements of a business plan containing at least the following ○ Market size(in terms of TAM total addressable market, SAM Serviceable Available Market, and SOM Serviceable Obtainable Market) ○ Solution product/service & unique selling proposition ○ Financial feasibility ○ Go to market strategy ● How to collect & synthesize information to create a	Summative for Theory and Practical Based Assessment	Knowledge / Understanding/ Application	Question(s) will be asked in the Annual theory paper as well as Lab work will be assessed in the Practical Based Assessment	

Content Domain/ Area	SLO No./ Description	Form of Assessment	Cognitive Level (Knowledge, Understanding, Application)	Remarks	Number of Periods required (1 period= 40 minutes)
	business plan • How to evaluate a business plan Students will be able to: • Create a business plan using digital tools like MS Word or Google Docs to communicate their business problem, suggested solution, and financial feasibility • Evaluate a business plan using criteria such as communication, feasibility, market potential etc.				

PBA STANDS FOR “PRACTICAL BASED ASSESSMENT”

FINAL CONCEPTUAL PATTERN OF SSC-I & II

Physics, Chemistry, Biology and Computer Science

Total Marks: 60 Marks (Theory Paper)

Components	Detail
Marks Allocated to MCQs	30 marks
Total MCQs	60
Marks per MCQ	0.5
Objective Portion – MCQs (30 Marks)	(Time Allowed: 1:20 hours) Section-A 40 straight MCQs ($40 \times 0.5 = 20 \text{ marks}$) 20 MCQs with (stimulus/situations/scenario) ($20 \times 0.5 = 10 \text{ marks}$)
Subjective Portion – SRQs & ERQs (30 Marks)	(Time Allowed: 1:40 hours) Section- B Section B having 6 questions. Each question has internal choice. Each question having 3 marks. ($3 \times 6 = 18 \text{ marks}$) Section -C Section C having 2 questions. Each question has internal choice. Each question having 6 marks. ($2 \times 6 = 12 \text{ marks}$)
Subjective Portion Structure	6 straight SRQs (with no sub parts) 2 straight ERQs (may have part but with same concept)

Important Note:

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

PHY/CHEM/BIO/COMP SSC-I

CORRECTLY FILLED



WRONG METHOD

To be filled-in by the Candidate

PAPER VERSION

(A)

(B)

(C)

(D)

(E)

Time Allowed: 1:20 Hours

Total Marks: 30

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)	16	(A)	(B)	(C)	(D)	31	(A)	(B)	(C)	(D)	46	(A)	(B)	(C)	(D)
2	(A)	(B)	(C)	(D)	17	(A)	(B)	(C)	(D)	32	(A)	(B)	(C)	(D)	47	(A)	(B)	(C)	(D)
3	(A)	(B)	(C)	(D)	18	(A)	(B)	(C)	(D)	33	(A)	(B)	(C)	(D)	48	(A)	(B)	(C)	(D)
4	(A)	(B)	(C)	(D)	19	(A)	(B)	(C)	(D)	34	(A)	(B)	(C)	(D)	49	(A)	(B)	(C)	(D)
5	(A)	(B)	(C)	(D)	20	(A)	(B)	(C)	(D)	35	(A)	(B)	(C)	(D)	50	(A)	(B)	(C)	(D)
6	(A)	(B)	(C)	(D)	21	(A)	(B)	(C)	(D)	36	(A)	(B)	(C)	(D)	51	(A)	(B)	(C)	(D)
7	(A)	(B)	(C)	(D)	22	(A)	(B)	(C)	(D)	37	(A)	(B)	(C)	(D)	52	(A)	(B)	(C)	(D)
8	(A)	(B)	(C)	(D)	23	(A)	(B)	(C)	(D)	38	(A)	(B)	(C)	(D)	53	(A)	(B)	(C)	(D)
9	(A)	(B)	(C)	(D)	24	(A)	(B)	(C)	(D)	39	(A)	(B)	(C)	(D)	54	(A)	(B)	(C)	(D)
10	(A)	(B)	(C)	(D)	25	(A)	(B)	(C)	(D)	40	(A)	(B)	(C)	(D)	55	(A)	(B)	(C)	(D)
11	(A)	(B)	(C)	(D)	26	(A)	(B)	(C)	(D)	41	(A)	(B)	(C)	(D)	56	(A)	(B)	(C)	(D)
12	(A)	(B)	(C)	(D)	27	(A)	(B)	(C)	(D)	42	(A)	(B)	(C)	(D)	57	(A)	(B)	(C)	(D)
13	(A)	(B)	(C)	(D)	28	(A)	(B)	(C)	(D)	43	(A)	(B)	(C)	(D)	58	(A)	(B)	(C)	(D)
14	(A)	(B)	(C)	(D)	29	(A)	(B)	(C)	(D)	44	(A)	(B)	(C)	(D)	59	(A)	(B)	(C)	(D)
15	(A)	(B)	(C)	(D)	30	(A)	(B)	(C)	(D)	45	(A)	(B)	(C)	(D)	60	(A)	(B)	(C)	(D)



Federal Board SSC-I Examination
Computer Science Model Question Paper
National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)
(50% MCQs & 50% Descriptive)

SECTION - A (Marks 30)

Time Allowed: 1:20 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

Candidate Sign. _____

Invigilator Sign. _____

Note: Fill the correct bubble for each question on OMR Sheet given in the E-Sheet. Each question carries 0.5 mark.

S #	Question	(A)	(B)	(C)	(D)
1.	A computer model used in a weather forecasting system is primarily designed for:	To archive weather data permanently	To control weather monitoring equipment	To simulate atmospheric conditions and predict future weather	To calculate electricity consumption in weather stations
2.	What is the primary purpose of HTML in web development?	To design the layout and structure of a webpage	To add dynamic behavior and interactivity to a webpage	To manage databases on a website	To control computer operations
3.	Which tag is used to create a hyperlink in HTML?		<a>	<p>	<div>
4.	Which symbol is commonly used to end statements in JavaScript?	Colon (:)	Period (.)	Semi colon (;)	Comma (,)
5.	Why is visualization important in data analysis?	It increases file size	It makes data harder to read	It helps in understanding data easily	It removes unnecessary data
6.	A student organizes exam marks in a table to easily compare results. What does this represent?	Data collection	Data analysis	Data encryption	Data backup
7.	Which programming language is commonly used for web development	HTML	CSS	Java Script	Python
8.	A CSS rule is written as: </>CSS body{ background-color: yellow;} what will happen?	Text becomes yellow	Page background becomes yellow	Image turns yellow	Button color changes to yellow

9.	Students are requested to organize and show the relationships between different topics of Artificial Intelligence, such as machine learning, computer vision, and natural language processing. Which tool would be most suitable for this purpose?	Flowchart	Trace tables	Algorithm	Concept maps
10.	Which scenario best illustrates the transition from Process to Output in an IPO chart for a weather app?	Entering the city name and clicking search.	Calculating the average weekly temperature from raw data.	Converting calculated data into a visual 7-day forecast.	Refreshing the app to check for new server updates.
11.	In a voice assistant system, Natural Language Processing (NLP) is used to:	Convert audio signals into electrical power	Extract meaning and context from human speech input	Encrypt user voice data for security purposes	Connect the assistant to external hardware devices
12.	Which technology is used to build systems like chatbots that can interact with users and provide automated responses?	Machine learning	Expert system	Digital assistance	Computer vision
13.	A student tests a solution by executing it and fixing any errors that appear. Which stage of the problem-solving process is being carried out?	Decomposition	Debugging	Pattern recognition	Abstraction
14.	A student is unable to identify an error in a program. The teacher advises reviewing the flowchart created before coding. How can the flowchart help?	It will automatically correct the error	It will execute the program	It will show the logical sequence of steps and decisions	It will convert the program into machine code
15.	A student creates a web page and wants to display a notification popup. Which JavaScript function will achieve this?	alert()	print()	show()	message()
16.	A student is using several software applications at the same time and the computer becomes slow. Which component should be upgraded to improve performance?	ROM	RAM	Register	Cache
17.	While preparing for exams, a student studies previous question papers to identify similarities in question types and predict possible future questions. Which computational thinking concept is being used?	Decomposition	Pattern recognition	Abstraction	Algorithm

18.	Which of the following classifications represents categorical data?	Quantitative	Binary	Qualitative	Continuous
19.	Big data helps organization to:	Ignore Customers	Reduce Information	Avoid Technology	Make Better Decision
20.	A young entrepreneur evaluates a business idea by gathering customer feedback and studying competitors before making any financial investment. Which stage of the entrepreneurial process is being applied?	Production	Marketing	Empathize	Budgeting
21.	A developer wants to style a webpage by changing colors, fonts, and layout. Which language is used for this purpose?	CSS	HTML	ASP	Java script
22.	Which Technology is used in mobiles for Face recognition?	Computer Vision	NLP	Robotics	Machine learning
23.	Cloud computing primarily offers computing resources and services over the internet. What does it mainly provide?	Online storage and computing services	To replace all computer hardware	To provide internet browsing services only	Only data backup solutions
24.	A school installs the same licensed copy of Microsoft Windows on several computers using one activation key without buying separate licenses for each system. What type of software usage does this represent?	Freeware	Shareware	Pirated Software	Open Source software
25.	While using email, a student receives a message that appears to be from a bank and asks him to urgently enter his password and personal information via a link. What is this type of email known as?	Spam	Phishing	Cookie	Spyware
26.	How does the Control Unit manage instructions while a program is being executed?	It performs mathematical calculations and logic operations	It directs and coordinates all CPU activities during execution	It permanently stores user data and programs	It connects the computer to external hardware devices
27.	Based on the nature of its content, how can fake news be recognized?	True information	Misleading information	Educational content	Verified news
28.	What is the primary purpose of functions in JavaScript?	To store permanent data in the browser	To delete unwanted files from memory	To block advertisements on a webpage	To group reusable blocks of code for performing specific tasks

29.	Why does a computer use secondary storage along with primary memory?	To increase CPU speed	To store data permanently	To control input devices	To process instructions
30.	Which innovation has made it possible to conduct business and trade globally over the internet?	Digital marketing	E-Commerce	Social networking	Radio/ TV broadcasting
31.	Which ability helps entrepreneurs think of innovative and original business ideas?	Coding ability	Graphic designing	Creative thinking	Marketing analysis
32.	When a company collects and analyze users' private data without permission for profit, it leads to which issue?	Data optimization	Privacy violation	System efficiency	Digital collaboration
33.	A student spends most of the day on social media, resulting in poor academic performance and lack of sleep. Which harmful effect of computing does this reflect?	Enhanced productivity	Educational growth	Digital addiction	Improved health
34.	Why are registers regarded as the fastest type of memory in a computer system?	They store large amounts of data permanently	They are built directly inside the CPU for immediate access	They are used for long-term data backup	They are the least expensive type of memory
35.	How does an algorithm help in solving a problem effectively?	It organizes data in random order	It converts programs into machine code automatically	It deletes errors from a program automatically	It provides a clear step-by-step procedure to reach a solution
36.	What is the primary purpose of JavaScript in web development?	To structure the content of a webpage	To style the appearance of a webpage	To make webpages interactive and dynamic	To design the layout of a webpage
37.	Which topology connects all devices to one central device?	Bus	Ring	Star	Mesh
38.	In computer networking, what are protocols defined as?	Set of communication rules	Hardware design specifications	Storage devices used in computers	Programming languages used for software development
39.	Which technology enables everyday physical devices to connect to the internet and exchange data automatically?	Internet of Things	Cloud Computing	Embedded Systems	Device Networking
40.	The 3 Vs of big data are:	Volume, Variety, Velocity	Value, Validity, Visibility	Vision, Voice, Value	Volume, Verification, Vision

		STIMULUS/SITUATION/SCENARIO BASED MCQs							
SCENARIO#1 (FOR QUESTIONS 41-44)		A student is creating a simple website to share school announcements, mainly showing fixed content. To enhance interactivity, the student includes features like pop-up messages on clicks and voice-based controls using speech recognition. During development, the system is divided into modules such as short of attendance and exams schedule, while only key details are considered to keep the design simple. The student uses suitable software tools to write and edit the website code.							
41.	Which software tool can edit website code?	chrome	Visual Studio	Cassandra	MongoDB				
42.	During system development, the system is organized into separate modules such as attendance, examinations, and fees. This process is called:	Abstraction	Decomposition	Iteration	Debugging				
43.	An interaction using voice based controls into actions like saying “Attendance status” could open the attendance module is based on:	Computer vision	Speech Recognition (NLP)	Machine learning	Neural networks				
44.	How does modular design support updating a specific part of a system like the exam section?	By allowing changes in one module independently	It forces changes in the entire system	By merging all modules into one program	By converting code into machine language				
SCENARIO#2 (FOR QUESTIONS 45-48)		A student is developing a JavaScript program to store and display exam marks using an array. The program creates an array of marks and accesses different elements using their index positions. <code>let marks = [35, 50, 75, 100, 65];</code> <code>document.write(marks[1] + "
");</code> <code>document.write(marks[3] + "
");</code> <code>document.write(marks.length);</code>							
45.	What will be printed when the code executes?	35, 75, 5	50, 100, 5	50, 75, 4	35, 100, 4				
46.	Which JavaScript statement correctly adds the value 110 to the end of an array named marks?	marks.add(110)	marks.push(110)	marks.insert(110)	marks.append(110)				
47.	What does “marks.length” return in a JavaScript array?	Number of indexes starting from 0	Total number of elements in the array	Last index value of the array	Memory size of the array				
48.	Which JavaScript statement correctly calculates and displays the sum of the second and fourth elements of an array named marks?	document.write(marks[1] + marks[3]);	document.write(marks[2] + marks[4]);	document.write(marks.sum(1, 3));	document.write(marks.sum(2, 4));				
SCENARIO#3 (FOR QUESTIONS 49-52)		A school is setting up a computer network for its lab. The technician connects all computers to a central device so that if one computer fails, the others keep working. However, the technician also considers another design where all computers are connected in a circular path, where failure of one node can affect the entire network. The goal is to choose a topology that is reliable, easy to manage, and suitable for future expansion.							

49.	The technician wants to reduce cable cost but accepts that a single cable failure may affect the whole network. Which topology fits this requirement?	Bus topology	Ring topology	Star topology	Bus & Ring topologies both				
50.	Why is the central device-based topology preferred in the school lab?	It uses less cable	It does not require any device	It is the cheapest	Failure of one node does not affect others				
51.	A technician is designing a school network using a central device where all computers are connected individually. One student claims: "If one computer fails in this setup, the entire network will stop working." What is the correct evaluation of this statement?	The statement is correct for star topology	The statement is correct for ring topology	The statement is incorrect for star topology	The statement is only correct for mesh topology				
52.	What is a key difference between star and ring topology in a school network?	Star topology has no connections between computers	Ring topology uses a central device	Star topology uses a central device for communication	Both have identical structures				
SCENARIO#4 (FOR QUESTIONS 53-56)		A data science team is working on a project to analyze student performance in schools. They collect data using online surveys, school databases, and sensors that track attendance automatically. The team ensures that the data is accurate, relevant, and properly organized before analysis. They also remove incomplete or duplicate entries to improve data quality.							
53.	When data is collected from users through Google Forms or online questionnaires, it is called:	Sensor-based collection method	Survey method	Simulation method	Experimental method				
54.	Why does the team remove duplicate and incomplete entries?	To increase storage usage	To improve data accuracy and quality	To reduce internet speed	To randomize the dataset structure				
55.	Which data collection method automatically collects information in real time without human involvement?	Surveys	Interviews	Sensors	Questionnaires				
56.	Which of the following is a primary data source in the scenario?	School databases	Published reports	Online surveys	Historical books				
SCENARIO#5 (FOR QUESTIONS 57-60)		A smart city uses interconnected digital systems to improve traffic management and public services. Sensors placed on roads collect real-time traffic data, which is analyzed to reduce congestion and optimize traffic signals. AI systems process this data to predict traffic flow and suggest alternate routes to drivers through mobile applications. Public transport systems are also monitored to improve efficiency and scheduling. The city stores large amounts of data in cloud systems for easy access and scalability. To ensure safety, cybersecurity measures and ethical data usage policies are implemented to protect citizens' information and maintain system reliability.							
57.	What is the main reason smart cities rely on cloud computing for data storage?	To limit data sharing between departments	To enable flexible storage and easy access	To reduce system functionality	To avoid storing large amounts of data				

			from anywhere						
58.	Why are cybersecurity measures important in a smart city system?	To increase traffic congestion	To limit the use of technology	To reduce internet connectivity	To ensure data privacy and prevent unauthorized access				
59.	What is the main purpose of installing sensors on roads in a smart city?	To store citizen personal data	To collect real-time traffic data	To replace traffic police completely	To provide internet to drivers				
60.	A driver receives AI-based suggestions for alternate routes during traffic congestion. What kind of action is the system performing?	To permanently store traffic records	Predicting and optimizing traffic flow in real time	To delete GPS data from vehicles	To increase fuel consumption				



Federal Board SSC-I Examination
Computer Science Model Question Paper
National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)
(50% MCQs & 50% Descriptive)

Time allowed: 1:40 hours

Total Marks: 30

Note: Answer all parts from Section „B“ and „C“ on the **E-sheet at specifically provided space**. Write your answers on the allotted /given spaces.

SECTION-B [Marks: 3x6 = 18]

1.	What is a business plan? Write down its two components.	3	OR	What is an operating system? Give any two examples.	3
2.	Compare simplex and Full Duplex Modes of communications with one example each.	3	OR	Differentiate between discrete and continuous data with one example of each.	3
3.	How can a user search for information on the internet in a safe and responsible way? (State any three methods)	3	OR	Compare simple and complex problems with one daily life example of each.	3
4.	A startup team struggles to design a mobile app and applies design thinking by understanding users' needs, generating ideas, and testing prototypes—how does this process help in creating innovative solutions? (Give any three points)	3	OR	A teacher uses graphs and charts to analyze student exam results in order to identify performance trends and make decisions. How can data visualization be applied in this situation? (Explain any two applications)	3
5.	Write down the purpose of any three input devices.	3	OR	List any three applications of Artificial Intelligence in real life.	3
6.	Identify and correct errors in the following JavaScript code: let fruits = ["Apple", "Banana", "Orange"]; console.log(fruits.length) console.log(fruit.length);	3	OR	Compare any two types of storage devices with respect to reliability, capacity and speed.	3

SECTION-C [Marks: 2x6 = 12]

7.	Explain how computing innovations can negatively affect society and the environment. Support your answer with real life examples.	6	OR	A school is setting up a computer network to connect its lab, library, and administrative office for efficient communication and data sharing. The network design follows the OSI model to ensure proper data transmission between devices. Explain how the OSI model helps in managing communication in this network by describing the role of any three layers.	6
8.	Create a result sheet using HTML that can display the following data in table format.	6	OR	Draw a flowchart that prints the sum of first 20 even numbers.	6

Roll No	Student Name	Math	English	Computer Science	Total Marks	Percentage
1	Ali Ahmed	78	85	90	253	84.3%
2	Sara Khan	88	79	92	259	86.3%
3	Usman Ali	65	72	70	207	69.0%
4	Ayesha Noor	90	88	95	273	91.0%
5	Hamza Raza	55	60	68	183	61.0%

Federal Board SSC-I Examination
Computer Science Model Question Paper
National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)
(50% MCQs & 50% Descriptive)

Alignment of Questions with Student Learning Outcomes

Sr No	Section: Q. No. (Part no.)	Content Domain / Area	Student Learning Outcomes	Cognitive Level *	Allocated Marks in Model Paper
1.	A: Q#1(1).	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	U	0.5
2.	A: Q#1(2).	C	[SLO CS-09-C-01] Students will understand web development and differentiate between a website and a web application.	K	0.5
3.	A: Q#1(3).	C	[SLO CS-09-C-02] Students should be able to create a static website using HTML/CSS in an appropriate environment.	K	0.5
4.	A: Q#1(4).	C	[SLO CS-09-C-03] Students should be able to create dynamic websites using JavaScript as the frontend scripting.	K	0.5
5.	A: Q#1(5).	D	[SLO CS-09-D-01] Students will explain the scope of the data science field as an interdisciplinary field (computer sciences, mathematics & statistics, and business knowledge & understanding).	U	0.5
6.	A: Q#1(6).	D	[SLO CS-09-D-02] Students will define and explain data types, data collection, and data storage.	U	0.5
7.	A: Q#1(7).	C	[SLO CS-09-C-01] Students will understand web development and differentiate between a website and a web application.	K	0.5
8.	A: Q#1(8).	C	[SLO CS-09-C-02] Students should be able to create a static website using HTML/CSS in an appropriate environment.	U	0.5
9.	A: Q#1(9).	B	[SLO CS-09-B-02] Solve simple and complex problems computationally.	A	0.5
10.	A: Q#1(10)	B	[SLO CS-09-B-02] Solve simple and complex problems computationally.	U	0.5
11.	A: Q#1(11)	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	U	0.5
12.	A: Q#1(12)	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	K	0.5
13.	A: Q#1(13)	B	[SLO CS-09-B-01] Understand and apply techniques to decompose problems.	U	0.5
14.	A: Q#1(14)	B	[SLO CS-09-B-02] Solve simple and complex problems computationally.	A	0.5
15.	A: Q#1(15)	C	[SLO CS-09-C-03] Students should be able to create dynamic websites using JavaScript as the frontend scripting.	U	0.5

16.	A: Q#1(16)	A	[SLO CS-09-A-01] Students will define and describe types of systems (artificial, natural), computer hardware components such as computer architecture (CPU, microprocessors, etc.)	U	0.5
17.	A: Q#1(17)	B	[SLO CS-09-B-01] Understand and apply techniques to decompose problems.	A	0.5
18.	A: Q#1(18)	D	[SLO CS-09-D-02] Students will define and explain data types, data collection, and data storage.	U	0.5
19.	A: Q#1(19)	D	[SLO CS-09-D-03] Students will be able to define and explain big data, and applications of big data in real-world business	K	0.5
20.	A: Q#1(20)	H	[SLO EN-09-H-01]: Students identify a problem and create a business using design thinking	A	0.5
21.	A: Q#1(21)	C	[SLO CS-09-C-02] Students should be able to create a static website using HTML/CSS in an appropriate environment.	U	0.5
22.	A: Q#1(22)	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	U	0.5
23.	A: Q#1(23)	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	K	0.5
24.	A: Q#1(24)	F	[SLO CS-09-F-02] Analyse the beneficial and harmful effects of computing innovations such as social networking, fake news, etc.	A	0.5
25.	A: Q#1(25)	F	[SLO CS-09-F-02] Analyse the beneficial and harmful effects of computing innovations such as social networking, fake news, etc.	A	0.5
26.	A: Q#1(26)	A	[SLO CS-09-A-01] Students will define and describe types of systems (artificial, natural), computer hardware components such as computer architecture (CPU, microprocessors, etc.)	U	0.5
27.	A: Q#1(27)	F	[SLO CS-09-F-02] Analyse the beneficial and harmful effects of computing innovations such as social networking, fake news, etc.	U	0.5
28.	A: Q#1(28)	F	[SLO CS-09-F-02] Analyse the beneficial and harmful effects of computing innovations such as social networking, fake news, etc.	K	0.5
29.	A: Q#1(29)	A	[SLO CS-09-A-01] Students will define and describe types of systems (artificial, natural), computer hardware components such as computer architecture (CPU, microprocessors, etc.)	U	0.5
30.	A: Q#1(30)	F	[SLO CS-09-F-01] Understand and apply safe and responsible use of computers (responsible use of hardware, appropriate use of software, and safe use of digital platforms like data searches, social networking, etc.)	U	0.5
31.	A: Q#1(31)	H	[SLO EN-09-H-01]: Students identify a problem and create a business using design thinking	U	0.5

32.	A: Q#1(32)	F	[SLO CS-09-F-02] Analyse the beneficial and harmful effects of computing innovations such as social networking, fake news, etc.	K	0.5
33.	A: Q#1(33)	F	[SLO CS-09-F-02] Analyse the beneficial and harmful effects of computing innovations such as social networking, fake news, etc.	K	0.5
34.	A: Q#1(34)	A	[SLO CS-09-A-01] Students will define and describe types of systems (artificial, natural), computer hardware components such as computer architecture (CPU, microprocessors, etc.)	U	0.5
35.	A: Q#1(35)	B	[SLO CS-09-B-02] Solve simple and complex problems computationally.	U	0.5
36.	A: Q#1(36)	C	[SLO CS-09-C-03] Students should be able to create dynamic websites using JavaScript as the frontend scripting.	K	0.5
37.	A: Q#1(37)	A	[SLO CS-09-A-03] Students will be able to identify and analyze data communication, computer networks, networking devices, basic networking systems and understand how data is transmitted and key concepts such as protocols, speeds, etc.	K	0.5
38.	A: Q#1(38)	A	[SLO CS-09-A-03] Students will be able to identify and analyze data communication, computer networks, networking devices, basic networking systems and understand how data is transmitted and key concepts such as protocols, speeds, etc.	K	0.5
39.	A: Q#1(39)	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	U	0.5
40.	A: Q#1(40)	D	[SLO CS-09-D-03] Students will be able to define and explain big data, and applications of big data in real-world business.	K	0.5
41.	A: Q#1(41)	C	[SLO CS-09-C-05] Students will determine ways of debugging their code in JavaScript	K	0.5
42.	A: Q#1(42)	B	[SLO CS-09-B-01] Understand and apply techniques to decompose problems.	U	0.5
43.	A: Q#1(43)	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	A	0.5
44.	A: Q#1(44)	B	[SLO CS-09-B-01] Understand and apply techniques to decompose problems.	A	0.5
45.	A: Q#1(45)	C	[SLO CS-09-C-04] Students should be able to implement common algorithms that use sequence, selection, and repetition in JavaScript.	A	0.5
46.	A: Q#1(46)	C	[SLO CS-09-C-04] Students should be able to implement common algorithms that use sequence, selection, and repetition in JavaScript.	U	0.5
47.	A: Q#1(47)	C	[SLO CS-09-C-04] Students should be able to implement common algorithms that use sequence, selection, and repetition in JavaScript.	U	0.5

48.	A: Q#1(48)	C	[SLO CS-09-C-04] Students should be able to implement common algorithms that use sequence, selection, and repetition in JavaScript.	U	0.5
49.	A: Q#1(49)	A	[SLO CS-09-A-03] Students will be able to identify and analyze data communication, computer networks, networking devices, basic networking systems and understand how data is transmitted and key concepts such as protocols, speeds, etc.	K	0.5
50.	A: Q#1(50)	A	[SLO CS-09-A-03] Students will be able to identify and analyze data communication, computer networks, networking devices, basic networking systems and understand how data is transmitted and key concepts such as protocols, speeds, etc.	U	0.5
51.	A: Q#1(51)	A	[SLO CS-09-A-03] Students will be able to identify and analyze data communication, computer networks, networking devices, basic networking systems and understand how data is transmitted and key concepts such as protocols, speeds, etc.	U	0.5
52.	A: Q#1(52)	A	[SLO CS-09-A-03] Students will be able to identify and analyze data communication, computer networks, networking devices, basic networking systems and understand how data is transmitted and key concepts such as protocols, speeds, etc.	K	0.5
53.	A: Q#1(53)	D	[SLO CS-09-D-02] Students will define and explain data types, data collection, and data storage.	K	0.5
54.	A: Q#1(54)	D	[SLO CS-09-D-02] Students will define and explain data types, data collection, and data storage.	U	0.5
55.	A: Q#1(55)	D	[SLO CS-09-D-02] Students will define and explain data types, data collection, and data storage.	A	0.5
56.	A: Q#1(56)	D	[SLO CS-09-D-02] Students will define and explain data types, data collection, and data storage.	U	0.5
57.	A: Q#1(57)	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	K	0.5
58.	A: Q#1(58)	F	[SLO CS-09-F-02] Analyse the beneficial and harmful effects of computing innovations such as social networking, fake news, etc.	U	0.5
59.	A: Q#1(59)	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	U	0.5
60.	A: Q#1(60)	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	A	0.5

SECTION B									
SR#	SEC: QUE# PART	DOMAIN	QUESTION	COGNITIVE	OR	DOMAIN	QUESTION	COGNITIVE	MARKS
61.	B: Q#1.	H	[SLO EN-09-H-02]: Students will use digital tools to create and present a business plan for an entrepreneurial solution.	K	OR	A	[SLO CS-09-A-01] Students will define and describe types of systems (artificial, natural), computer hardware components such as computer architecture (CPU, microprocessors, etc.)	K	3
62.	B: Q#2.	A	[SLO CS-09-A-03] Students will be able to identify and analyze data communication, computer networks, networking devices, basic networking systems and understand how data is transmitted and key concepts such as protocols, speeds, etc.	U	OR	D	[SLO CS-09-D-01] Students will explain the scope of the data science field as an interdisciplinary field (computer sciences, mathematics & statistics, and business knowledge & understanding).	U	3
63.	B: Q#3.	F	[SLO CS-09-F-01] Understand and apply safe and responsible use of computers (responsible use of hardware, appropriate use of software, and safe use of digital platforms like data searches, social networking, etc.)	U	OR	B	[SLO CS-09-B-02] Solve simple and complex problems computationally.	U	3
64.	B: Q#4.	H	[SLO EN-09-H-01]: Students identify a problem and create a business using design thinking	A	OR	D	[SLO CS-09-D-02] Students will define and explain data types, data collection, and data storage.	A	3
65.	B: Q#5.	A	[SLO CS-09-A-01] Students will define and describe types of systems (artificial, natural), computer hardware components such as computer architecture (CPU, microprocessors, etc.)	K	OR	E	[SLO CS-09-E-01] Students will be able to describe uses and applications of computing like AI, Machine Learning, and Cloud Computing	K	3

66.	B: Q#6.	C	[SLO CS-09-C-05] Students will determine ways of debugging their code in JavaScript	U	OR	A	[SLO CS-09-A-01] Students will define and describe types of systems (artificial, natural), computer hardware components such as computer architecture (CPU, microprocessors, etc.)	U	3
SECTION C									
67.	C: Q#7.	F	[SLO CS-09-F-02] Analyse the beneficial and harmful effects of computing innovations such as social networking, fake news, etc.	U	OR	A	[SLO CS-09-A-03] Students will be able to identify and analyze data communication, computer networks, networking devices, basic networking systems and understand how data is transmitted and key concepts such as protocols, speeds, etc.	U	6
68.	C: Q#8.	C	[SLO CS-09-C-02] Students should be able to create a static website using HTML/CSS in an appropriate environment.	A	OR	B	[SLO CS-09-B-02] Solve simple and complex problems computationally.	A	6

Table of specifications (ToS) Model Paper Computer Science (50% MCQs Pattern) Grade IX (SSC I)

Table of Specification

Content Domain / Area	Domain A: Computer Systems	Domain B: Computational Thinking and Algorithms.	Domain C: Programming Fundamentals	Domain D: Data and Analysis	Domain E: Applications of Computer Science	Domain F: Impacts of Computing	Domain G: Digital Literacy	Domain H: Entrepreneurship in the digital age	Total Marks	Percentage of cognitive level
Cognitive Level										
Knowledge	A-37 (0.5) A-38 (0.5) A-49 (0.5) A-52 (0.5) B-Q5 (f) 3 B-Q1 (s) 3		A-2 (0.5) A-3 (0.5) A-4 (0.5) A-7 (0.5) A-36 (0.5) A-41 (0.5)	A-19 (0.5) A-40 (0.5) A-53 (0.5)	A-12 (0.5) A-23 (0.5) A-57 (0.5) B-Q5 (s) 3	A-28 (0.5) A-32 (0.5) A-33 (0.5)		B-Q1 (f) 3	21.5	24%
Understanding	A-16 (0.5) A-26 (0.5) A-29 (0.5) A-34 (0.5) A-50 (0.5) A-51 (0.5) B-Q2 (f) 3 B-Q6 (s) 3 <u>C-Q7 (s) 6</u>	A-10 (0.5) A-13 (0.5) A-35 (0.5) A-42 (0.5) B-Q3 (s) 3	A-8 (0.5) A-15 (0.5) A-21 (0.5) A-46 (0.5) A-47 (0.5) A-48 (0.5) B-Q6 (f) 3	A-5 (0.5) A-6 (0.5) A-18 (0.5) A-54 (0.5) A-56 (0.5) A-58 (0.5) B-Q2 (s) 3 B-Q4 (s) 3	A-1 (0.5) A-11 (0.5) A-22 (0.5) A-39 (0.5) A-59 (0.5)	A-27 (0.5) A-30 (0.5) A-58 (0.5) B-Q3 (f) 3 <u>C-Q7 (f) 6</u>		A-31 (0.5)	48	53%
Application		A-9 (0.5) A-14 (0.5) A-17 (0.5) A-44 (0.5) <u>C-Q8 (s) 6</u>	A-45 (0.5) <u>C-Q8 (f) 6</u>	A-55 (0.5)	A-43 (0.5) A-60 (0.5)	A-24 (0.5) A-25 (0.5)		A-20 (0.5) B-Q4 (f) 3	20.5	23%
Total Marks	23	13	15.5	10.5	8	13	0	7	90	
Total Percentages	26%	14%	17%	12%	9%	14%	0%	8%		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 as per the defined ranges may be ensured.
- 3 The percentage of cognitive level is 30%, 50%, and 20% for knowledge, understanding, and application, respectively with $\pm 5\%$ variation.
- 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 both questions should also be same
 - SLOs of both the alternative questions must be different

Key: Section-A [Objectives]:

SECTION-PART (marks)

example: **A-1 (0.5)**

Section B & C [SRQs/ ERQs Question]:

SECTION-Question Number (part/ second choice) marks

example: **B-Q1 (f / s) 3 OR C-Q7 (f / s) 6**



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