COMPUTER SCEINCE

CLASS-XI

THEORY PAPER

One Paper ***3 Hours*** ***7O Marks***

Unit No.	Unit Name	Marks
1	COMPUTER FUNDAMENTALS	10
2	PROBLEM SOLVING	07
3	INTRODUCTION TO PYTHON	30
4	PROGRAMMING WITH PYTHON	15
5	EMERGING TRENDS AND SOCIETAL IMPACTS	08

A minimum of 180 periods including practicals

UNIT- I: COMPUTER FUNDAMENTALS 10 Marks

Chapter 1:Computer System 20 Periods

Introduction to computer and computing: evolution of computing devices, data and information, types of data, functional components of a computer system and their interconnections, I/O devices, data transfer through systembus.

Computer Memory: Units of memory, types of memory – primary and secondary; data deletion, its recovery and related security concerns.

Microprocessor: Evolution, features of microprocessor including memory size, word size, clock speed, introduction to microcontrollers.

Software: purpose and types – system and application software, operating system, language translators, device drivers, programming tools, generic and specific purpose software, classification of programming languages (high level language, machine language).

Operating System (OS): Need for operating system, brief introduction to functions of OS, user interface.

Chapter 2: Encoding Schemes and Number System 10 Periods

Encoding schemes: American Standard Code for Information Interchange (ASCII), UNICODE, Indian Script Code for Information Interchange (ISCII)

Number system: Decimal, Binary, Octal and Hexadecimal number system and converting a number from a number system to another, including its fractional part.

UNIT – II: **PROBLEM SOLVING** **7 Marks**
Chapter 4:Problem Solving **18 Periods**

Introduction to Problem Solving: problem solving cycle - analyzing a problem, designing algorithm, implementation through coding, testing the solution

Algorithms: what is an algorithm, need of algorithm in problem solving, characteristics of algorithm, representation of algorithm using flowchart and pseudo-code

Programming: concept of a program, need for writing programs, process of conceptualizing a solution to a problem and moving from algorithm to programming.

Programming Constructs: Sequence, Selection and Iteration; Simulation (dry run) of program for better understanding of algorithm; Comparison and Analysis of Algorithms through simulations.

Decomposition: concept, need for decomposing a problem, examples of problem-solving using decomposition.

UNIT – III: INTRODUCTION TO PYTHON **30 Marks**
Chapter 5: Getting started with Python **35 Periods**

Basics of Python programming, working with Python interpreter in interactive mode and script mode, structure of a program, debugging-errors and exceptions, identifiers, keywords, constants, variables, types of operators, precedence of operators, data types, mutable and immutable data types, statements, expressions, evaluation and comments, input and output statements, data type conversion, debugging

Chapter 6 : Flow of control **15 Periods**

Control structures: Sequence, selection (decision) and repetition (iteration) Selection: if, if-else, and nested if statement, indentation

Repetition: for, while, and nested loops, break,continue;

Chapter 7: Functions **20 Periods**

Introduction to functions, need of functions

User defined functions: passing arguments to a function, returning values from functions, scope of variables,

Standard library: using built-in functions, importing modules-math, random, statistics, creating and importing user defined module.

UNIT – IV: PROGRAMMING WITH PYTHON **15 Marks**

Chapter 8: Strings **10 Periods**

Strings: initializing strings and accessing strings, string operations, built-in functions for string manipulation, string traversal, string as argument to function

Chapter 9: Lists **12 Periods**

Lists*:* list operations - creating, initializing, traversing and manipulating lists, list methods and built-in functions, nested lists, list as argument to a function.

Chapter 10: Tuples and Dictionary **20 Periods**

Tuples: Creating, initializing, accessing elements, tuple assignment, operations on tuples, tuple methods and built-in functions, nested tuples.

Dictionary*:* concept of key-value pair, mutability, creating, initializing, traversing, updating and deleting elements; dictionary methods and built-in functions.

UNIT – V: EMERGING TRENDS AND SOCIETAL IMPACTS **15 Marks**

Chapter 3: Emerging Trends **10 Periods**

Brief understanding of the following emerging trends:

Artificial Intelligence, Machine learning, Natural Language Processing, Immersive experience, Robotics, Big data and its characteristics, Internet of Things (IoT), Sensors, Smart cities, Cloud Computing and Cloud Services (SaaS, IaaS, PaaS); Grid Computing, Blockchain technology

Chapter 11: Societal Impacts **10 Periods**

Digital footprint, Etiquettes for Net surfing and for communicating through social medias, data protection, Intellectual Property Rights (IPR) and their violation, plagiarism and copyrights, Free and Open Source Software (FOSS), Cyber crime and cyber laws, hacking, phishing, cyber bullying, Indian IT Act, preventing cyber crime.

Awareness about health concerns related to usage of technology like effect on eyesight, physiological issues and ergonomic aspects.

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DESIGN OF
QUESTION PAPER

SUBJECT: COMPUTER SCIENCE
PAPER: THEORY
CLASS: XI
FULL MARK : 70
TIME: 3 HOURS

I

WEIGHTAGE TO OBJECTIVES:

Objectives	Marks	Percentage
Knowledge (K)	14	20
Understanding (U)	32	46
Application (A)	21	30
Skill (S)	03	04
	70	**100**

II

WEIGTHAGE OF FORM OF QUESTIONS:

Form of Questions	No. of questions	Time (in minutes)	Marks	Percentage
Essay/Long Answer (E/LA)	04	60	20	29
Short Answer (SA-I)	05	30	15	21
Short Answer (SA-II)	09	45	18	26
Very Short Answer (VSA)	10	30	10	14
MCQ	07	15	07	10
Total	**35**	**180**	**70**	**100**

III

WEIGHTAGE OF CONTENTS

UNIT	TOPIC	MARKS
1	COMPUTER FUNDAMENTALS	10
2	PROBLEM SOLVING	07
3	INTRODUCTION TO PYTHON	30
4	PROGRAMMING IN PYTHON	15
5	EMERGING TRENDS AND SOCIETAL IMPACTS	08
	TOTAL	**70**

IV **SCHEME OF SECTION :** Nil

V **SCHEME OF OPTION: Internal option may be given in Essay Type Question & SA-I.**

VI

DIFFICULTY LEVEL:

Difficult : 30%
Average : 50%
Easy : 20%

Abbreviation: K (Knowledge), U (Understanding), S(Skill), E (Essay Type), SA(Short Answer Type), VSA (Very Short Answer Type), MCQ(Multiple Choice Question)

COMPUTER SCIENCE

CLASS- XI
PRACTICAL

One Paper ***3 Hours*** ***30 Marks***

UNIT	TOPICS	MARKS
1	**Programming in Python** One programming problem in Python to be developed and tested in Computer. During the examination. Marks are allotted on the basis of following: Logic : 5 Marks Documentation/Indentation : 2 Marks Output presentation : 3 Marks Notes: The types of problems to be given will be of application type from the following topics:	**10**
2	**Project work** As mentioned in general guidelines for project, given at the end of the curriculum)	**10**
3	**Practical File** Must have minimum 15 programs from the topics covered in Class XI course.	**05**
4	**Viva voce** Viva will be asked from syllabus covered in Class XI and the project developed by the student	**05**

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COMPUTER SCIENCE

CLASS- XI
PRACTICAL

One Paper ***3 Hours*** ***30 Marks***

Sl. No.	Form of Exercise	Nature of Exercise	Booting skills	Program correctness	Program Presentation	Debugging skills	Operational Skills	Marks Allotted	Estimated Time (Min)
1.	Short	Project Record	0	2	4	2	2	10	60
2.	Major	Algorithm/ Program Writing	0	5	2	2	1	10	100
3.	Short	Viva-Voce	0	0	1	2	2	5	20**
4.	Sessional Record	Record File of Program/Algorithm	0	3	2	0	0	5	x

N.B. : Only one python program is to be performed by each student.

** No fixed time is allotted for Viva-Voce. It is to be performed during the course of the examination.

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PRESCRIBED TEXTBOOK:

Computer Science for class XI
Published by : NCERT, New Delhi

REFERENCE BOOK :

Saraswati Computer Science for Class XI
By Reeta Sahoo and Gagan Sahoo
Published by New Saraswati House (India) Private Limited, New Delhi – 110002

COMPUTER SCIENCE

CLASS- XII
THEORY PAPER

ONE PAPER **TIME: 3 HOURS** **70 MARKS**

UNIT NO.	NAME OF UNIT	MARKS
1.	DATA STRUCTURE USING PYTHON	30
2.	DATABASE MANAGEMENT SYSTEM AND SQL	25
3.	COMMUNICATION AND NETWORK CONCEPTS	15

A minimum of 180 periods including practicals

UNIT 1: DATA STRUCTURE USING PYTHON 30 Marks

Chapter 1: Exception and File Handling in Python 20 Periods

Exception Handling: syntax errors, exceptions, need of exception handling, user-defined exceptions, raising exceptions, handling exceptions, catching exceptions, Try - except - else clause, Try - finally clause, recovering and continuing with finally, built-in exception classes.

File Handling: text file and binary file, file types, open and close files, reading and writing text files, reading and writing binary files using pickle module, file access modes.

Chapter 2: Stack 15 Periods

Stack (List Implementation): Introduction to stack (LIFO Operations), operations on stack (PUSH and POP) and its implementation in python. Expressions in Prefix, Infix and postfix notations, evaluating arithmetic expressions using stack, conversion of Infix expression to postfix expression

Chapter 3:Queue 15 Periods

Queue (List Implementation): Introduction to Queue (FIFO), Operations on Queue (INSERT and DELETE) and its implementation in Python.
Introduction to DQueue and its implementation in Python.

Chapter 4: Searching **20 Periods**

Searching: Sequential search, Binary search, Analysis of Sequential and Binary Search. Dry run to identify best, worst and average cases. Implementation of searching techniques in Python.

Chapter 5: Sorting **20 Periods**

Overview of sorting techniques, Bubble Sort, Selection Sort and Insertion Sort. Dry run to identify best, worst and average cases. Implementation of sorting techniques in Python.
Hashing: Hash Functions, Collision Resolution, Implementing the Map Abstract Data Type.

UNIT II: DATABASE MANAGEMENT SYSTEM AND SQL **25 Marks**

Chapter 6: Understanding Data **5 Periods**

Data and its purpose, collection and organization; understanding data using statistical methods: mean, median, standard deviation, variance; data interpretation; visualization of data.

Chapter 7: Database Concepts **15 Periods**

Introduction to database concepts, difference between database and file system, relational data model: concept of domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key;
Relational algebra: selection, projection, union, set difference and cartesian product;

Chapter 8: Structured Query Language **35 Periods**

Advantages of using Structured Query Language, Data Definition Language, Data Query Language and Data Manipulation Language, Introduction to MySQL, Creating a database using MySQL, Data Types

Data Definition: CREATE TABLE, DROP TABLE, ALTER TABLE, Data Query: SELECT, FROM, WHERE

Data Manipulation: INSERT, UPDATE, DELETE Math functions: POWER (), ROUND (), MOD ().

Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/ SUBSTR (), LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().

Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().

Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (*).

Querying and manipulating data using Group by, Having, Order by.
Operations on Relations - Union, Intersection, Minus, Cartesian Product, JOIN

COMMUNICATION AND NETWORK CONCEPTS **15 Marks**

Chapter 9: Computer Networks **15 Periods**

Introduction to computer networks, Evolution of networking,

Network types: LAN, WAN, MAN

Network devices: Modem, Ethernet Card, Repeater, Hub, Switch, Router, Gateway. Network Topologies: Mesh, Ring, Bus, Star, and Tree topologies

Basic concept of MAC and IP Address Difference between Internet and web

Chapter 10: Data Communication **12 Periods**

Concept of communication, Types of Data Communication, switching techniques

Communication Media: Wired Technologies – Twisted pair cable, Co-axial cable, Ethernet Cable, Optical Fibre;

Introduction to mobile telecommunication technologies Wireless Technologies – Bluetooth, WLAN, Infrared, Microwave

Network Protocol: Need for Protocol, Categorization and Examples of protocol, HTTP, FTP, IP, PPP; electronic mail protocol

Concept of Channel, Bandwidth (Hz, KHz, MHz) and Data Transfer rate (bps, Kbps, Mbps, Gbps, Tbps)

Chapter 11: Security Aspects **8 Periods**

Threats and prevention: Viruses, Worms, Trojan horse, Spam, Cookies, Adware, Firewall, http vshttps

Network Security Concepts: Firewall, Cookies, Hackers and Crackers Antivirus and their workings

Network security threats: Denial of service, Intrusion problems, Snooping, Eavesdropping

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DESIGN OF
QUESTION PAPER

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PAPER: THEORY
CLASS: XII
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TIME: 3 HOURS

I — **WEIGHTAGE TO OBJECTIVES:**

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MCQ	07	15	07	10
Total	**35**	**180**	**70**	**100**

III — **WEIGHTAGE OF CONTENTS**

UNIT	TOPIC	MARKS
1	DATA STRUCTURE USING PYTHON	30
2	DATABASE MANAGEMENT SYSTEM AND SQL	25
3	COMMUNICATION AND NETWORK CONCEPTS	15
	TOTAL	**70**

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V — **SCHEME OF OPTION:** **Internal option may be given in Essay Type Question & SA-I.**

VI — **DIFFICULTY LEVEL:**
Difficult : 30%
Average : 50%
Easy : 20%

Abbreviation: K (Knowledge), U (Understanding), S(Skill), E (Essay Type), SA(Short Answer Type), VSA (Very Short Answer Type), MCQ(Multiple Choice Question)

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COMPUTER SCIENCE

CLASS- XII
PRACTICAL

One Paper ***3Hours*** ***30 Marks***

Sl. No.	Form of Exercise	Nature of Exercise	Booting skills	Program correctness	Program Presentation	Debugging skills	Operational Skills	Marks Allotted	Estimated Time (Min)
1.	Short	Project Record	0	2	4	2	2	10	60
2.	Major	Algorithm/ Program Writing	0	5	2	2	1	10	100
3.	Short	Viva-Voce	0	0	1	2	2	5	20**
4.	Sessional Record	Record File of Program/Algorithm	0	3	2	0	0	5	x

N.B. : Only one python program is to be performed by each student.

** No fixed time is allotted for Viva-Voce. It is to be performed during the course of the examination.

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COMPUTER SCIENCE

CLASS XII

PRACTICAL

One Paper	*3 Hours*	*30 Marks*
Unit No.	**Unit Name**	**Marks**

1. Programming in Python **10**

One programming problem in Python to be developed and tested in Computer During the examination. Marks are allotted on the basis of following:

Logic	:	5 Marks
Documentation/Indentation	:	2 Marks
Output presentation	:	3 Marks

Notes : The types of problems to be given will be of application type from the following topics

- Lists
- Stack using Lists
- Queue using Lists (circular)
- Searching and sorting
- Binary File operations (Creation, Displaying, Searching and modification)
- Text File operations (Creation, Displaying and modification)

2. SQL Commands 05

Five Query questions based on a particular Table/Relation to be tested practically on Computer during the examination. The command along with the result must be written in the answer sheet.

3. Project Work 05

The project has to be developed in Python language and also should have use of Data files.

- Presentation on the computer
- Project report (Listing, Sample, Outputs, Documentation)
- Viva-Voce

4. Practical File 05

Must have minimum 20 programs from the following topics

- Lists
- Stack using Lists

- Queue using Lists (circular)
- Searching and sorting
- Binary File operations (Creation, Displaying, Searching and modification)
- Text File operations (Creation, Displaying and modification)

15 SQL commands along with the output based on any table/relation :

5. Viva Voce 05

Viva will be asked from syllabus covered in Class-XII and the project developed by student.

GUIDELINES FOR PROJECTS (Class XI and XII)

1. Preamble

1.1 The academic course in Computer Science includes one Project in each year. The Purpose behind this is to consolidate the concepts and practices imparted during the course and to serve as a record of competence.

1.2 A group of two/three students a steam may be allowed to work on one project.

2. Project content

2.1 Project for Class-XI can be selected from one of the topics given in event programming.

2.2 Project for Class-XII should ensure the coverage of following areas of curriculum:

a. Problem Solving
b. Data Structure
c. Programming in Python
d. Data File Handling

Theme of the project can be

- Any subsystem of a System Software or Tool
- Any Scientific or a fairly complex algorithmic situation
- Business oriented problems like Banking, Library in formation system. Hotel or Hospital management system, Transport query system
- Quizzes/Games;
- Tutor/Computer Aided Learning Systems

2.3 The aim of the project is to highlight the abilities of algorithmic formulation, modular programming, optimized code preparation, systematic documentation and other associated aspects of Software Development.

2.4 The assessment would be through the project demonstration and the Project Report, which should portray Programming Style, Structured Design, Minimum Coupling, High Cohesion, Good documentation of the code to ensure readability and ease of maintenance.

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