KENDRIYAVIDYALAYA SANGTHAN

REGIONALOFFICE,CHANDIGARH
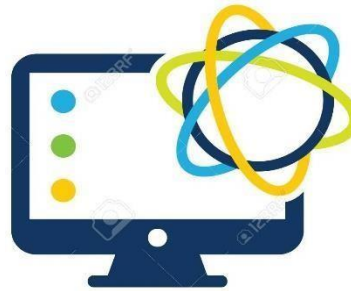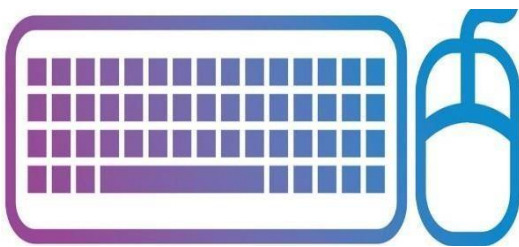
(An Autonomous Body Under the Ministry of Education, Government of India)

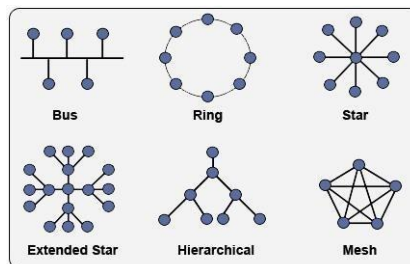# STUDY MATERIAL

COMPUTER SCIENCE

SESSION 2023-24

CLASS-XI

ADVISORS

Mrs. Prreti Saxena,Deputy Commissioner,KVS RO CHANDIGARH

Sh. T Brahmanandam ,

Assistant   Commissioner,

KVS RO CHANDIGARH

Sh Jugal Kishore ,

Assistant Commissioner,

KVS RO CHANDIGARH

CO-ORDINATION TEAM

Mr. SANJEET KUMAR SAGAR PRINCIPAL KV SECTOR 47 ,CHANDIGARH

Mr. SEEMA RATHOUR PGT CS KV SECTOR 47 ,CHANDIGARH

CONTENT TEAM

Mr. PARAMJEET SINGH ,PGTCS,KV NO. 5 BATHINDA CANTT

Ms. HARJEET KAUR , PGT CS, K V FEROZEPUR CANTT 2

Mr. HARTEJ SINGH, PGT CS, K V HUSSAINPUR NO 2

Mrs. AMARJEET KAUR , PGT CS , K V PATIYALA NO 3

Mr. D K JUNEJA , PGT CS GURDASPUR (TIBRI CANTT)

Mrs. MEENAKSHI SINGH PGT CS, PATHANKOT NO 3

EXPERT CONTENT CREATER

Mr. ASHOK KUMAR PGT (CS) KV KAPURTHALA
Mr. DEVENDER KUMAR PGT (CS) CHANDIGARH 3 BRD
Mr. ASHOK KUMAR BHUKAL PGT (CS) KV DAPPER

ORGANISER

Mr. CHANDRA PRAKASH MEENA PGT CS KV 4 BATHINDA CANTT

INDEXPAGE

Computer Science Class -XI
Code No. 083
2023-24

1. Learning Outcomes

Students should be able to:

a) develop basic computational thinking
b) explain and use data types
c) appreciate the notion of algorithms
d) develop a basic understanding of computer systems- architecture, operating system, and cloud computing
e) explain cyber ethics, cyber safety, and cybercrime
f) understand the value of technology in societies along with consideration of gender and disability issues.

2. Distribution of Marks

Unit No.	Unit Name	Marks	Periods	
			Theory	Practical
I	Computer Systems and Organisation	10	10	10
II	Computational Thinking and Programming -1	45	80	60
III	Society, Law, and Ethics	15	20	—
	Total	**70**	**110**	**70**

3. Unit wise Syllabus

Unit I: Computer Systems and Organisation

- Basic computer organisation: Introduction to Computer System, hardware, software, input device, output device, CPU, memory (primary, cache and secondary), units of memory (bit, byte, KB, MB, GB, TB, PB)
- Types of software: System software (Operating systems, system utilities, device drivers), programming tools and language translators (assembler, compiler, and interpreter), application software
- Operating System(OS): functions of the operating system, OS user interface
- Boolean logic: NOT, AND, OR, NAND, NOR, XOR, NOT, truth tables and De Morgan's laws, Logic circuits
- Number System: Binary, Octal, Decimal and Hexadecimal number system; conversion

between number systems
- Encoding Schemes: ASCII, ISCII, and Unicode (UTF8, UTF32)

Unit II: Computational Thinking and Programming - I

- Introduction to Problem-solving: Steps for Problem-solving (Analyzing the problem, developing an algorithm, coding, testing, and debugging), representation of algorithms using flowchart and pseudocode, decomposition
- Familiarization with the basics of Python programming: Introduction to Python, Features of Python, executing a simple "hello world" program, execution modes: interactive mode and script mode, Python character set, Python tokens(keyword, identifier, literal, operator, punctuator), variables, concept of l-value and r-value, use of comments
- Knowledge of data types: Number(integer, floating point,complex), boolean, sequence(string, list, tuple), None, Mapping(dictionary), mutable and immutable data types.
- Operators: arithmetic operators, relational operators, logical operators, assignment operators, augmented assignment operators, identity operators (is, is not), membership operators (in not in)
- Expressions, statement, type conversion, and input/output: precedence of operators, expression, evaluation of an expression, type-conversion (explicit and implicit conversion), accepting data as input from the console and displaying output.
- Errors- syntax errors, logical errors, and run-time errors
- Flow of Control: introduction, use of indentation, sequential flow, conditional and iterative flow
- Conditional statements: if, if-else, if-elif-else, flowcharts, simple programs: e.g.: absolute value, sort 3 numbers and divisibility of a number.
- Iterative Statement: for loop, range(), while loop, flowcharts, break and continue statements, nested loops, suggested programs: generating pattern, summation of series, finding the factorial of a positive number, etc.
- Strings: introduction, string operations (concatenation, repetition, membership and slicing), traversing a string using loops, built-in functions/methods–len(), capitalize(), title(), lower(), upper(), count(), find(), index(), endswith(), startswith(), isalnum(), isalpha(), isdigit(), islower(), isupper(), isspace(),lstrip(), rstrip(), strip(), replace(), join(), partition(), split()
- Lists: introduction, indexing, list operations (concatenation, repetition, membership and slicing), traversing a list using loops, built-in functions/methods–len(), list(), append(), extend(), insert(), count(), index(), remove(), pop(), reverse(), sort(), sorted(), min(), max(), sum(); nested lists, suggested programs: finding the maximum, minimum, mean of numeric values stored in a list; linear search on list of numbers and counting the frequency of elements in a list.
- Tuples: introduction, indexing, tuple operations (concatenation, repetition, membership and slicing); built-in functions/methods – len(), tuple(), count(), index(), sorted(), min(), max(), sum(); tuple assignment, nested tuple; suggested programs: finding the minimum, maximum, mean of values stored in a tuple; linear search on a tuple of numbers, counting the frequency of elements in a tuple.
- Dictionary: introduction, accessing items in a dictionary using keys, mutability of a dictionary (adding a new term, modifying an existing item), traversing a dictionary, built-in

functions/methods – len(), dict(), keys(), values(), items(), get(), update(), del(), del, clear(), fromkeys(), copy(), pop(), popitem(), setdefault(), max(), min(), sorted(); Suggested programs: count the number of times a character appears in a given string using a dictionary, create a dictionary with names of employees, their salary and access them.

● Introduction to Python modules: Importing module using 'import <module>' and using from statement, importing math module (pi, e, sqrt(), ceil(), floor(), pow(), fabs(), sin(), cos(), tan()); random module (random(), randint(), randrange()), statistics module (mean(), median(), mode()).

Unit III: Society, Law and Ethics

● Digital Footprints

● Digital Society and Netizen: net etiquettes, communication etiquettes, social media étiquettes

● Data Protection: Intellectual property rights (copyright, patent , trademark), violation of IPR(plagiarism, copyright infringement, trademark infringement), open source software and licensing (Creative Commons, GPL and Apache)

● Cyber Crime: definition, hacking, eavesdropping, phishing and fraud emails, ransomware, cyber trolls, cyber bullying

● Cyber safety: safely browsing the web, identity protection, confidentiality

● Malware: viruses, trojans, adware

● E-waste management: proper disposal of used electronic gadgets.

● Information Technology Act (IT Act)

● Technology and society: Gender and disability issues while teaching and using computers

4.   Practical

S.No.	Unit Name	Marks (Total=30)
1.	**Lab Test (12 marks)**	
	Python program (60% logic + 20% documentation + 20%code quality)	**12**
2.	**Report File + Viva (10 marks)**	
	Report file: Minimum 20 Python programs	**7**
	Viva voce	**3**
3.	Project (that uses most of the concepts that have beenlearnt)	**8**

5. Suggested Practical List
Python Programming

● Input a welcome message and display it.

● Input two numbers and display the larger / smaller number.

- Input three numbers and display the largest / smallest number.
- Generate the following patterns using nested loops:

Pattern-1	Pattern-2	Pattern-3
* ** *** **** *****	12345 1234 123 12 1	A AB ABC ABCD ABCDE

- Write a program to input the value of x and n and print the sum of the following series:
  - $1 + x + x^2 + x^3 + x^4 + \cdots x^n$
  - $1 - x + x^2 - x^3 + x^4 - \cdots x^n$
  - $x + \dfrac{x^2}{2} + \dfrac{x^3}{3} + \dfrac{x^4}{4} + \cdots \dfrac{x^n}{n}$
  - $x + \dfrac{x^2}{2!} + \dfrac{x^3}{3!} + \dfrac{x^4}{4!} + \cdots \dfrac{x^n}{n!}$

- Determine whether a number is a perfect number, an Armstrong number or a palindrome.
- Input a number and check if the number is a prime or composite number.
- Display the terms of a Fibonacci series.
- Compute the greatest common divisor and least common multiple of two integers.
- Count and display the number of vowels, consonants, uppercase, lowercase characters instring.
- Input a string and determine whether it is a palindrome or not; convert the case of charactersin a string.
- Find the largest/smallest number in a list/tuple
- Input a list of numbers and swap elements at the even location with the elements at the oddlocation.
- Input a list/tuple of elements, search for a given element in the list/tuple.
- Create a dictionary with the roll number, name and marks of n students in a class and displaythe names of students who have marks above 75.

6. Suggested Reading Material

- NCERT Textbook for Computer Science (Class XI)
- Support Material on CBSE website

UNIT -1
INTRODUCTION TO COMPUTER SYSTEM

A computer is an electronic device, under the control of instructions stored in its memory that can accept data (input), process the data according to specified rules(Program) on processor & produces information (output), and store the information for future use.

Data vs Information
Data are raw numbers or other findings which, by themselves, are of limited value.Information is data that has been converted into a meaningfuland useful context.Computers are being used extensively nowadays in
everyday life/every field

In the form of laptop, desktop, smartphone,gadgets etc.

Advantages of computer

*   Speed

*   Accuracy

*   Huge storage

*   Versatility

*   Tirelessness

Disadvantages of computer

*   Data security issue

*   Computer crimes

*   Health risk

*   Bad impact on environment if not properly disposed off

Computer Components Any kind of computers consists of HARDWARE AND SOFTWARE.

Hardware: Computer hardware is the collection of physical elements/parts that constitutes a computer system,such as the monitor, mouse, keyboard, computer data storage, hard drive disk (HDD), system unit (graphic cards, sound cards, memory, motherboard and chips), etc. all of which are physical objects & can be touched.

Software : Software is a generic term for organized collections of computer data and instructions,often broken into two major categories: system software that provides the basic nontask- specific functions of the computer, and application software which is used byusers to accomplish specific tasks.

Functional components of a computer

Von Neumen Computer Architecture
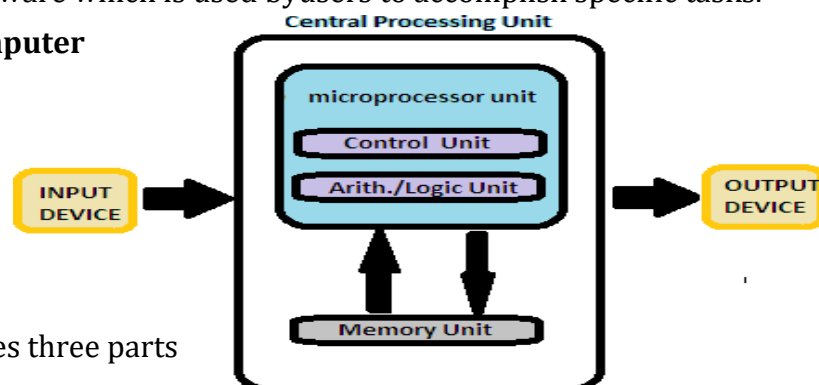
Central processing unit – Comprises three parts

1.   Arithmetic/Logic Unit

Performs basic arithmetic operations such as addition and subtraction Performs logical operations such as AND, OR, and NOT. Most modern ALUs have a small amount of special storage units called registers that can be accessed faster than main memory.

2.   Control unit

It organizes the computer to work computer as single unit & generates control signals for various devices regarding read/write or execute operation

3.   Memory

A collection of cells, each with a u Most computers are byte-addressable

Memory Units – How much memory is required for a file/data/progam etc. is measured by memory units. Following are the memory units.

UNIT	STORAGE
Bit	Binary Digit, Single 1 or 0
Nibble	4 bits
Byte/Octet	8 bits
Kilobyte	1024 bytes
Megabyte	1024 KB
Gigabyte	1024 MB
Terabyte	1024 GB
Petabyte	1024 TB
Exabyte	1024 PB
Zettabyte	1024 EB
Yottabyte	1024 ZB

Memory Types

Primary Memory

Random Access Memory (RAM) - is a type of volatile memory that is stores information on an integrated circuit which hold the data mainly when the program is being executed by the CPU. As it is volatile in nature so it can't store data permanently.

Read Only Memory (ROM) - a non-volatile memory chip in which data are stored permanently, and can not be altered by

Cache Memory - is the volatile computer memory which is very nearest to the CPU,so also called CPU memory, and is between CPU and RAM all the Recent Instructions are Stored into the Cache Memory. It is the fastest memory that provides high-speed data access to a computer microprocessor.

Secondary Storage Devices

A hard disk is a set of stacked disks. Each disk has data recorded electromagnetically in concentric circles, or tracks, on the disk Hard Drive Types

1.   Parallel Advanced Technology Attachment (PATA)

2.   Serial ATA (SATA)

3.   Small Computer System Interface (SCSI)

4.   Solid State Drives (SSD)

Upto 12 TB sized HDD is available in the market

Input Devices

Input devices can send data or information to a computer or another device.

Keyboard: It is an input device which sends data in to the computer. The data send depends on the

key pressed by the user.

Mouse: A mouse is a small handheld input device which controls a cursor in a graphical user interface. It can move and select text, files, folders etc. on our computer according to the user input.

Scanner: Scanner optically reads and document, file or image and then changes it into digital signal and sends to the computer.

OMR: optical mark recognition/ reader, is used to read marks on a document and send them tocomputer.

OCR: OCR stands for optical character Recognition, is an input device which reads printed text and sends that to computer.

MICR: Magnetic Ink Character Reader is an input device which generally finds application is banks to process cheques.

Microphone: it receives audio generated by some input source and sends it to a computer. Webcam: it sends the captured images to a computer.

Graphics Tablets: This input device is used to draw using hand.

Trackballs: an upside down mouse ,encased within a socket. Is a cursor control device. Barcode reader: It is used to read the barcode of various items and feed the same to computer. Gamepad: Also known as joy pad is the input controller for video games.

Joystick: these input devices are used to control video games.

Output Devices

A device that can receive data from computer or another device and create output with that data is called output device. Examples of various output devices are as :

Monitor: A monitor is an output device that is responsible for receiving data from a computer and displaying that information as text or images for users to see.

Speakers: Receives sound signal from a computer and then plays that sound signal and thus we hear songs or music or any other audio.

Projector: Gets data from a computer and displays or projects the same information onto a screen or a wall. Projector cannot directly accept data from a user and send that data to another device.

TYPES OF SOFTWARE

Software is an organized instructions/code written by programmers using any of various special computer languages for specific purpose.

Types of software:

(1)   System software: controls the basic functions of a computer & hides complexity of computer system from user and application software. E.g. Operating System, Compiler, Interpret etc.

(2)   Application software: It handles specialized/ common tasks a user wants to perform, such as banking, hotel management, any data processing, word processing etc.

(3)   Utility software: Which helps to manage, maintain and control computer resources. E.g. are antivirus software, backup software

1)   System software

OPERATING SYSTEM

An Operating System (OS) is a system program that controls and manages the computer resources(resource manager) so that application software can run on it.

Example: Microsoft Windows, Solaris, Linux, MAC OS,Ubuntu, Apple's i-Phone OS etc.

HOW OPERATING SYSTEM WORKS

In any computer or mobile device, the operating system can be termed as the back bone when it comes to software. This is because it has to be there before other programs can be run.It works as a middleman (interface) between machine and user.

At the simplest level, an operating system does two things:

•   It manages the hardware resources of the computer system. These resources include such things as the processor, memory, disk space, etc.

•   It provides a stable, consistent way for applications to deal with the hardware without having to know all the details of the hardware.

FUNCTIONS OF OPERATING SYSTEM

•   Processor management

•   Memory management

•   Device management

•   Storage management

•   Application interface

•   User interface

•   Process management

•   Process a program in execution is known as process

•   Handling of multiple processes at a time is known as process management.

•   Process States

TYPE OF OPERATING SYSTEM

*   Single-User, Single Task Operating System:

These operating systems work on single task & single user at a time.E.g. DOS

*   Single-User, Multi-Task Operating System:

These operating systems works on more than one task and process them concurrently at a

time.E.g. windows 95 or later version of windows

*   Multiuser Operating System:

In these OS, multiple users are allowed to access the same data or information at a time via a network. E.g. Unix,Linux,Windows7.

*   Multiprocessing Operating System:

Here, a single process runs on two or more processors. All the processing and their management takes place in a parallel way, hence this OS are also called as Parallel Processing. E.g. Linux, UNIX and Windows 7.

*   Embedded Operating System:

These are embedded in a device, which is located in ROM.E.g. OS of microwaves,washing

machine.

*   Distributed Operating System:

In these OS, the computers work in co-operation with each other.

SYSTEM SOFTWARE/PROGRAMMING SOFTWARES

Language processor/Programming tool

As the computer understand machine language(0/1) where as Humans understand High level/Human Lang. Language Processors does the conversion task(high level to machine lang.)

These are of 3 types Language processors

1.   Compilers-It convert high-level language code to machine code in one session. It takes time because it have to translate high-level code to lower-level machine language all at once and then save the executable object code to memory.

2.   Interpreters-It translates code like a compiler but reads the code and immediately executes that code, and therefore it is faster than a compiler.

3.   Assemblers-It translates an assembly language program into machine language. One-pass assemblers go through the source code once. Any symbol used before it is defined will require "errata" at the end of the object telling the linker or the loader to "go back" and overwrite a placeholder which had been left where the as yet undefined symbol was used.

Multi-pass assemblers create a table with all symbols and their values in the first passes, then use the table in later passes to generate code.

(2)   Application software

*   General Purpose application software

These are ready to use software for daily use purpose

e.g. word processor,spreadsheet,presention,DBMS etc.

*   Specific Purpose application software Softwares which are designed for specific task

e.g. Payroll,HotelMgmt,HospitalMgmt,StockMgmt etc.

(3)   Utility software/System Utilities

that assist OS in carrying out certain specialized tasks are called utility software.

⬜   Antivirus - An anti-virus scans the system for any virus and if detected, gets rid of it by deleting or isolating it.

⬜   Compression tools - Compression tools are utilities that assist operating systems in shortening files so that they take less space.

 (3) Utility software/System Utilities

⬜   Disk Cleanup - Disk cleanup tools assist users in freeing up disk space.

⬜   Disk Defragmenter - Disk defragmenter is a disk management utility that increases file access speeds by rearranging fragmented files on contiguous locations.

⬜   Backup - Backup utility enables backing up of files, folders, databases or complete disks.

⬜   File management tools - Utility software providing regular file management tasks like browse, search, update, preview, etc. are called file management tools.

⬜   Restore – This utility restores the backup earlier taken.

⬜   Device driver or hardware driver is a group of files that enable one or more hardware devices to communicate with the computer's operating system. Without drivers, the computer would not be able to send and receive data correctly to hardware devices, such as a printer

MCQ

1. Smallest measurement unit of computer memory is?
(a) Megabyte
(b) Bit
(c) Byte

(d) Killo Byte

2. How many bytes are in 1 Kilobyte?
(a) 8 Bytes
(b) 128 Bytes
 (c) 1024 Bytes
(d) 256 Bytes

3. Read Only Memory (ROM) is a_____memory.
(a) Non Volatile Memory
(b) Volatile Memory
(c) Both (a & b)
(d) None of these

4. Which of the following is designed to control the operations of a computer?
a) Application Software
b) System Software
c) Utility Software
d) User

5. The software designed to perform a specific task:
a) Synchronous Software
b) Package Software
c) Application Software
d) System Software

6. The software substituted for hardware and stored in ROM.
a) Synchronous Software
b) Package Software
c) Firmware
d) Middleware

7. Which of the following is not application software?
a) Windows 7
b) WordPad
c) Photoshop
d) MS-excel

Very Short Answer Questions
1. Namethesoftwarerequiredtomakeacomputerfunctional.Writedownitstwoprimaryservices.
2. What is the need for secondary memory?
3. Draw the block diagram of a computer system. Briefly write about the functionality of each component.

Short Answer Questions
1. State the basic units of Computer along with its sub units and their functions.
2. Differentiate between RAM and ROM.
3. What is the role of CPU in Computer System?

Long Answer Questions
1. Name any four secondary storage media.
2. Define software. Explain with examples- System Software, Utility Software and Application Software.
3. Write short notes on Assembler, Compiler and Interpreter.

Boolean Logic

Boolean Logic

Because of computer understands machine language(0/1) which is binary value so every operation is done with the help of these binary value by the computer.

To understand boolean logic properly we have to understand Boolean logic rule,Truth table and logic gates

Boolean Logic rules

Boolean Algebra is the mathematics we use to analyse digital gates and circuits. We can use these "Laws of Boolean" to both reduce and simplify a complex Boolean expression in an attempt to reduce the number of logic gates required.

A +1=1	Annulment
A +0=A	Identity
A .1=A	Identity
A.0 =0	Annulment
A +A=A	Idempotent
A .A=A	Idempotent
NOTA=A	Double Negation
A +A =1	Complement
A .A =0	Complement
A+B=B+A	Commutative
A.B =B.A	Commutative
A+B =A.B	deMorgan'sTheorem
A.B=A+B	deMorgan'sTheorem

Boolean Expression

A Boolean expression is a logical statement that is either TRUE or FALSE .

A Boolean expression can consist of Boolean data, such as the following:

* BOOLEAN values (YES and NO, and their synonyms, ON and OFF, and TRUE and FALSE)
* BOOLEAN variables or formulas
* Functions that yield BOOLEAN results

De Morgan's Law

The complement of the union of two sets is equal to the intersection of their complements and the complement of the intersection of two sets is equal to the union of their complements. These are called De Morgan's laws.

For any two finite sets A and B
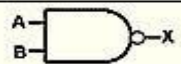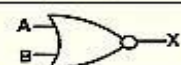
(i)   (A+B)'=A'.B'

(ii)   (A . B)'=A'+B'
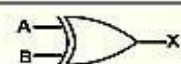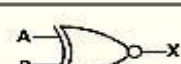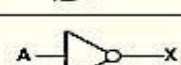
Truth table

A truth table is a mathematical table used in logic. e.g.

A	B	(A and B)	(A or B)	not(A and B)	not(A or B)
True	True	True	True	False	False
True	False	False	True	True	False
False	True	False	True	True	False
False	False	False	False	True	True

Logic Gates

Logic gate is an idealized or physical device implementing a Boolean function. These are used to construct logic circuit.

LOGIC GATES		
Logic gate symbol	Description	Boolean
	The AND gate output is at logic 1 when, and only when all its inputs are at logic 1, otherwise the output is at logic 0.	$X = A \cdot B$
	The OR gate output is at logic 1 when one or more of its inputs are at logic 1. If all the inputs are at logic 0, the output is at logic 0.	$X = A + B$
	The NAND Gate output is at logic 0 when, and only when all its inputs are at logic 1, otherwise the output is at logic 1.	$X = \overline{A \cdot B}$
	The NOR gate output is at logic 0 when one or more of its inputs are at logic 1. If all the inputs are at logic 0, the output is at logic 1.	$X = \overline{A + B}$
	The XOR gate output is at logic 1 when one and ONLY ONE of its inputs is at logic 1. Otherwise the output is logic 0.	$X = A \oplus B$
	The XNOR gate output is at logic 0 when one and ONLY ONE of its inputs is at logic 1. Otherwise the output is logic 1. (It is similar to the XOR gate, but its output is inverted).	$X = \overline{A \oplus B}$
	The NOT gate output is at logic 0 when its only input is at logic 1, and at logic 1 when its only input is at logic 0. For this reason it is often called an INVERTER.	$X = \overline{A}$

Universal gates are the logic gates which are capable of implementing any Boolean function without requiring any other type of gate.

Types of Universal Gates-

In digital electronics, there are only two universal gates which are-

1.   NAND Gate

2.   NOR Gate

Number System & Encoding Schemes

In general term computer represent information in different types of data forms i.e. number , character ,picture ,audio , video etc.

Computers are made of a series of switches/ gates. Each switch has two states: ON(1) or OFF(0).That's why computer works on the basis of binary number system(0/1).But for different purpose different number systems are used in computer world to represent information. E.g. Octal, Decimal, Hexadecimal.

NUMBER SYSTEM		
SYSTEM	BASE	DIGIT
Binary	2	0 1
Octal	8	0 1 2 3 4 5 6 7
Decimal	10	0 1 2 3 4 5 6 7 8 9
Hexadecimal	16	0 1 2 3 4 5 6 7 8 9 A B C D E F

CONVERSIONS

DECIMAL TO OTHER

1. DECIMAL TO BINARY

Decimal Number System to Other Base

To convert Number system from **Decimal Number System** to **Any Other Base** is quite easy;you have to follow just two steps:

A) Divide the Number(Decimal Number)by the base of target base system(in which you want to convert the number:Binary (2),octal (8)and Hexadecimal(16)).

B) Write the remainder from step1 as a Least Signification Bit(LSB)to Step last as a Most significant Bit(MSB).

Decimal to Binary Conversion	Result
Decimal Number is : **(12345)10** 2 | 12345 → 1 LSB 2 | 6172 → 0 2 | 3086 → 0 2 | 1543 → 1 2 | 771 → 1 2 | 385 → 1 2 | 192 → 0 2 | 96 → 0 2 | 48 → 0 2 | 24 → 0 2 | 12 → 0 2 | 6 → 0 2 | 3 → 1 1 → 1 MSB	BinaryNumberis **(11000000111001)2**

2. DECIMAL TO OCTAL

Decimal to Octal Conversion	Result
Decimal Number is:**(12345)10** 	Octal Number is **(30071)8**

Decimal to Octal conversion steps:

8	12345		1	LSB
8	1543		7	
8	192		0	
8	24		0	
	3		3	MSB

3. DECIMAL TO HEXADECIMAL

Decimal to Hexadecimal Conversion	Result
Example1 Decimal Number is:**(12345)10**	Hexadecimal Number is**(3039)16**
Example2 Decimal Number is:**(725)10**	Hexadecimal Number is **(2D5)16** **Convert** **10,11,12,13,14,15** **To its equivalent...A,B,C,D,E,F**

Example1 conversion steps:

16	12345		9	LSB
16	771		3	
16	48		0	
8	3		3	MSB

Example2 conversion steps:

16	725		5	5	LSB
16	45		13	D	
	2		2	2	MSB

BINARY TO OTHER

A)Multiply thedigit with 2(with place value exponent).Eventually add all the multiplication becomes the Decimal number.

1. BINARY TODECIMAL

$1 \times 2^0 = 1 \times 1 = 1$
$0 \times 2^1 = 0 \times 2 = 0$
$0 \times 2^2 = 0 \times 4 = 0$
$1 \times 2^3 = 1 \times 8 = 8$
$1 \times 2^4 = 1 \times 16 = 16$
$0 \times 2^5 = 0 \times 32 = 0$
$1 \times 2^6 = 1 \times 64 = 64$
$1 \times 2^7 = 1 \times 128 = 128$
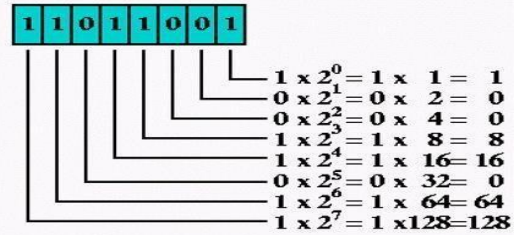
$1 + 8 + 16 + 64 + 128 = 217$

2. BINARY TO OCTAL

An easy way to convert from binary to octal is to group binary digits into sets of three, starting with the least significant (rightmost)digits.

Binary:11100101 =	11 100 101	
	011 100 101	Pad the most significant digits with zeros if necessary to complete a group of three.

Then,lookup each group in a table:

Binary:	000	001	010	011	100	101	110	111

Octal:	0	1	2	3	4	5	6	7

Binary=	011	100	101	
Octal =	3	4	5	= 345oct

3. BINARYTOHEXADECIMAL

An equally easy way to convert from binary to hexadecimal is to group binary digits into sets off our,starting with the least significant (rightmost)digits.

        Binary:11100101 =11100101

        Then, lookup each group in a table:

Binary:	0000	0001	0010	0011	0100	0101	0110	0111
Hexadecimal:	0	1	2	3	4	5	6	7
Binary:	1000	1001	1010	1011	1100	1101	1110	1111
Hexadecimal:	8	9	A	B	C	D	E	F

Binary=		1110	0101	
Hexadecimal=		E	5	=E5 hex

OCTAL TO OTHER

1. OCTAL TO BINARY

Converting from octal to binary is as easy as converting from binary to octal. Simply lookup each octal digit to obtain the equivalent group of three binary digits.

Octal:	0	1	2	3	4	5	6	7
Binary:	000	001	010	011	100	101	110	111

Octal =	3	4	5	
Binary=	011	100	101	=011100101binary

2. OCTALTOHEXADECIMAL

When converting from octal to hexadecimal, it is often easier to first convert the octal number into binary and then from binary into hexadecimal. For example, to convert 345octal into hex:

(from the previous example)

Octal =	3	4	5	
Binary=	011	100	101	=011100101binary

Drop any leading zeros or pad with leading zeros to get groups of four binary digits (bits):Binary 011100101=11100101

3. OCTALTODECIMAL

The conversion can also be performed   in the conventional mathematical way,by showing each digit place as an increasing power of 8.

345 octal=$(3*8^2)$ +$(4*8^1)$ +$(5*8^0)$ =$(3*64)$ +$(4*8)$ + $(5*1)$=229decimal

HEXADECIMAL TO OTHER

1. HEXADECIMALTO BINARY

Converting from hexadecimal to binary is as easy as converting from binary to hexadecimal.Simply lookup each hexadecimal digit to obtain the equivalent group off our binary digits.

Hexadecimal:	0	1	2	3	4	5	6	7
Binary:	0000	0001	0010	0011	0100	0101	0110	0111
Hexadecimal:	8	9	A	B	C	D	E	F
Binary:	1000	1001	1010	1011	1100	1101	1110	1111

Hexadecimal	A	2	D	E	
Binary=	1010	0010	1101	1110	10100010110 binary

2. HEXADECIMAL TO DECIMAL

Convert 42A.1216 into a decimal number. Solution-

The hexadecimal number given is 42 A.12

Positional weights 210-1-2

The positional weights for each of the digits are written in italics below each digit. Hence the decimal equivalent number is given as:

$4×16^2+2×16^1+10×16^1+1×16^{-1}+1×16^{-2}$

=1024 +32 +10+0.0625 +0.00390625

=$(1066.06640625)_{10}$

3. HEXADECIMALTOOCTAL

Given hexa decimalnumber is A 72E

Binary equivalent is 1010011100101110=1010011100101110

Forming groups of 3bits from the LSB 001 010011100101 110

Octal equivalent 1 23 45 6

Hence the octal equivalent of $(A72E)_{16}$is $(123456)_8$.

ENCODING SCHEMES

American Standard Code for Information Interchange (ASCII)

In the early 1960s, computers had no way of communicating with each other due to different ways of representing keys of the keyboard. Hence, the need for a common standard was realised to overcome this shortcoming. Thus, encoding scheme ASCII was developed for standardising the character representation. ASCII is still the most commonly used coding scheme.

Initially ASCII used7 bit store present characters. Recall that there are only binary digits(0or1).Therefore, total number of different character son the English keyboard that can be encoded by 7-bit ASCII code is 27 = 128. Following Table shows some printable characters for ASCII code. But ASCII is able to encode character set of English language only.

Indian Script Code for Information Interchange(ISCII)

In order to facilitate the use of Indian languages on computers, a common standard for coding Indian scripts called ISCII was developed in India during mid1980s.

It is an 8-bit code representation for Indian languages which means it can represent 28=256characters.It retainsall 128 ASCII codes and uses rest of the codes(128)for additional Indian language character set. Additional codes have been assigned in the upper region (160–255)for the 'aksharas' of the language.

UNICODE

There were many encoding schemes, for character sets of different languages. But they were not able to communicate with each other, as each of them represented characters in their own ways. Therefore, a standard called UNICODE has been developed to incorporate all the characters of every written language of the world. Commonly used UNICODE encodings are UTF-8, UTF-16 and UTF-32.

MCQ

1. When we convert 10011 binary numbers to decimals. Then the solution is :
   a. 20   b.18   c.19   d.16

2. Convert (22) from octal to its corresponding decimal equivalent.
   a. 20   b.18   c.14   d. 81

3. Name the number system which uses alphabets as well as numerical.
   a. Binary number system
   b. octal number system
   c. Decimal number system
   d. Hexadecimal number system

4. The octal equivalent of $(13)_{10}$ is
   a. 18   b. 14   c. 15   d. 16

5. Conversion of hexadecimal number $(69)_{16}$ to octal equivalent will be
   a.451   b. 351   c. 251   d. 151

Very Short Answer Questions

1. Write full form of ASCII and ISCII.
2. What is the base of binary number system?
3. How many digits used by the hexadecimal number system.

Short Answer Questions

1. Expressthefollowingoctalnumbersintotheirequivalentdecimalnumbers.
   (i) 145   (ii) 6760 (iii)455 (iv)10.75
2. Convert the following binary numbers into octal and hexadecimal numbers.
(i)1110001000 (ii)110110101(iii)1010100   (iv)1010.1001

<div align="center">

UNIT -2

Getting Stating with Python

</div>

1. INTRODUCTION

- Computers are used for solving various day-to-day problems.
- It is pertinent to mention that computers themselves can not solve a problem.
- Precisestep-by-stepinstructionsshouldbegivenbyustosolvetheproblem.
- Thus, the success of a computer in solving a problem depends on how correctly and precisely we define the problem, design a solution (algorithm) and implement the solution (program) using a programming language.
- Thus, problem solving is the process of identifying a problem, developing an algorithm for the identified problem and finally implementing the algorithm to develop a computer program.

2. Steps for ProblemSolving

There are four steps in problem solving

- Analysing the problem, Developing an Algorithm, Coding, Testing and Debugging

2.1 Analysing the problem

- It is important to clearly understand a problem before we begin to find the solution for it.
- If we are not clear as to what is to be solved,we may end up developing a program which may not solve our purpose.
- By analysing a problem, we would be able to figure out what are
- the inputs that our program should accept and the outputs that it should produce.

2.2 Developing an Algorithm

- The solution for a problem is represented in step by step procedure called analgorithm.
- For a given problem, more than one algorithm is possible and we have to select the most suitable solution.

2.3 Coding

- After finalising the algorithm, we need to convert the algorithm into the format which can be understood by the computer to generate the desired solution.

2.4 Testing and Debugging

- The program created should be tested on various parameters.
- The program should meet the requirements of the user.
- In the presence of syntactical errors, no output will be obtained.
- In case the output generated is in correct, then the program should be checked for logical errors, if any.

3. Algorithm

Algorithm is the step by step procedure for solving the problem. Suppose following are the steps required for an activity 'riding a bicycle':

- Remove the bicycle from the stand,
- Sit on the seat of the bicycle,
- Start peddling,
- Use breaks when ever needed and
- Stop on reaching the destination.

Example:
Algorithm to find square of anumber.
Step1: Input a number and store it to num
Step 2: Compute num * num and store
it in square
Step 3:Print square

3.1 Why do we need an Algorithm

- Writing an algorithm is mostly considered as a first step to programming.
- Once we have an algorithm to solve a problem, we can write the computer program for giving instructions to the computer in high level language.
- If the algorithm is correct, computer will run the program correctly, everytime.
- So, the purpose of using an algorithm is to increase the reliability, accuracy and efficiency of obtaining solutions.

Characteristics of a good algorithm
- Precision—the steps are precisely stated or defined.
- Uniqueness—results of each step are uniquely defined and only

depend on the input and the result of the preceding steps.

• Finiteness—the algorithm always stops after a finite number of steps.

• Input—the algorithm receives some input.

• Output—the algorithm produces some output.

While writing an algorithm ,it is required to clearly identify the following:

• The input to be taken from the user

• Processing or computation to be performed to get the desired result

• The output desired by the user

4. Representation of Algorithms

There are two common methods of representing an algorithm —flowchart and pseudocode. Either of the methods can be used to represent an algorithm while keeping in mind the following:

• it show cases the logic of the problem solution, excluding any implementational details

• it clearly reveals the flow of control during execution of the program

4.1 Flowchart —Visual Representation of Algorithms

- A flow chart is a visual representation of an algorithm.

- A flowchart is a diagram made up of boxes, diamonds and other shapes, connected by arrows.

Symbol	Name	Function
	Start/end	An oval represents a start or end point
	Arrows	A line is a connector that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectagle represents a process
	Decision	A diamond indicates a decision

Flow chart to calculate square of a number

```
        ( Start )
            |
            v
     / Input num /
            |
            v
   | square = num*num |
            |
            v
    / Print square /
            |
            v
        ( Stop )
```
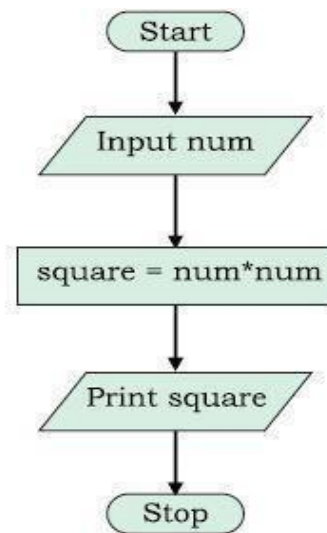
4.2 Pseudocode

A pseudocode (pronounced Soo-doh-kohd) is another way of representing an algorithm. It is considered as a non-formal language that helps programmers to write algorithm. The word"pseudo" means "not real," so "pseudocode" means "not real code". Following are some of the frequently used keywords while writing pseudocode:

- INPUT/•COMPUTE/•PRINT/•INCREMENT/•DECREMENT
- IF/ELSE,•WHILE,•TRUE/FALSE

Example:

Pseudo code for the sum of two numbers will be:

Input num1
input num2
COMPUTE Result = num1 + num2
PRINT Result

4.3 Coding

- Once analgorithm is finalised,it should be coded in ahigh-level programming language as selected by the programmer.
- The ordered set of instructions are written in that programming language by following its syntax.
- Syntax is the set of rules or grammar that governs the formulation of the statements in the language,such as spellings,order of words, punctuation,etc.

4.4 Decomposition

- The basic idea of solving a complex problem by decomposition is to 'decompose' or break down a complex problem into smaller sub problems.

Answer the Following Questions   (Very ShortAnnswers)

1. Define Algorithm
2. What is decomposition?
3. Why do we need Algorithm?
4. What is meant by Debugging?

Answer the Following Questions   (Short Answers)

1. Write an algorithm to find the greatest among two different numbers.
2. Write a pseudo code to calculate the factorial of a number.
3. Write an algorithm to find greater among three numbers

Answer the Following Questions   (Long Answers)

1. Write pseudo code and draw flow chart to accept number still the user enters and then find their average.
2. Write a pseudocode and draw a flowchart where multiple conditions are checked to categorize a person as either child(<13), teenager(>=13but<20) or adult(>=20),based on age specified:

3. Write an algorithmth at accepts four numbers as input and find the largest and smallest of them.

PYTHON PROGRAMMING FUNDAMENTAL:

5.1.1 Features of Python

• Python is a high level language. It is a free and open source language.
• It is an interpreted language, as Python programs are executed by an interpreter.
• Python programs are easy to understand as they have a clearly defined syntax and relatively simple structure.
• Python is case-sensitive. For example, NUMBER and number are not same in Python.
• Python is portable and platform independent, means it can run on various operating systems and hardware platforms.
• Python has a rich library of predefined functions.
• Python uses indentation for blocks and nested blocks.
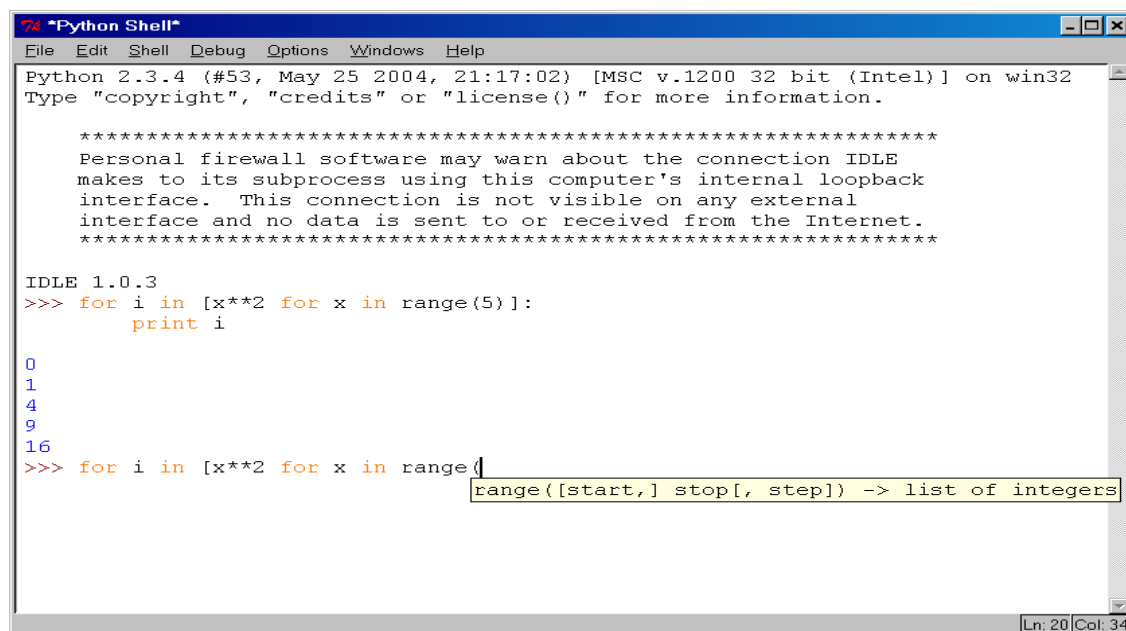
How to Install Python

- Python is pre-installed on most Unix systems, including Linux and MAC OS X
- The pre-installed version may not be the most recent one (2.6.2 and 3.1.1 as of Sept 09)
- Download from http://python.org/download/
- Python comes with a large library of standard modules
- There are several options for an IDE

IDLE – works well with Windows

IDLE (Integrated Development Environment)

- IDLE is an Integrated DeveLopment Environment for Python, typically used on Windows
- Multi-window text editor with syntax highlighting, auto-completion, smart indent and other.
- Python shell with syntax highlighting.
- Integrated   debugger   with   stepping,   persistent   breakpoints, and call stack visibility
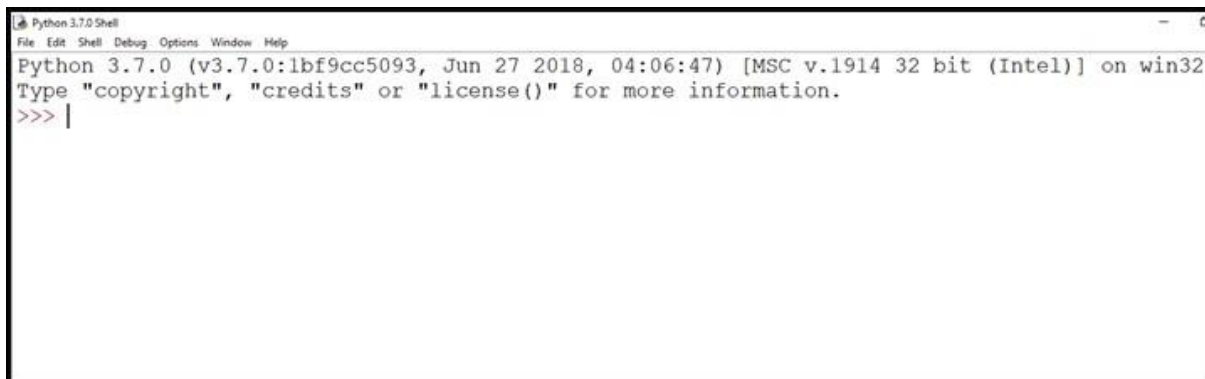
```
74 *Python Shell*                                                    _ □ ×
File  Edit  Shell  Debug  Options  Windows  Help
Python 2.3.4 (#53, May 25 2004, 21:17:02) [MSC v.1200 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.

    ****************************************************************
    Personal firewall software may warn about the connection IDLE
    makes to its subprocess using this computer's internal loopback
    interface.  This connection is not visible on any external
    interface and no data is sent to or received from the Internet.
    ****************************************************************

IDLE 1.0.3
>>> for i in [x**2 for x in range(5)]:
        print i

0
1
4
9
16
>>> for i in [x**2 for x in range(
                     range([start,] stop[, step]) -> list of integers

                                                              Ln: 20 Col: 34
```

5.1.2 Working with Python

To write and run (execute) a Python program, we need to have a Python interpreter installed on our computer or we can use any online Python interpreter. The interpreter is also called Python shell. A sample screen of Python interpreter is shown in Figure:

In the above screen, the symbol >>> is the Python prompt, which indicates that the interpreter is ready to take instructions. We can type commands or statements on this prompt to execute them using a Python interpreter.

5.1.3 Execution Modes
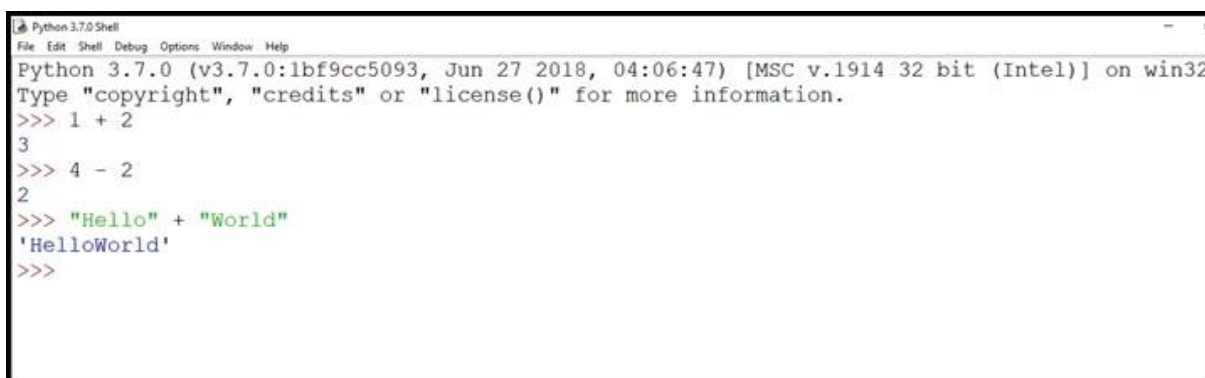
There are two ways to use the Python interpreter:
a) Interactive mode
b) Script mode

Interactive mode allows execution of individual statement instantaneously. Whereas, Script mode allows us to write more than one instruction in a file called Python source code file that can be executed.

(A) Interactive Mode

To work in the interactive mode, we can simply type a Python statement on the >>> prompt directly. As soon as we press enter, the interpreter executes the statement and displays the result(s), as shown in Figure:

Working in the interactive mode is convenient for testing a single line code for instant execution. But in the interactive mode, we cannot save the statements for future use and we have to retype the statements to run them again.

(B) Script Mode

In the script mode, we can write a Python program in a file, save it and then use the interpreter to execute it. Python scripts are saved as files where file name has extension ".py". By default, the Python scripts are saved in the Python installation folder. To execute a script, we can either:

a) Type the file name along with the path at the prompt. For example, if the name of the file is prog5-1.py, we type prog5-1.py. We can otherwise open the program directly from IDLE.

b) While working in the script mode, after saving the file, click [Run]->[Run Module] from the menu as shown in Figure below.

c) The output appears on shell as shown in figure below:

Program 5-1 Write a program to show print statement in script mode.

Basic DataTypes:

- **Integers (default for numbers)- Number without decimal point**
    - z = 5 / 2   # Answer 2.5, integer division
- **Floats : Number with decimal Point**
    - x = 3.456

- **Strings -**
  Can use "" or '' to specify with "abc" == 'abc'

  Use triple double-quotes for multi-line strings or strings than contain both ' and " inside of them:
  """"a'b"c""""

Comments :

- Comments are very important while writing a program. It describes what's going on inside a program so that a person looking at the source code does not have a hard time figuring it out.
- In Python, we use the hash (#) symbol to start writing a comment.
- If we have comments that extend multiple lines, one way of doing it is to use hash (#) in the beginning of each line.
- For example:

  #This is a long comment
  #and it extends
  #to multiple lines

- Another way of doing this is to use triple quotes, either ''' or """.
- These triple quotes are generally used for multi-line strings. But they can be used as multi-line comment as well.

  """This is also a
  perfect example of
  multi-line comments"""

Assignment :

- *Binding a variable* in Python means setting a *name* to hold a *reference* to some *object*
  Assignment creates references, not copies
- Names in Python do not have an intrinsic type, objects have types
  Python determines the type of the reference automatically based on what data is assigned to it
- You create a name the first time it appears on the left side of an assignment expression:
  x = 3
- A reference is deleted via garbage collection after any names bound to it have passed out of scope
- Python uses *reference semantics* (more later)
- You can assign to multiple names at the same time

```
>>> x, y = 2, 3
>>> x
2
>>> y
3
```

- This makes it easy to swap values

```
>>> x, y = y, x
```

- Assignments can be chained

```
>>> a = b = x = 2
```

Python keywords

Reserved words in the library of a language.There are 3 3keywords in python.

False	class	finally	is	return	break
None	continue	for	lambda	try	except
True	def	from	nonlocal	while	in
and	del	global	not	with	raise
as	elif	if	or	yield	
assert	else	import	pass		

All the keywords are in lowercase except 03 keywords(True, False, None)

Identifier

- **An identifier is a name given to entities like class, functions, variables, etc.**
- **It helps to differentiate one entity from another.**

Rules for naming Identifier :

- **Identifiers can be a combination of letters in lowercase (a to z) or uppercase (A to Z) or digits (0 to 9) or an underscore _.**
- **Names like myClass, var_1 and print_this_to_screen, all are valid example.**
- **An identifier cannot start with a digit. 1variable is invalid, but variable1 is perfectly fine.**
- **Keywords cannot be used as identifiers.**
- **We cannot use special symbols like !, @, #, $, % etc. in our identifier.**

   bob Bob _bob _2_bob_ bob_2 BoB

- **There are some reserved words:**

   and, assert, break, class, continue, def, del, elif, else, except, exec, finally, for, from, global, if, import, in, is, lambda, not, or, pass, print, raise, return, try, while

Program : Write a program to display values of variables in Python.

```
#To display value of variable
message = "hello"
print(message)
)
```

Output:
Hello

Program : Write a Python program to find the area of a rectangle given that its length is 10 units and breadth is 20 units.

```
#To find the area of a rectangle
length = 10
breadth = 20
area = length * breadth
print("Area of Rectangle=", area)
```

Output: 200

Do it yourself:

1. Write a Python program to find the sum and subtract of two numbers
2. Find the simple interest. Principle amount, rate of interest and time given by user.

Constants
- A constant is a type of variable whose value cannot be changed.
- It is helpful to think of constants as containers that hold information which cannot be changed later.

Literals
- Literals
- Literal is a raw data given in a variable or constant. In Python, there are various types of literals they are as follows:
  - Numeric Literals
  - Numeric Literals are immutable (unchangeable). Numeric literals can belong to 3 different numerical types Integer, Float and Complex.
  - a = 0b1010 #Binary Literals
  - b = 100 #Decimal Literal
  - c = 0o310 #Octal Literal
  - d = 0x12c #Hexadecimal Literal
- #Float Literal
  - float_1 = 10.5
  - float_2 = 1.5e2
- #Complex Literal
  - x = 3.14j
- print(a, b, c, d)
- print(float_1, float_2)
- print(x, x.imag, x.real)

OUTPUT
```
10 100 200 300
10.5 150.0
3.14j 3.14 0.0
```

Python Data Types

Built-in Data Types

In programming, data type is an important concept. Variables can store data of different types, and different types can do different things. Python has the following data types built-in by default, in these categories:

	Str
Numeric Types:	int, float, complex
Sequence Types:	list, tuple, range
Mapping Type:	dict
Set Types:	set, frozen set
Boolean Type:	bool

Binary Types: bytes, byte array, memory view

Let us now try to execute few statements in interactive mode to determine the data type of the variable using built-in function type().
Example :

```
>>> num1 = 10
>>> type(num1)
<class 'int'>
>>> num2 = -1210
>>> type(num2)
<class 'int'>
>>> var1 = True
>>> type(var1)
<class 'bool'>
```

Operators

An operator is used to perform specific mathematical or logical operation on values. The values that the operators work on are called operands. For example, in the expression 10 + num, the value 10, and the variable num are operands and the + (plus) sign is an operator. Python supports several kinds of operators whose categorisation is briefly explained in this section

Python divides the operators in the following groups:

- Arithmetic operators

- Assignment operators

- Comparison operators

- Logical operators

- Identity operators

- Membership operators

Python Arithmetic Operators

Arithmetic operators are used with numeric values to perform common mathematical operations:

Operator	Name	Example
+	Addition	x + y
-	Subtraction	x - y
*	Multiplication	x * y
/	Division	x / y
%	Modulus	x % y
**	Exponentiation	x ** y
//	Floor division	x // y

Concatenation

Concatenating means obtaining a new string that contains both of the original strings. In Python, there are a few ways to concatenate or combine strings. The new string that is created is referred to as a string object. In order to merge two strings into a single object, you may use the + operator.

For Example
>>>"CBSE "+"India"

Output is CBSEIndia

Replication. : The multiplication operator acts as a replication operator when we have one string and one integer as operands. What is replication? First, understand the meaning of the word replication.
>>>"CBSE" 3
Output is CBSECBSECBSE

Python Assignment Operators		
Operator	**Example**	**Equal to**
=	a = 20	a = 20
+=	a += b	a = a + b
-=	a -= b	a = a - b
*=	a *= b	a = a * b
/=	a /= b	a = a / b
%=	a %= b	a = a % b
//=	a //= b	a = a // b
**=	a **= b	a = a ** b
&=	a &= b	a = a & b
|=	a |= b	a = a	b
^=	a ^= b	a = a ^ b
>>=	a >>= b	a = a >> b
<<=	a <<= b	a = a << b

Python Comparison Operators

Comparison operators are used to compare two values:

Operator	Name	Example
==	Equal	x == y
!=	Not equal	x != y
>	Greater than	x > y
<	Less than	x < y
>=	Greater than or equal to	x >= y
<=	Less than or equal to	x <= y

Python Logical Operators

Logical operators are used to combine conditional statements:

Operator	Description	Example
and	Returns True if both statements are true	x < 5 and x < 10
or	Returns True if one of the statements is true	x < 5 or x < 4
not	Reverse the result, returns False if the result is true	not(x < 5 and x < 10)

Python Identity Operators

Identity operators are used to compare the objects, not if they are equal, but if they are actually the same object, with the same memory location:

Operator	Description	Example
is	Returns True if both variables are the same object	x is y
is not	Returns True if both variables are not the same object	x is not y

Python Membership Operators

Membership operators are used to test if a sequence is presented in an object:

Operator	Description	Example
in	Returns True if a sequence with the specified value is present in the object	x in y
not in	Returns True if a sequence with the specified value is not present in the object	x not in y

The following table lists all operators from highest precedence to lowest.

Operator	Description
**	Exponentiation (raise to the power)
~ + -	Complement, unary plus and minus (method names for the last two are +@ and -@)
* / % //	Multiply, divide, modulo and floor division
+ -	Addition and subtraction
>> <<	Right and left bitwise shift
&	Bitwise 'AND'td>
^ |	Bitwise exclusive `OR' and regular `OR'
<= < > >=	Comparison operators
<> == !=	Equality operators
= %= /= //= -= += *= **=	Assignment operators
is is not	Identity operators
in not in	Membership operators
not or and	Logical operators

Statement

In Python, a statement is a unit of code that the Python interpreter can execute.

Example
```
>>> x = 4        #assignment statement
>>> cube = x ** 3      #assignment statement
>>> print (x, cube)     #print statement

    4 64
```

- **Multi-line statement**
  In Python, end of a statement is marked by a newline character. But we can make a statement extend over multiple lines with the line continuation character (\).

For example:
```
a = 1 + 2 + 3 + \
4 + 5 + 6 + \
7 + 8 + 9
```

Input and Output

Sometimes, a program needs to interact with the user's to get some input data or information from the end user and process it to give the desired output. In Python, we
have the input() function for taking the user input. The input() function prompts the user to enter data. It accepts all user input as string. The user may enter a number or a string but the input() function treats them as strings only. The syntax for input() is:

input ([Prompt])

Example
```
>>>fname = input("Enter your first name: ")
Enter your first name: Arnab

>>> age = input("Enter your age: ")
Enter your age: 19

>>> type(age)
<class 'str'>
```

Example

```
#function int() to convert string to integer
>>> age = int( input("Enter your age:"))

Enter your age: 19
>>> type(age)
<class 'int'>
```

Example

Statement	Output
print("Hello")	Hello
print(10*2.5)	25.0
print("I" + "love" + "my" + "country")	Ilovemycountry
print("I'm", 16, "years old")	I'm 16 years old

More Examples:

```
print(1,2,3,4)
# Output: 1 2 3 4

print(1,2,3,4,sep='*')
# Output: 1*2*3*4

print(1,2,3,4,sep='#',end='&')
# Output: 1#2#3#4&
```

Type Conversion

The process of converting a Python data type into another data type is known as type conversion. There are mainly two types of type conversion methods in Python: implicit type conversion and explicit type conversion

Explicit Conversion

Explicit conversion, also called type casting happens when data type conversion takes place because the programmer forced it in the program. The general form of an explicit data type conversion is:

(new_data_type) (expression)

With explicit type conversion, there is a risk of loss of information since we are forcing an expression to be of a specific type. For example, converting a floating value of x = 20.67 into an integer type, i.e., int(x) will discard the fractional part .67. Following are some of the functions in Python that are used for explicitly converting an expression or a variable to a different type.

Explicit type conversion functions in Python

Function	Description
int(x)	Converts x to an integer
float(x)	Converts x to a floating-point number
str(x)	Converts x to a string representation
chr(x)	Converts x to a character

Program of explicit type conversion from int to float.

```
#Explicit type conversion from int to float
num1 = 10
num2 = 20
num3 = num1 + num2
print(num3)
print(type(num3))
num4 = float(num1 + num2)
print(num4)
print(type(num4))
```

Output:
30
<class 'int'>
30.0
<class 'float'>

Implicit Conversion

Implicit conversion, also known as coercion, happens when data type conversion is done automatically by Python and is not instructed by the programmer.

Program to show implicit conversion from int to float.

```
#Implicit type conversion from int to float
num1 = 10 #num1 is an integer
num2 = 20.0 #num2 is a float
sum1 = num1 + num2 #sum1 is sum of a float and an integer
print(sum1)
print(type(sum1))
```

Output:
30.0

MCQ:

Q.1 Who developed the Python language?
    a) Zim Den
    b)Wick van Rossum
    c) Guido van Rossum
    d) NieneStom

Q.2.. Which of the following is an invalid variable?
    a) my_string_1
    b) 1st_string
    c) foo
    d) _amount

Q.3.. Which one of these is floor division?
    a) /
    b) //
    c) %
    d) None of the mentioned

Q.4.. Which character is used in Python to make a single line comment?
    a) /
    b) //
    c) #
    d) !

Q.5.. If x=3.123, then int(x) will give ?

a) 1

b) 0

c) 1

d) 3

Answers :

Q.1. C   Q.2. B   Q.3. B

Q.4. C   Q.5. D

Practice Questions

1. Write a Python program to convert temperature in degree Celsius to degree Fahrenheit. If water boils at 100 degree C and freezes as 0 degree C, use the program to find out what is the boiling point and freezing point of water on the Fahrenheit scale.
   (Hint: T(°F) = T(°C) × 9/5 + 32)

2. Write a Python program to calculate the amount payable if money has been lent on simple interest. Principal or money lent = P, Rate of interest = R% per annum and Time = T years.P,R,T are given by user. Then Simple Interest (SI) = (P x R x T)/ 100.

3. Amount payable = Principal + SI

4. Write a program to enter two integers and perform all arithmetic operations on them.

5. Write a program to swap two numbers using a third variable.

6. Write a program to swap two numbers without using a third variable.

DEBUGGING

Errors occurring in programs can be categorized as:

    i) Syntax error

    ii) Logical error

    iii) Run Time error

Syntax Errors

Python has its own rules that determine its syntax. The interpreter interprets the statements only if it is syntactically (as per the rules of Python) correct. For example, parentheses must be in pairs, so the expression (10 + 12) is syntactically correct, whereas (7 + 11 is not due to absence of right parenthesis. Such errors need to be removed before the execution of the program

Logical Errors

Logical errors are also called semantic errors as they occur when the meaning of the program (its semantics) is not correct.For example, if we wish to find the average of two numbers 10 and 12 and we write the code as 10 + 12/2, it would run successfully and produce the result 16. Surely, 16 is not the average of 10 and 12. The correct code to find the average should have been (10 + 12)/2 to give the correct output as 11.

Runtime Error

A runtime error causes abnormal termination of program while it is executing. Runtime error is when the statement is correct syntactically, but the interpreter cannot execute it. Runtime errors do not appear until after the program starts running or executing.

Flow of Control

Sequential flow : In sequential flow instructions of a program are executed one after the another

Conditional Flow : In Conditional flow , flow of control of instructions in a program are changed based on a condition.

Iterative Flow : In iterative flow , a set of instructions are executed repeatedly based on a certain condition

Flow control statements are used to control the flow of e x e c u t i o n depending upon the specified condition/logic.

There are three types of control statements.

     Decision Making Statements /If control statement

     Iteration Statements(Loop control statement, for, while)

     Jump Statements(break,continue)

Decision Making Statements /If control statement

Decision making statement used to control the flow of execution of program depending upon condition.

Types of decision making statement.

1.   If statements

2.   if-else statements

3.   if-else-elif ladder

if statements

An if statement is a programming conditional statement that, if proved true, performs a function or displays information.

Syntax

if <condition>:
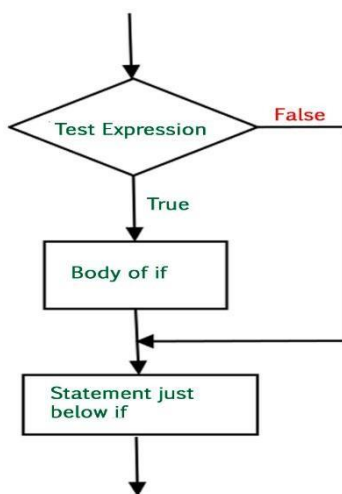
                                Statement(s)

Example:

a=2

b=3

if a < b :
    print('a is greater')

Output : a is greater

if-else statement

The statements inside the if block are executed only when condition is True, otherwise the statements in the else block are executed.

Syntax

if <condition>:
    Statement(s)
else:
   statements

Flow Chart
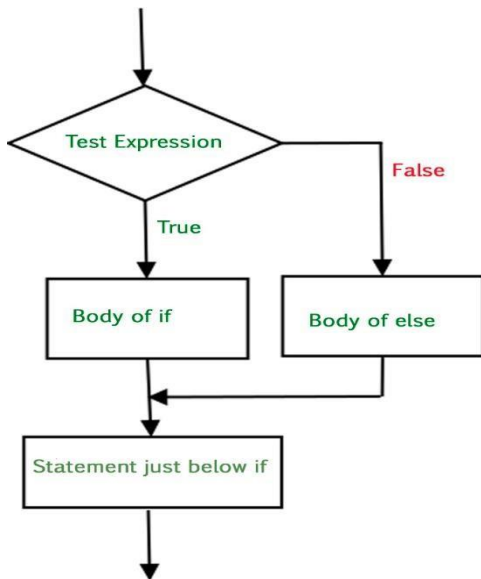
Example:
```
a=5
b=6
if a < b :
    print( 'b is greater' )
else:
    print( 'a is greater' )
Output : b is greater
```

if elif statement

The if...elif...else statement allows you to check for multiple test expressions and execute different codes for more than two conditions.

FlowChart
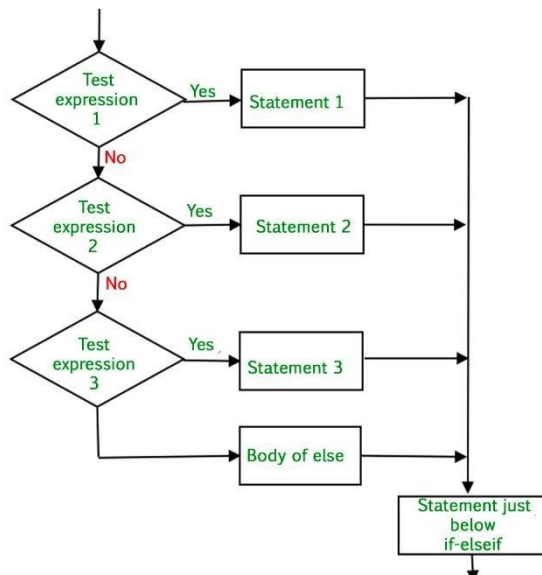
Example :
```
if 51<5:
    print("False, statement skipped")
elif 6<5:
    print("False, statement skipped")
elif 0<3:
    print("true, block will execute")
else:
    print("If all fails.")
output : true, block will execute
```

48

Iteration statements

Iteration statements(loop) are used to execute a block of statements as long as the condition is true.

Python Iteration (Loops) statements are of three type:-

1.   while Loop

2.   for Loop

WHILE LOOP

It is used to execute a block of statement if a given condition is true. And when the condition become false, the control will come out of the loop. The condition is checked every time at the beginning of the loop.

Syntax

while(condition) :

[statement]
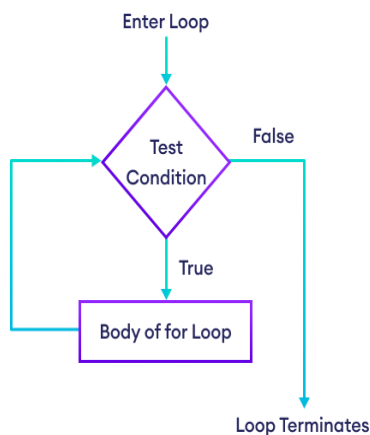
```
Example :
        count =0
        while(count <2):
          count=count +1
            print("Hello")

Output :  Hello
          Hello
```

FOR LOOP

It is used to iterate over items of any sequence, such as a list or a string.

Syntax

for val in sequence: #here val will take value of each element in the sequence

statements

```
for i in [1, 2, 3, 4, 5]:
        print(i*5)
```

OUTPUT:

5
10
15
20
25
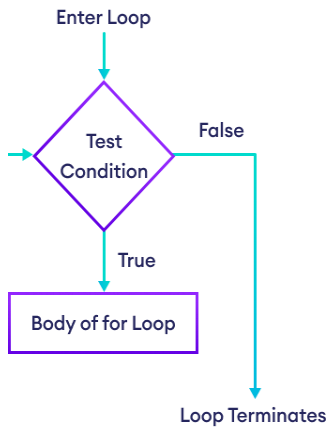
range() Function

This function generates a sequence of numbers based on the parameters passed.

Parameters

start: Starting number of the sequence.

stop: Generate numbers up to, but not including this number.

step(Optional): Determines the increment between each numbers in the sequence.

Python use range() function in three ways:

a. **range**(stop) : By default, It starts from 0 and increments by 1 and ends upto stop, but not including **stop** value.

```
fori inrange(5):
    print(i, end=" ")
```

   Output : 0 1 2 3 4

b.**range**(start,stop) : It starts from the **start** value and upto stop, but not including stop value.

```
fori inrange(5, 10):
    print(i, end=" ")
```

   Output : 5 6 7 8 9

c. **range**(start,stop,step): Third parameter specifies to increment or decrement the value by adding or subtracting the value.

```
fori inrange(0, 10, 2):
    print(i, end=" ")
```

Output : 0 2 4 6 8

BREAK STATEMENT

It is used to terminate the loop.

Example

```
for val in "string":
    if val == "i":
        break
    print(val, end=" " )
print("The end")
```

Output: s t r The end

CONTINUE STATEMENT

•   Used to skip the rest of the statements of the current loop block and to move to next iteration, of the loop.

•   Continue will return back the control to the beginning of the loop.

Example

```
for letter in  'Python' :
    if letter ==  'h' :
        continue
print (letter)
```

Output

```
Pyton
```

Nested Loops

Nested loops mean loops inside a loop. For example, while loop inside the for loop, for loop inside the for loop, etc.
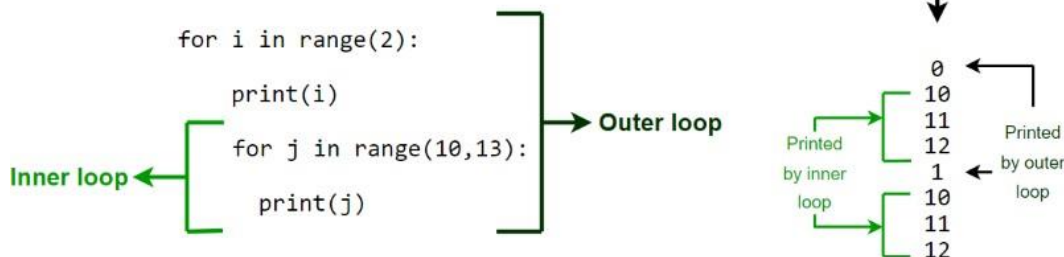
SOLVED QUESTIONS

MCQ (1 mark)

Q1:Which keyword is used to add multiple conditions in a statement?
1. if
2. else
3. elif
4. while

Ans : 3. elif

Q2 : Choose correct output :
namesl = ['Amir', 'Barry',Chales','Dao']
   if 'amir' in namesl:
       print 1
   else:
       print 2

1. 1

2. 2

3. Error

4. 12

Ans : 2. 2

Q3 : Find correct output :

x=3
        if x>2 or x<5 and x==6:
                print("ok")
        else:
                print("no output")
            1. Ok
            2. no output
            3. error
            4. ok no output

Ans : 2. No output

Q4 : Which keyword is used to terminate the looping in Python when certain condition is met ?

    1. Break
    2.   Continue
    3. Raise
    4. Pass

Ans 1. Break

Q5. What will be the output of the following Python code?

```
i = 1
while True:
    if i % 3 == 0:
        bre
      ak
    print(i)
    i + = 1
```

    1. 1 2
    2. 1 2 3
    3. Error
    4. None of the mentioned

Ans : 1. 1 2

Q 6 : Which of the following sequences would be generated in the given line of code?
    range (5,0, -2)

    1. 5 4 3 2 1 0 -1
    2. 5 3 1 -1
    3. 5 3 1
    4. 5 3
    5.

Ans : 3. 5 3 1

Very Short Answer type Questions (2 marks)

Q1 :   Find output

```
x=True
        y=False
        z=False
        if x or y and z:
                print("YES")
        elif x and y or z:
                print("yes")
        else:
                 print("no")
```

Ans : no

Q2 . What is the output for the following code
```
i=1
        while(i<=7):
                i*=2
        print(i)
```

Ans : 128

Q3**.** What is the difference between break and continue statements?
Ans:
Break: breaks the iteration of loop when a certain condition is met .
Continue : skip the rest of the statements of the current loop block and to move to
     next iteration, of the loop.

Q4. Write a program to print the sum of series: $s=1+x+x^2+x^3…..+x^n$
Ans :
```
s=0
    x=int(input("enter x"))
    for i in range(1,n+1):
       s=s+x**i
    print(s)
```

Q5 . Write a Python program that accepts two integers from the user and prints a message saying if first number is divisible by second number or if it is not?

Ans:

```
x=int(input("enter first number"))
         y=int(input("enter second number"))
         if(X%Y ==0):
             print(x, "is divisible by",y)
         else :
             print(x,"is not divisible by " , y)
```

Syntax Error	Logical Error
Syntax Errors occur when we violate the rules of writing the statements of the programming language.	Logical Errors occur due to our mistakes in programming logic.
Program fails to compile and execute.	Program compiles and executes but doesn't give the desired output.
Syntax Errors are caught by the compiler.	Logical errors need to be found and corrected by people working on the program.
Example : print("hello) . closing " is missing	Example : average=a+b/2 gives incorrect value for average of a and b .

Q6. Differentiate between Syntax Error and Logical Error with Example.

Short Answer Type Questions (3 marks)

 Q 1 Write a program to print grade of a student as per input percentage as per criteria given below:-

Percentage range	Grade
>=90	A
75<=89	B
60<=74	C
40<=59	D
>=40	E

Ans:
```
perc= int(input("enter percentage"))
    if(perc>=90):
    Print(" grade A")
    elif(perc>=75 and perc< 89 ) :
            Print ( " grade B ")
    elif( perc>= 60 and perc< 74 ) :
             Print("grade C")
    elif(perc>=40  and perc< 60):
             Print("grade D")
     else:
             Print("E")
```

Q2. Write a program to find maximum of 3 integers entered by user .

Ans :
```
a=int(input ("Enter First Number ?"))
b=int(input("Enter First Number ?"))
c=int(input("Enter First Number ?"))
if (a>b) and (a>c) :
   print ("Max number is ",a)
if (b>a) and (b>c) :
   print ("Max number is ",b)
 if (c>a) and (c>b) :
    print ("Max number is ",c)
```

Long answer question (5marks)

Q2. **Q1 Write python code to Generate following pattern using Nested loop**
```
 *
 * *
 * * *
 * * * *
 * * * * *
```

Ans :
```
    n = int(input("Enter the number of rows"))
    # outer loop to handle number of rows
```

```
    for i in range(0, n):
        for j in range(0, i + 1):
            print("* ", end="")
         # ending line after each row
        print()
```

Unsolved questions :

MCQs

Q1 :   How do we differentiate the body of the loop from the rest of the code?

1. Writing loop above.
2. Writing loop below the whole code.
3. Using proper indentation.
4. All are correct.

Q2: Which of the following is False regarding loops in Python?

A. Loops are used to perform certain tasks repeatedly.
B. While loop is used when multiple statements are to executed repeatedly until the given condition becomes False
C. While loop is used when multiple statements are to executed repeatedly until the given condition becomes True.
D. for loop can be used to iterate through the elements of lists.

Q3 :   The_____statement skips the rest of the loop statements and causes the next iteration of the loop to take place.
1. Break
2. Continue
3. Raise
4. Pass

Q1. Rewrite the following code after removing syntax errors :

```
name = ("Enter Name :" )
age = int(input("Enter Age: ")
if age >=18
        print(name, "is eligible for driving license")
else
print(name, "isot eligible for driving license")
```

Q2 . Find Output

```
i=0
    while (i<10):
    i=i+1
        if i==5:
            break
    print(i,end=" ")
```

Q3 Find ouput of following code :

```
for x in range(0,10,2):
      print(x,"#", end=' ')
```

SA (3 marks)

Q1. Write a program to find sum of all even numbers from 1 to 100.

Q2.Write a program which accept Sales Amount from user then calculate and print discount

amount per following criteria :

Sales Amount	Discount
Less than 5000	5% of Sales Amount
5001 to 10000	7% of sales Amount
More than 10000	10% of Sales Amount

(e.g. if Sales amount is 400 then Discount amount would be 400*5/100 i.e. 20)

Q1 Write a python program to accept age of a person from user and check whether he has completed 18 years or more. If yes print 'Eligible for Voting' or otherwise print 'Minor'.

Q2 Write a program in python to print the table of a number given by the user using for loop

STRING MANIPULATION

Strings: Sequence of characters that is enclosed in single or double quotes referred as String. Strings are immutable. Various string operations are as follows:-

Operators	Syntax	Description
+ (Concatenation)	Str1+Str2	Adds or join two or more strings
*(Repetition)	Str*3	*operator creates a new string by repeating multiple copies of the same string.
in/not in (Membership)	'M' in 'Mumbai' 'M' not in 'mumbai'	Returns true if character exist in given the string and return false if the given character does not exist in the string
[:] (range(start, stop, step)	Str[1:8:2]	Extracts the characters from the given range or to extract a subset of values.
[ ] Slice[n:m]	Str[2:7]	Extracts the characters from the given index
Traversing a String	for i in range(len(str)):	iterate through the elements of a string,one character at a time.

String Methods and Built-in functions:

Function/Method	syntax	Description
len()	len (str)	Returns the length of the string
count()	str.count(sub, start, end)	It returns number of times substring str occurs in the given string.
split()	str.split(",")	Breaks up a string at the specified separator and returns a list of substrings
capitalize()	str.capitalize ()	Converts the first letter of the string in uppercase
title()	str.title()	It returns the string with first letter of every word in the string in uppercase and rest in lowercase.

find()	str.find (sub, start, end)	It is used to search the first occurrence of the substring in the given string.
replace()	str.replace (old, new)	It replaces all the occurrences of the old string with the new string.
index()	index(substr, start, end)	It also searches the first occurrence and returns the lowest index of the substring.
lower()	str,lower ()	It converts the string into lowercase
islower()	str.islower ()	It returns True if all the letters in the string are in lowercase otherwise false
upper()	str.upper()	It converts the string into uppercase
isupper()	str.isupper ()	It returns True if all the letters in the string are in uppercase otherwise false.
isalpha()	str.isaplha ()	It checks for alphabets in an inputted string and returns True in string contains only letters else false.
isalnum()	str.isanum ()	It returns True if all the characters are alphanumeric else false.
isdigit()	str.sidigit ()	It returns True if the string contains only digits, otherwise false.
lstrip()	str.istrip(chars) str.istrip()	It returns the string after removing the space from the left of the string
rstrip()	str.restrip(chars) str.rstrip()	It returns the string after removing the space from the right of the string
strip()	str.strip()	It returns the string after removing the space from the both side of the string
index()	str.index(substring)	It returnsthe index position of an element or an item in a string of characters or a list of items.
startswith()	string.startswith(substring, start, end)	It returns True if the string starts with the given substring, and False otherwise.
partition()	str.partition(separator)	It splits a given string into three parts based on the first occurrence of a specified separator. It returns a tuple containing the three parts: the portion before the separator, the separator itself, and the portion after the separator.
join()	separator.join(iterable)	It is used to concatenate elements from an iterable (like a list or tuple) into a single string, with a specified separator between each element.
endswith()	string.endswith(substring, start, end)	It returns True if the string ends with the given substring, and False otherwise.

MULTIPLE CHOICE QUESTIONS (MCQ)-1 Mark

1	Which of the following operations on a string will generate an error? (a) "PYTHON"*3 (b) "PYTHON" + "20" (c)"PYTHON" + 10 (d) "PYTHON" + "LANGUAGE"

2	If the following code is executed, what will be the output of the following code?
	      name="Computer_Science_with_Python"
	      print (name [-25:10])
	(a) puter_S (b) hon (c) puter_Science (d) with python

3	Which of the following functions will return the total number of characters in a string? count () b) index() c) len() d) all of these
4	Which of the following functions will return the last three characters of a string s ? s[3:] b) s[: 3] c) s[-3:] d) s[: -3]
5	Which of the following functions will raise an error if the given substring is not found in the string ? a) find() b) index() c) replace() d) all of these
6	Which of the following functions removes all leading and trailing spaces from a string ? a) lstrip() b) rstrip() c) strip() d) all of these
7	Find the operator which cannot be used with a string in Python from the following: (a) + (b) not in (c) * (d) //
8	What will be the output of above Python code? str1= "6/4" print("str1") a) 1 b) 6/4 c) str1 d (1.5)

9	Which of the following will result in an error?
	str1="python"
	    a) print(str1[2]) b) str1[1]="x"
	    b) c) print(str1[0:9]) d) Both (b) and (c)

10	Which of the following is False?
	   a) String is immutable.
	   b) capitalize() function in string is used to return a string by converting the whole given string into uppercase.
	   c) lower() function in string is used to return a string by converting the whole given string into lowercase.
	   d) None of these.

11	What will be the output of below Python code? str1="Information" print(str1[2:8])

	a) formatb) formation c) orma d) ormat
12	What will be the output of below Python code? str1="Aplication" str2=str1.replace('a','A') print(str2) a) application b) Application c) ApplicAtion d) applicAtion

13	What will be the output of below Python code?
	str1="power"
	str1.upper( )
	print(str1)
	    a) POWER b) Power c) power d) power
	    b)

14	Which of the following will give "Simon" as output?
	If str1="John,Simon,Aryan"
	
	    a) print(str1[-7:-12]) b) print(str1[-11:-7])
	    c) print(str1[-11:-6]) d) print(str1[-7:-11])

	In the following questions(15 to 20) , a statement of assertion (A) is followed by a statement of reason(R) . Make the correct choice as : (a) Both A and R are true and R is the correct explanation for A (b) Both A and R are true and R is not the correct explanation for A (c) A is True but R is False (or partially True) (d) A is false(or partially True) but R is True
15	Assertion(A): The position and index of string characters are different. Reason(R) : The positions for string's characters vary from 1..n , where n is size of the string . The indices for string's characters vary from 0 to n-1.
16	Assertion(A): Operators + and * can work with numbers as well as strings. Reason(R) : Unlike numbers , for strings , + means concatenation and * means replication.
17	Assertion(A):String slices and substrings ,both are extracted subparts of a string. Reason(R) : String slices and substrings mean the same.
18	Assertion(A):Like numbers, ==,>,< can also compare two strings. Reason(R) :comparison of python strings takes place in dictionary order by applying character-by-character comparison rules for ASCII/Unicode.
19	Assertion(A):String slices and substrings, despite being subparts of a string , are not the same. Reason(R) :While the substring contains a continuous subparts of the string , the slices may or may not contain continuous subparts of a string.
20	Assertion(A): The individual characters of a string are randomly stored in memory. Reason(R) :Python strings are stored in memory by storing individual characters in contiguous memory locations.

1	c	11	a
2	a	12	c
3	c	13	a
4	c	14	c
5	b	15	a
6	c	16	a
7	d	17	c
8	c	18	b
9	b	19	a
10	b	20	d

VeryShortanswerTypeQuestions

Q1.Which of the following is not a Python legal string operation?

a) "abc"+"abc"   (b)„abc"*3

b) (c)"abc"+3   (d)"abc".lower()Ans:

Ans.   (c)‗abc'+3

Q2. Out of the following operators ,which one scan be used with strings?

=,-,*,/,//,%,>,<>,in, not in,<=

Ans: /,// and %

Q3. From the string S="CARPEDIEM".Which ranges return"DIE"and"CAR"?

Ans.   S[6:9]forDIEandS[0:3]for   CAR

Q4. Given a string S = "CARPE DIEM". If n is length/2 then what would following return?

(a)S[:n]   (b)S[n:]   (c)S[n:n]   (d)S[1:n]   (e)S[n:length-1]

Ans: (a)"CARPE(b)"DIEM"   (c)" "   (d)"ARPE"   (e)"DIE"

Q5.Whatwouldfollowingexpressionreturn?

(a) "HelloWorld".upper().lower()   (b)"HelloWorld".lower().upper()
(c)"HelloWorld".find("Wor",1,6)   (d)"HelloWorld".find("Wor")
(e)"HelloWorld".find("wor")   (f)"HelloWorld".isalpha()
(g)"HelloWorld".isalnum()   (h)"HelloWorld".isdigit()
(i)"123FGH".isdigit()

Ans: (a) 'helloworld'   (b)'HELLOWORLD'

(c)-1   (d)6

(e)-1   (f)False

(g) False   (h)False

(i)False

Q-6. Find the output:

```
str="PYTHON@LANGUAGE"
print(str[2:12:2])
```

Ans. TO@AG

Q-7. Find and write the output of the following python code:

```
x = "abcdef"
i = "a"
while i in x:
     print(i, end = " ")
```

  Ans: aaaaaa ---- OR infinite loop

ShortAnswerTypeQuestions

Q1.What is a string slice?How is it useful?

Ans: String Slice is a part of a string containing some contiguous characters from the string.

It is accessed from the string by providing a rangein"[]"bracketsi.e.S[n:m].Python returns all the characters at indices n,n+1, n+2. .n-1e.g.

          S="Barabanki"
          S[4:7]will return ban

Q2.Write a python script that traverses through an input string and prints its characters in different lines–two characters per line.

Ans:

```
s=input("Enter a string")
l=len(s)
j=0
for i in range(0,l):
    print(s[i],end='')
    j+=1
    if j%2==0:
        print('')
```

Q3.Which functions would you chose to use to remove leading and trailing white spaces from a given string?

Ans: Python String strip() function will remove leading and trailing white spaces.If you want to remove only leading or trailing spaces,use lstrip()or rstrip()function instead.

Q4.Suggest appropriate functions for the following tasks –

   (a) To check whether the string contains digits.
   (b) To find the occurrence a string within another string.
   (c) Toconvertthefirstletterofastringtouppercase.
   (d) To convert all the letters of a string toupper case.
   (e) To check whether all the letters of the string are in capital letters.
   (f) to remove all the white spaces from the beginning of a string.

Ans:(a) isalnum()

(b) find()

(c) capitalize()

(d) upper()

(f) isupper()

(g) lstrip()

Q5. Find the errors-
> *s="PURAVIDA"*
> *print(s[9]+s[9:15])*

  Ans: Here the error is:String index out of range.

Q6- How many types of strings are supported in Python?
 Ans: Python allows two string types:

Single Line strings –Strings that are terminated in a single line enclosed within single and double quotes.

Multiline strings- String storing multiple lines of text enclosed within three single or double quotes.

HOTs Questions

Q.1   WAP to print following pattern without using any nested loop.

```
#
# #                    Ans:
# # #
# # # #
# # # # #
```

```
n=int(input("Enter Limit"))
for i in range(1,n+1):
    print("#"*i)
```

Q2. WAP to print the number of occurrences of a substring into a line.

Ans.

```
s=input("Enter a String : ")
substr=input("Enter a Sub String : ")
l=len(s)
lsub=len(substr)
start=count=0
end=l
while True:
    position=s.find(substr,start,end)
    if position!=-1:
        count+=1
        start=position+lsub
    else:
        break
    if start>=l:
        break
print("No. of occurances of ",substr, " : ",count)
```

Q3. WAP to check the given string ispalindrome or not.

Ans.

```
s=input("Enter a string : ")
mid=len(s)//2
rev=-1
for a in range(mid):
    if s[a]==s[rev]:
        rev-=1
    else:
        print(s," is not Palindrome")
        break
else:
    print(s, " is palindrome")
```

65

Q1.Find output of the following "abcd".startswith("cd").

Q2. Find output of the following "COMPUTER SCIENCE".title().

Q3. Differentiate between partition ( ) and split( ) functions.

Q4. Find the length of string: name= "Computer Science").

Q5. Find the output:

```python
str = "Python Output based Questions"
word=str.split()
for i in word:
   print(i)
```

Q6. . Find and write the output of the following python code:

```python
Text1="DIGITAL INDIA2023"
Text2=""
I=0
while I<len(Text1):
    if Text1[I]>="0" and Text1[I]<="9":
            Val = int(Text1[I])
            Val = Val + 1
            Text2=Text2 + str(Val)
      elif  Text1[I]>="A" and Text1[I] <="Z":
            Text2=Text2 + (Text1[I+1])
       else:
            Text2=Text2 + "*"
       I=I+1
print (Text2)
```

Q7. Find and write the output of the following python code:

```python
s="welcome2cs"
n = len(s)
m=""
for i in range(0, n):
   if (s[i] >= 'a' and s[i] <= 'm'):
      m = m +s[i].upper()
   elif (s[i] >= 'n' and s[i] <= 'z'):
      m = m +s[i-1]
   elif (s[i].isupper()):
       m = m + s[i].lower()
   else:
      m = m +'&'
print(m)
```

Answers:
Q1. False
Q2. Computer Sceince
Q3. The split() method is used to split a string into a list of substrings based on a delimiter. The delimiter can be any character or sequence of characters that you specify. By default, if no delimiter is provided, it will split the string at spaces.
The partition() method is used to split a string into three parts based on the first occurrence of a specified delimiter. It returns a tuple containing the part before the delimiter, the delimiter itself, and the part after the delimiter.
Q4. 16
Q5. Python

 Output
 based
 Questions
Q6. IGITAL *NDIA23134
Q7. sELCcME&Cc

LIST MANIPULATION

List: A list is a collection of comma-separated values (items) of same or different type within square ( )

brackets. List is a mutable data type.

Slicing: Slicing is an operation in which we can slice a particular range from a sequence.

List slices are the sub parts extracted from a list.

Nested List: When a list appears as elements of another list, it is called a nested list.

Built-in Function (Manipulating Lists)

Function	Syntax	Description
list()	list(sequence)	It returns a list created from the passed arguments, which should be a sequence type(string, list, tuple etc.). if no argument is passed, it will create an empty list.
append()	list.append (items)	It adds a single item to the end of the list.
extend()	list1.extend (list2)	It adds one list at the end of another list.
insert()	list.insert (index_no, value)	It adds an element at a specified index
reverse()	list.reverse ()	It reverses the order of the elements in a list.
index()	list.index (item)	It returns the index of first matched item from the list.
len()	len (list)	Returns the length of the list i.e. number of elements in a list
sort()	list.sort ()	This function sorts the items of the list.
clear()	list.clear ()	It removes all the elements from the list.
count()	list.count (element)	It counts how many times an element has occurred in a list and returns it.
sorted()	sorted(sequence,reverse=False)	It returns a newly created sorted list; it does not

67

		change the passed sequence.
pop()	list.pop (index)	It removes the element from the specified index and also returns the element which was removed.
remove()	list.remove (value)	It is used when we know the element to be deleted, not the index of the element.
max()	max(list)	Returns the element with the maximum value from the list.
min()	min(list)	Returns the element with the minimum value from the list
sum()	sum(list)	It returns sum of elements of the list.

MCQs

1	**1. The data type list is an ordered sequence which is_____and made up of one or more elements.** a. Mutable b. Immutable c. Both a) and b) d. None of the above
2	**Which statement from the list below will be create a new list?** a. new_l = [1, 2, 3, 4] b. new_l = list() c. Both a) and b) d. None of the above
3	**What will be the output of the following python code** new_list = ['P','y','t','h','o','n'] print(len(new_list)) a. 6 b. 7c. 8d. 9
4	**Python allows us to replicate a list using repetition operator depicted by symbol_____.** a. – b. + c. / d. *
5	**We can access each element of the list or traverse a list using a_____.** a. for loop b. while loop c. Both a) and b) d. None of the above
6	**_____a single element passed as an argument at the end of the list.** a. append() b. extend() c. insert() d. None of the above
7	**_____returns index of the first occurrence of the element in the list. If the element is not present, ValueError is generated.** a. insert() b. index() c. count() d. None of the above
8	**_____function returns the element whose index is passed as parameter to this function and also removes it from the list.** a. push() b. remove() c. pop() d. None of the above

9	**What will be the output of the following python code.** **new_list = "1234"** **print(list(new_list))** a. ['1', '2', '3', '4'] b. ('1', '2', '3', '4') c. {'1', '2', '3', '4'} d. None of the above
10	**Suppose list1 is [4, 2, 2, 4, 5, 2, 1, 0], which of the following is correct syntax** **for slicing operation?** **a) print(list1[0]) b) print(list1[:2])** **c) print(list1[:-2]) d) all of the mentioned**
11	**Suppose list1 is [2, 33, 222, 14, 25], What is list1[-1] ?** **a) Error b) None c) 25 d) 2**
12	**Suppose list1 is [1, 3, 2], What is list1 * 2 ?** **a) [2, 6, 4] b) [1, 3, 2, 1, 3]** **c) [1, 3, 2, 1, 3, 2] d) [1, 3, 2, 3, 2, 1].**
13	**What is the output when following code is executed ?** **>>>list1 = [11, 2, 23]** **>>>list2 = [11, 2, 2]** **>>>list1 < list2 is** **a) True b) False c) Error d) None**
14	**To insert 5 to the third position in list1, we use which command ?** **a) list1.insert(3, 5) b) list1.insert(2, 5)** **c) list1.add(3, 5) d) list1.append(3, 5)**
	In the following questions(15 to 20) , a statement of assertion (A) is followed by a statement of reason(R) . Make the correct choice as : (a) Both A and R are true and R is the correct explanation for A (b) Both A and R are true and R is not the correct explanation for A (c) A is True but R is False (or partially True) (d) A is false(or partially True) but R is True
15	Assertion: In python, unlike other types, you can change elements of a list in place. Reason: Lists are mutable sequences.
16	Assertion: Any comma-separated group of values creates a list. Reason: Only a group of comma-separated values or expressions enclosed in [ ] , creates a list.
17	Assertion: Lists and strings have similar types of indexing. Reason: Both lists and strings have two-way indexing , forward indexing and backward indexing.
18	Assertion :Lists are similar to strings in a number of ways like indexing , slicing and accessing individual elements. Reason : Lists, unlike strings , are mutable.
19	Assertion : The membership operators in and not in work in the same way on lists as they do , with strings. Reason :Some operators work differently on strings and lists , such as + and * .
20	Assertion: A list slice is an extracted part of a list. Reason: A list slice is a list in itself.

1	a	11	c
2	c	12	c
3	a	13	b
4	d	14	b
5	c	15	a
6	c	16	d
7	b	17	a
8	c	18	b
9	a	19	c
10	d	20	b

Very Short Answer Type Questions

Q1. What do you understand by mutability?

Ans: Mutable means changeable. In Python, mutabletypes are those whose values can be changed inplace.Onlythreetypesaremutablein python–Lists,Dictionariesand Sets.

Q2. Startwiththelist[8,9,10].Dothefollowingusinglistfunctions:

(a) Setthesecondentry(index1)to17
(b) Add4,5and6tothe endofthelist.
(c) Removethefirstentryfromthelist.
(d) Sortthelist
(e)   Doublethelist.
(f) Insert 25 at index 3

Answers:

(a) list[1]=17

(b)   list.append(4)

list.append(5)

list.append(6)

(c) list.pop(0)

(d) list.sort()

(e) list=list*2

(f) list.insert(3,25)

Q3. Ifais[1,2,3],what is the difference(ifany) between a*3 and [a,a,a]?

Ans: a*3 will produce [1,2,3,1,2,3,1,2,3],means a list of integers and [a,a,a] will produce[[1,2,3],[1,2,3], [1,2,3]], means list of lists

Q4. If a is [1,2,3],is a*3 equivalent to a+ a+a?

Ans: Yes, Both a*3and a+a+a will produce same result.

```
>>> a=[1,2,3]
>>> a*3
[1, 2, 3, 1, 2, 3, 1, 2, 3]
>>> a+a+a
[1, 2, 3, 1, 2, 3, 1, 2, 3]
```

Q5. If ai s[1,2,3],what is the meaning of a[1:1]=9?

Ans: This will generate an error–Type Error: can only assign an iterable.

Q6. If a is[1,2, 3],what is the meaning of a[1:2]=4 and a[1:1]=4?

Ans: These will generate an error–Type Error:can only assign an iterable.

Q7. What are list slices?

Ans: List slices are the sub-part of a list extracted out. You can use indexes of the list elements to create *list*

slices as per following format. Syntax is as follows:- *Seq=ListName [start:stop]*

Q8.Does a slice operatoral ways produce a newlist?

Ans: Yes, this will create a new list.

ShortAnswerTypeQuestions

Q1. How are lists different from strings when both are sequences?

Ans: Lists are similar to strings in many ways like indexing, slicing, and accessing individual elements but
 they are different in the sense that *Lists are mutable while strings are immutable*.
Inconsecutive locations, strings store the individual characters while list stores the references of its elements.
Strings store single type of elements-all characters while lists can store elements belonging to different types.

Q2. What are nested Lists?

Ans: A list can have an element in it,which itself is a list.Such a list is called nested list.e.g.

        L=[1,2,3,4,[5,6,7],8]

Q3.Discuss the utility and significance of Lists.

Ans: The list is a most versatile datatype available in Python which can be written as a list of
 comma-separated values(items) between square brackets. Important thing about a list is that items in a
list need not be of the same type. List is majorly used with dictionaries when there is large number of data.

Q4. What is the purpose of the del operator and pop method? Try deleting a slice.

Ans: *del operator* is used to remove an individual item,or to remove all items identified by a slice.
It is to be used as per syntax given below–

        >>>del List[index]

        >>>del List[start:stop]

        Pop method is used to remove single element, not list slices.The pop() method removes an

        individual

         item and returns it.I ts syntax is–

        >>>a=List.pop()   #thiswill remove last item and deleted item will be assigned to a.

        >>>a=List[10]   #thiswill remove the item at index10 and deleted item will be assigned to a.

Q5. What are list slices?

Ans: List slices,like string slices are the sub part of a list extracted out. Indexes can be used to create list
slices as per following format:

seq=L[start:stop]

Q6. What do you understand by true copy of a list? How is it different from shallow copy?

Ans:A shallow copy means constructing a new collection object and then populating it with references to the
child objects found in the original. In essence, a shallow copy is only *one leveldeep*. The copying process does
not recurse and therefore won‘t create copies of the child objects themselves.

True Copy means you can create a copy of a list using *New_list=My_list.* The assignment just copies the reference to the list, not the actual list, so both new_list and my_list refer to thesamelistaftertheassignment.

Q7. Predict the output –   Ans:

```
L1=[1,3,5,7,9]
print(L1==L1.reverse())          False
print(L1)                        [9, 7, 5, 3, 1]
```

Q8. Predict the output –   Ans:

```
List1=[13,18,11,16,13,18,13]
print(List1.index(18))           1
print(List1.count(18))           2
List1.append(List1.count(13))    [13, 18, 11, 16, 13, 18, 13, 3]
print(List1)
```

UNSOLVED QUESTIONS
Q1. WAP to find minimum element from a list of elements along with its index in the list.
Q2.WAP to Calculate mean of the given list of numbers.
Q3. WAP to search for an element in a given list of numbers.
Q4. WAP to count the frequency of a given element in the list of numbers.
Q5. Differentiate between append( ) and extend ( ) functions in Python.

UNSOLVED QUESTIONS(ANSWERS)
Q1. WAP to find minimum element from a list of elements along with its index in the list.

Ans. lst = eval(input("enter list :"))
min_element = lst[0]
min_index = 0
for i in range(1, len(lst)):
 if lst[i] <min_element:
min_element = lst[i]
min_index = i
print("Given list is : ",lst)
print("The minimum element of the given list is :")
print(min_element,"at index",min_index)

Q2.WAP to Calculate mean of the given list of numbers.
Ans.numbers = [23, 45, 12, 67, 9, 31]
# Calculate the sum of the numbers
total = 0
for num in numbers:
 total += num
# Calculate the mean
mean = total / len(numbers)
print("The mean of the numbers is :",mean)

Q3. WAP to search for an element in a given list of numbers.
Ans.lst=eval(input("Enter list:"))
      length=len(lst)
      element=int(input("Enter element to be searched for:"))
      for i in range(0,length):
            if element==lst[i]:
                  print(element,"found at index",i)
            break
      else:
            print(element,"not found in given list")

Q4. WAP to count the frequency of a given element in the list of numbers.
Ans .   L=[2,58,95,999,65,32,15,1,7,45]
      n=int(input("Enter the number : "))
      print("The frequency of number ",n," is ",L.count(n))

Q5. Differentiate between append( ) and extend( ) functions.
Ans. The append() function/method adds a single item to the end of the existing list. It doesn't return a

new list. Rather, it modifies the original list. The extend() adds all multiple items in the form of a list at the

end of another list.

TUPLES

A tuple is a collection which is ordered and immutable (We cannot change elements of a tuple in place).
Tuples are written with round brackets. Tuples are used to store multiple items in a single variable. Tuples
may have items with same value.

      Exp.   T = ()   # Empty Tuple
              T = (1, 2, 3)   # Tuple of integers
              T = (1,3.4,7)   # Tuple of numbers
              T = ('a', 'b', 'c')   # Tuple of characters
              T = ('A',4.5,'Ram',45)   # Tuple of mixed values
              T = ('Amit', 'Ram', 'Shyam')   # Tuple of strings

Creating Tuples

A tuple is created by placing all the items (elements) inside parentheses (), separated by commas.
Exp. T = (10,20, 'Computer',30.5)

If there is only a single element in a tuple then the element should be followed by a comma, otherwise it will
be treated as integer instead of tuple. For example
      T = (10)   # Here (10) is treated as integer value, not a tuple
      T1 = (10,)   # It will create a tuple

Difference between List and Tuple

List	Tuple
Elements are enclosed in square brackets i.e. [ ]	Elements are enclosed in parenthesis i.e. ( )
It is mutable data type	It is immutable data type
Iterating through a list is slower as compared to tuple	Iterating through a tuple is faster as compared to list

Accessing Elements of a tuple (Indexing)

Elements of a tuple can be accessed in the same way as a list or string using indexing and slicing, for example
    If str = ('C', 'O', 'M', 'P', 'U', 'T', 'E', 'R')

ELEMENTS	C	O	M	P	U	T	E	R
POSITIVE INDEX VALUE	0	1	2	3	4	5	6	7
NEGATIVE INDEX VALUE	-8	-7	-6	-5	-4	-3	-2	-1

```
>>> str[2] = 'M'
>>> str[-3] = 'T'
```

Traversing a Tuple

    Traversing a tuple means accessing and processing each element of it. The for loop makes it easy to traverse or loop over the items in a tuple. For example:

    str = ('C', 'O', 'M', 'P', 'U', 'T', 'E', 'R')
    for x in str:
        print(str[x])
The above loop will produce result as :
    C
    O
    M
    P
    U
    T
    E
    R

Tuple Operations

Concatenation (Joining Tuples)

    The + operator is used to join (Concatenate) two tuples
Exp.
>>> T1 = (10,20,30)
>>> T2 = (11,22,33)
>>> T1 + T2
+ Operator concatenates Tuple T1 and Tuple T2 and creates a new Tuple
(10, 20, 30, 11, 22, 33)

Repetition

* Operator is used to replicate a tuple specified number of times, e.g.

```
>>> T = (10, 20, 30)
>>> T * 2
(10, 20, 30, 10, 20, 30)
```

Membership:

The **'in'** operator checks the presence of element in tuple. If the element present it returns True, else it
 returns False.

For Exp.   str = ('C', 'O', 'M', 'P', 'U', 'T', 'E', 'R')

'M' in str   => Returns True

'S' in str   => Returns False

The **not in** operator returns True if the element is not present in the tuple, else it returns False.

'M' not in str   => Returns False

'S' not in str   => Returns True

Slicing

It is used to extract one or more elements from the tuple. Slicing can be used with tuples as it is used in
Strings and List. Following format is used for slicing:

S1 = T[start : stop : step]

The above statement will create a tuple slice namely S1 having elements of Tuple T on indexes start,
start+step, start+step+step, …, stop-1.

By default value of start is 0, value of stop is length of the tuple and step is 1

For Example:

```
>>> T = (10,20,30,40,50,60,70,80,90)
>>> T[2:7:3]
(30, 60)

>>> T[2:5]
(30, 40, 50)

>>> T[::3]
(10, 40, 70)

T[5::]
(60, 70, 80, 90)
```

Built-in functions/methods:

The len( ) function

This method returns length of the tuple or the number of elements in the tuple, i.e.,

```
>>> T = (10,20,30,40,50,60,70,80,90)
>>> len(T)
9
```

The max( ) function
	This method returns element having maximum value, i.e.,
>>> T = (10,20,30,40,50,600,70,80,90)
>>>max(T)
600

>>> T = ('pankaj','pinki','parul')
>>> max(T)
'pinki'

The min( ) function
	This method returns element having minimum value, i.e.,
>>> T = (10,20,30,40,50,600,70,80,90)
>>>min(T)
10

>>> T = ('pankaj','pinki','parul')
>>> min(T)
'pankaj'

The sum( ) function
	This method is used to find the sum of elements of the tuple, i.e.,
>>> T = (10,20,30,40,50,600,70,80,90)
>>> sum(T)
990

The index( ) method
	It returns the index of an existing element of a tuple., i.e.,
>>> T = (10,20,30,40,50,600,70,80,90)
>>> T.index(50)
4
	But if the given item does not exist in tuple, it raises **ValueError** exception.
>>> T = (10,20,30,40,50,600,70,80,90)
>>> T.index(55)
ValueError: tuple.index(x): x not in tuple

The count( ) method
	**This method returns the count of a member / element (Number of occurrences) in a given tuple.,
i.e.,**
>>> T = (10,20,30,20,20,0,70,30,20)
>>> T.count(20)
4

>>> T = (10,20,30,20,20,0,70,30,20)
>>> T.count(30)
2

The tuple( ) method
        This function creates an empty tuple or creates a tuple if a sequence is passed as argument.
>>> L = [10, 20, 30]   # List
>>> T = tuple(L)   # Creates a tuple from the list
>>> print(T)
(10, 20, 30)

>>> str = "Computer"   # String
>>> T = tuple(str)   # Creates a tuple from the string
>>> print(T)
('C', 'o', 'm', 'p', 'u', 't', 'e', 'r')

The sorted( ) method
        This function takes the name of the tuple as an argument and returns a new sorted list with sorted elements in it.
>>> T = (10,40,30,78,65,98,23)
>>> X = sorted(T)   # Make a list of values arranged in ascending order
>>> print(X)
[10, 23, 30, 40, 65, 78, 98]

>>> Y = sorted(T, reverse = False)   # Make a list of values arranged in ascending order
>>> print(Y)
[10, 23, 30, 40, 65, 78, 98]

>>> Z = sorted(T, reverse = True)   # Make a list of values arranged in descending order
>>> print(Z)
[98, 78, 65, 40, 30, 23, 10]

Tuple Assignment (Unpacking Tuple)

        It allows a tuple of variables on the left side of the assignment operator to be assigned respective values from a tuple on the right side. The number of variables on the left should be same as the number of elements in the tuple.
Exp.
>>> T = ('A', 100, 20.5)
>>> x,y,z = T
>>> print(x,y,z)
A 100 20.5

Nested Tuple

        A tuple containing another tuple in it as a member is called a nested tuple, e.g., the tuple shown below is a nested tuple:
>>> students = (101,'Punit', (82,67,75,89,90))   # nested tuple
>>> len(students)
3

```
>>> print(students[1])                          # 2nd element of tuple
Punit
>>> print(students[2])                          # 3rd element of tuple
(82, 67, 75, 89, 90)
>>> print(students[2][3])                        # Accessing 4th element of inner tuple
89
```

 # Program to find sum of all the elements of a tuple
```
T = (10, 2, 30, 4, 8, 5, 45)
print(T)
s = sum(T)
print("Sum of elements : ", s)
```

Output
```
(10, 2, 30, 4, 8, 5, 45)
Sum of elements :  104
```

 # Program to find minimum and maximum values in a tuple
```
T = (10,2,30,4,8,5,45)
print(T)
minimum = min(T)
maximum = max(T)
print("Minimum Value : ", minimum)
print("Minimum Value : ", maximum)
```

Output
```
 (10, 2, 30, 4, 8, 5, 45)
Minimum Value : 2
Minimum Value :  45
```

 # Program to find mean of values stored in a tuple
```
T = (10,2,30,4,8,5,46)
print("Tuple :", T)
s = sum(T)
NumberOfElements = len(T)
average = s/NumberOf Elements
print("Mean of elements : ", average)
```

Output
```
Tuple : (10, 2, 30, 4, 8, 5, 46)
Mean of elements :  15.0
```

 # Write a program to find the given value in a tuple

```
T = (10,2,34,65,23,45,87,54)
print("Tuple :", T)
x = int(input("Enter value to search:"))
for a in T:
   if a == x :
      print("Value found")
      break
else:
   print("Value not found")
```
Output
```
Tuple :  (10, 2, 34, 65, 23, 45, 87, 54)
Enter value to search:45
Value found
```

Q) Write a program to find sum of elements of tuple without using sum() function?
```
T = (10,20,30)
sum = 0
for x in T:
   sum = sum + x
print(T)
print(sum)
```

Q) Write a program to find sum of even and odd elements of tuple
```
T = (10,23,30,65,70)
sumE = 0
sumO = 0
for x in T:
if (x%2 == 0):
     sumE = sumE + x
   else:
     sumO = sumO + x
print(T)
print("sum of Even numbers :",sumE)
print("Sum of Odd Numbers : ", sumO)
```

MCQs

1.	Consider a tuple in python named Months = ('Jul', 'Aug', 'Sep'). Identify the invalid statement(s) from the given below statements:-
	    a) S = Months[0] b) print(Months[2])
	    c) Months[1] = 'Oct' d) LIST1 =list(Months)
		C

2.	Suppose tuple1 = (2, 33, 222, 14, 25), What is tuple1[::-1]? a) [2, 33, 222, 14] b) Error c) 25 d) [25, 14, 222, 33, 2]	D

3.	Consider the following declaration of Record, what will be the data type of Record?
	      Record=(1342, "Pooja" , 45000, "Sales")
	    a) List b) Tuple c) String d) Dictionary
		B

4.	Which operator is used for replication? a) + b) % c) * d) //	C

5.	What will be the output of following Python Code? Tp = (5)
	                                               Tp1 = tp * 2
	 Print(len(tp1))
	    a) 0 b) 2 c) 1 d) Error
		D

Q1. Define Tuple?

Ans. A tuple is an ordered sequence of elements of different data types, such as integer, float, string, list or even a tuple. Elements of a tuple are enclosed in parenthesis (round brackets) and are separated by commas.

      For example T = (1,2, 'a', 5) # T is a tuple

Q2) Write a statement to create an empty tuple named T1?

Ans: T1 = ( ) or T1 = tuple( )

Q3) Write the code to convert given list L into a tuple?

Ans: T = tuple(L)

Q4) What is the difference between a List and a Tuple?

Ans:

List	Tuple
Elements are enclosed in square brackets i.e. [ ]	Elements are enclosed in parenthesis i.e. ( )
It is mutable data type	It is immutable data type
Iterating through a list is slower as compared to tuple	Iterating through a tuple is faster as compared to list

Q5) What is unpacking Tuple?

Ans: It allows a tuple of variables on the left side of the assignment operator to be assigned respective values from a tuple on the right side. The number of variables on the left should be same as the number of elements in the tuple.

Q6) Which error is returned by the following code:
```
T = (10,20,30,40,50,60,70)
Print(T[20])
```
Ans: IndexError : tuple index out of range

Q6) What are nested tuples?
Ans: A tuple containing another tuple in it as a member is called a nested tuple, e.g., the tuple shown below is a nested tuple:
```
>>> students = (101,'Punit', (82,67,75,89,90))          # nested tuple
```

Q7) Write a program to create a tuple and find sum of its alternate elements?
Ans:
```
T = (10,23,30,65,70)
sum = 0
for a in T[0:5:2]:
    sum = sum + a
print(sum)
```

Q8) Write a program to count vowels in a tuple?
Ans:
```
T = tuple(input("Enter Name :"))
print(T)
v = 0
for ch in T:
    if ch in ['a','e','i','o','u']:
        v = v + 1
print("No. of vowels : ",v)
```

Dictionaries

A dictionary is an unordered sequence of key-value pairs.

➢ Key and value in a key-value pair in a dictionary are separated by a colon. Further, the key : value
➢ pairs in a dictionary are separated by commas and are enclosed between curly parentheses.
➢ The keys of the dictionaries are immutable types such as Integers or Strings etc.
➢ Indices in a dictionary can be of any immutable type and are called keys.
➢ Dictionaries are mutable.

Creating Dictionaries

A Dictionary can be created in three different ways:

Empty Dictionary

```
>>>D = { }                          # Empty Dictionary
```

Dictionary using literal notation

```
>>>D = {"Name" : "Mohan", "Class" : "XI", "City" : "Gurdaspur"}
>>>print(D)
{"Name" : "Mohan", "Class" : "XI", "City" : "Gurdaspur"}
>>>print(D["City"])
"Gurdaspur"
```

Dictionary using dict() function

Dict() function is used to create a new dictionary with no items. For example,

```
>>> Months = dict()    # Creates an empty dictionary
>>>print(Month)        # Prints an empty dictionary
```

We can use Square Brackets([ ] with keys for accessing and initializing dictionary values. For Example:

```
>>> Months[0] = 'January'
>>> Months[1] = 'February'
>>>Months[2] = 'March'
>>> print(Months)
{0 : 'January', 1: 'February' , 2 : 'March'}
```

```
>>> Months = dict(Jan = 31, Feb = 28, March = 31) # Creating dictionary by giving values in dict()
function
>>> print(Months)
{'Jan' : 31, 'Feb' : 28, 'March' : 31}
```

Accessing Elements of a Dictionary

Elements of Dictionary may be accessed by writing the Dictionary name and key within square brackets ([ ]) as given below:

```
>>> D = {0 : "Sunday", 1 : "Monday", 2: "Tuesday"}
>>> print(D[1])
Monday
```

Attempting to access a key that does not exist, causes an error. Consider the following statement that is trying to access a non – existent key (7) from dictionary D. it raises KeyError.

```
>>> D[7]
KeyError : 7
```

Traversing a Dictionary

Dictionary items can be accessed using a for loop.

```
for x in D:
    print(D [x])
```

Output

Sunday
Monday
Tuesday

Mutability of Dictionary

Dictionary like lists are mutable, it means dictionary can be changed, new items can be added and existing items can be updated.

Adding an Element in Dictionary

We can add new element (key : value pair) to a dictionary using assignment, but the key being added must not exist in dictionary and must be unique.

```
>>> D[4] = "Wednesday"  # if a new key is given, new item is added
>>> print(D)
{0 : "Sunday", 1 : "Monday", 2: "Tuesday", 3: "Wednesday"}
```

Updating / Modifying an element in Dictionary

We can change the individual element of dictionary as given below:

```
>>> D[1] = "Mon"      # Value of Key (1) is changed
>>> print(D)
{0 : "Sunday", 1 : "Mon", 2: "Tuesday", 3: "Wednesday"}
```

Dictionary Functions and Methods

Built –in functions and methods are provided by Python to manipulate Python dictionaries.

len() function:

It is used to find the length of the dictionary, i.e., the count of the key : value pair.

Exp.

```
D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
length = len(D)
print("Length of Dictionary : ", length)
```

Output

Length of Dictionary : 4

dict() function:

The dict() function creates a dictionary.

Exp.

By giving Key:value pair in the form of separate sequence:

```
>>> Employee=dict([['name','anand'],['salary',14000],['age',23]])
>>> Employee
{'name': 'anand', 'salary': 14000, 'age': 23}          By passing List

>>> Employee=dict((['name','Angad'],['salary',11000],['age',29]))
>>> Employee
{'name': 'Angad', 'salary': 11000, 'age': 29}   By passing tuple of a list

>>> Employee=dict((('name','Suman'),('salary',17000),('age',21)))
>>> Employee
{'name': 'Suman', 'salary': 17000, 'age': 21}   By passing tuple of tuple
```

Accessing Items, Keys and Values – get(), items(), keys(), values () methods
get( ) Method : it returns value of the given key
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
>>> value = D.get('Rama', 'Key not Found')
>>> print("Age of Rama is : ", value)

>>> value = D.get('Mohit', 'Key not Found')   **# if key is not in the dictionary, it shows key not found**
>>> print("Age of Mohit is : ", value)

Output
Age of Rama is : 22
Age of Mohit is : Key not Found

items( ) Method :
It returns all items of a dictionary in the form of list of tuple of (key:value)
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
>>> print(D.items())

Output
dict_items([('Ram', 20), ('Mohan', 30), ('Rama', 22), ('Rashi', 32)])

keys( ) Method :
It returns list of all the keys of the dictionary.
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
>>> print(D.keys())

Output
dict_keys(['Ram', 'Mohan', 'Rama', 'Rashi'])

values( ) Method :
It returns list of all the values of the dictionary.
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
>>> print(D.values())

Output
dict_values([20, 30, 22, 32])

update( ) Method :
This function merges key : value pairs from the new dictionary into the original dictionary, adding or replacing
 as needed. The items in the new dictionary are added to the old one and override any items already there with
 the same keys.
```
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
>>> D2 = {'A' : 20, 'Mohan' : 60, 'Rama' : 62, 'B' : 32}
>>> D.update(D2)
>>> print("D  => ",D)
>>> print("D2 => ", D2)
```

Output
D => {'Ram': 20, 'Mohan': 60, 'Rama': 62, 'Rashi': 32, 'A': 20, 'B': 32}
D2 => {'A': 20, 'Mohan': 60, 'Rama': 62, 'B': 32}

Deleting elements from dictionary:
del statement
        del statement is used to delete a dictionary element or dictionary entry, i.e., a key:value pair.
```
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
>>> print(D)
>>> del D["Mohan"]    # to delete a key from the dictionary i.e. "Mohan"
>>> print(D)
>>> del D              # To delete the whole dictionary
```
Output

{'Ram': 20, 'Mohan': 30, 'Rama': 22, 'Rashi': 32}   # Complete Dictionary
{'Ram': 20, 'Rama': 22, 'Rashi': 32}   # After deleting "Mohan"

clear ( ) method
        It empties the dictionary.
```
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
>>> print(D)
>>> D.clear()
>>> print("Dictionary after Clear : ", D)
```

Output
{'Ram': 20, 'Mohan': 30, 'Rama': 22, 'Rashi': 32}
Dictionary after Clear : { }

pop ( ) method
        It removes and returns the dictionary element associated to passed key.
```
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
```

>>> print("Removed Item : ", D.pop("Rama"))

Output
Removed Item : 22

popitem ( ) method
        It removes and returns the last dictionary element.
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
>>> print("Removed Item : ", D.popitem())

Output
Removed Item : ('Rashi', 32)

sorted ( ) method
        It returns a sorted list of the dictionary keys. It is used as below:
>>> D = {'Ram' : 20, 'Mohan' : 30, 'Rama' : 22, 'Rashi' : 32}
>>> print(sorted(D))   # sort the keys in ascending order
>>> print(sorted(D), reverse = False) # sort the keys in ascending order
>>> print(sorted(D), reverse = True) # sort the keys in descending order

Output
['Mohan', 'Ram', 'Rama', 'Rashi']
['Mohan', 'Ram', 'Rama', 'Rashi']
['Rashi', 'Rama', 'Ram', 'Mohan']

max ( ) , min() and sum() Functions
        These functions work with the keys of a dictionary. Dictionaries must be homogeneous to use the
functions.
   - max() function gives the maximum value
   - min() function gives the minimum value
   - sum() function gives the sum of keys
   >>> D = {1: "Monday", 2: "Tuesday", 3:"Wednesday"}
   >>> print("Max = ",max(D))
   >>> print("min = ",min(D))
   >>> print("Sum = ", sum(D))

Output
        Max = 3
        min = 1
        Sum = 6

fromkeys ( ) method
        This method is used to create a new dictionary from a sequence containing all the keys and common
value, which will be assigned to all the keys. Keys argument must be an interable sequence (First argument).
When value not given, it will take None as the values for the keys (Second Argument)
Exp.

```
>>> D = dict.fromkeys([2,4,5,8],200)          # When Value given
>>> print(D)
>>> D = dict.fromkeys([2,4,5,8])        # When value not given, it will take None as the values for the keys
print(D)
```

Output

{2: 200, 4: 200, 5: 200, 8: 200}
{2: None, 4: None, 5: None, 8: None}

setdefault ( ) method

This method inserts a new key: value pair only if the key does not exist. If the key already exists, it returns the current value of the key.

Exp.
```
>>> D = {1: "Monday", 2: "Tuesday", 3:"Wednesday"}
>>> D.setdefault(2,"Tuesday")        # Key already exists, it will not insert
>>> print(D)
>>> D.setdefault(4,"Thursday")        # New Key, it will be inserted
>>> print(D)
```

Output

{1: 'Monday', 2: 'Tuesday', 3: 'Wednesday'}
{1: 'Monday', 2: 'Tuesday', 3: 'Wednesday', 4: 'Thursday'}

Q) Write a program to count number of words in a string?
```
str = "This is a book , book is very good"
D = {}
w = str.split()
for x in w:
    key = x
    if key not in D:
        count = w.count(key)
        D[key] = count
print("Count Frequencies...")
print(D)
```
Output:
Count Frequencies...
{'This': 1, 'is': 2, 'a': 1, 'book': 2, ',': 1, 'very': 1, 'good': 1}

Q) Write a program to count number of characters in a string?
```
str = "This is a book , book is very good"
D = {}
for x in str:
    if x not in D:
        count = str.count(x)
        D[x] = count
print("Count Frequencies...")
```

```
        print(D)
```
Output:
Count Frequencies...
{'T': 1, 'h': 1, 'i': 3, 's': 3, ' ': 8, 'a': 1, 'b': 2, 'o': 6, 'k': 2, ',': 1, 'v': 1, 'e': 1, 'r': 1, 'y': 1, 'g': 1, 'd': 1}

MCQs

1	Dictionaries are...................... set of elements. (a) sorted (b) Ordered (c) unordered (d) random	C
2	Which of the following will create a dictionary with given keys and a common value? (a) fromkeys() (b) update () (c) setdefault() (d) all of the above	A
3	What will be printed by the following statements? D1 = {"cat":12,"dog":6,"elephant":23,"bear":20} Print(25 in D1) (a) True (b) False (c) Error (d) None	B
4	What would the following code print? D = {'spring' : 'autumn', 'autumn': 'fall', 'fall' : 'spring'} Print(d['autumn']) (a) autumn (b) fall (c) spring (d) Error	B

5	What will be the output of following Python code?
	 d1 = {"a" : 10, "b" : 2, "c":3}
	 str1 = " "
	 for i in d1:
	    str1 = str1 + str(d1[i]) + " "
	    str2 = str1[:-1]
	 print(str2[::-1])
	 (a) 3, 2 (b) 3,2,10 (c) 3,2,01 (d) Error
		C

Question – Answers
Q1) What is a dictionary?
Ans: A dictionary is an unordered sequence of key-value pairs.
- Key and value in a key-value pair in a dictionary are separated by a colon. Further, the key : value
- pairs in a dictionary are separated by commas and are enclosed between curly parentheses.
- The keys of the dictionaries are immutable types such as Integers or Strings etc.
- Indices in a dictionary can be of any immutable type and are called keys.
- Dictionaries are mutable.

Q2) What is the use of from keys ( ) method?
Ans: This method is used to create a new dictionary from a sequence containing all the keys and common value, which will be assigned to all the keys. Keys argument must be an interable sequence (First argument). When value not given, it will take None as the values for the keys (Second Argument)

Q3) What do you understand by Mutability of Dictionary?
Ans: Dictionary is mutable, it means dictionary can be changed, new items can be added and existing items can be updated.

Q4) Why a list cannot be used as keys of dictionaries?
Ans: Lists cannot be used as keys in a dictionary because they are mutable and a Python dictionary can have
only keys of immutable types.

Q5) If the addition of new key : value pair causes the size of the dictionary to grow beyond its original size, an error occurs, True or False?
Ans: False, There cannot occur an error because dictionaries being the mutable types, they can grow or shrink
on and as needed basis.

Q6) Write the output of following code:

```
x = {1:10, 2:20, 3:30}
x[4] = 20
print(x)
```

Ans:

```
{1: 10, 2: 20, 3: 30, 4: 20}
```


Q7) Write the output of following code:

```
d = {'x': 1, 'y': 2, 'z': 3}
for k in d:
   print (k, '=', d[k])
```

Ans:

```
x = 1
y = 2
z = 3
```


Q8) Write the output of following code:

```
x = {1:10}
d = {2:20, 3:30, 4:40}
x.update(d)
print(x)
```

Ans:

```
{1: 10, 2: 20, 3: 30, 4: 40}
```

Python Modules

Python Modules:

Modules are the files in python used for grouping similar codes, to get an easy access to those codes.

Python Modules facilitates reusability and easy categorization of codes.

Python Built In Modules:

Python facilitates its users a variety of modules already defined in Python library that makes Python a easy

to use programming language. Some of these modules are:

Importing a Python Module:
Python modules can be imported in three ways, using:

Python import statement:
To use the functionality present in any module, you have to import it into your current program. You need to use the import keyword along with the desired module name.
Python "import" statement is used to import a Python module. For Example
      import math

Python from.. import statement:
Python also facilitates to import a specific attribute from a Python module. This can be done using Python "from..import" statement. For example
      from math import sqrt   # It will import only sqrt method from math module

Python from.. import* statement:
Python "from..import*" statement is used to import a complete Python module. For Example
      from math import *   # it imports entire module
Python Math Module:

Python math module contains different built in mathematical functions and mathematical constants.

Math Functions:

FUNCTION	USES	Example
ceil ()	The ceil() function returns the smallest integer not less than num	math.ceil(1.03) gives 2.0 math.ceil(-1.03) gives -1.0
floor()	The floor() function returns the largest integer not greater than num	math.floor(1.03) gives 1.0 math.floor(-1.03) gives -2.0
sqrt()	The sqrt() function returns the square root of num. If num < 0 , domain error occurs.	math.sqrt(81.0) gives 9.0
pow()	The pow() function returns the base raised to exp power	math.pow(5.0,0) gives 1 math.pow(3.0,4) gives 81
fabs()	The fabs() returns the absolute value of num	math.fabs(2.0) gives 2.0 math.fabs(-2.0) gives 2.0

sin()	The sin() function returns the sine of arg. The value of arg must be in radians.	math.sin(val) (val is a number)
cos()	The cos() function returns the cosine of arg. The value of arg must be in radians.	math.cos(val) (val is a number)
tan()	The tan() function returns the tangent of arg. The value of arg must be in radians.	math.tan(val) (val is a number)

The math module of Python also makes available two useful constants namely pi and e. Which we can use as
math.pi   gives the mathematical constant π = 3.141592…, to available precision.
math.e   gives the mathematical constant e = 2.718281…, to available precision.

Random Module

Function	Uses	Example
random()	Used to generate a random floating – point number between 0.0 to 1.0 that is, including zero but excluding one.	**Import random()** **print(random.random())** **0.022353**
randint()	**randint(start, stop)** is used to generate a random number between **start** and **stop** where both the numbers are inclusive.	**random.randint(10,15)** it may generate any one of the values given below 10,11,12,13,14,15
randrange()	• **random.randrange(<stopvalue**>) is used to generate a random number in the range 0 to <stopvalue> • **random.randrange(start,stop)** is used to generate a random number in the range start to stop • **random.randrange(start,stop,step)** is used to generate a random number in the range start to stop, but here, the difference between two such generated random numbers will be a multiple of step value.	• **random.randrange(35)** It will generate a random number from 0 to 35 • **random.randrange(11,45)** It will generate a random number in the range 11 .. 45 • **random.randrange(11,45, 4)** it may generate any one of the values given below11,15,19,23,27,31,35,39,43

Statistics Module

mean()	This method calculates the mean (average) of the givendata set. It add up all the given values, then divide by number of values in the set.	import statistics seq = [5,6,7,5,6,5,5,9,11,12,23,5] statistics.mean(seq) it gives 8.25
median()	This method calculates the median (middle value) of the given data set.	import statistics seq = [5,6,7,5,6,5,5,9,11,12,23,5] statistics.median(seq) it gives 6.0
mode()	This method determines the central tendency of numerical or nominal data. It is used to find the most frequent number in a sequence.	import statistics seq = [5,6,7,5,6,5,5,9,11,12,23,5] statistics.mode(seq) it gives 5

MCQs

1. To include the use of functions which are present in the random library, we must use the option:
a) import random   b) random.h   c) import.random   d) random.random
2. The output of the following Python code is either 1 or 2.
import random
        random.randint (1 , 2)
a) True   b) False

3. What will be the output of the following Python function if the random module has already been imported?
        random.randint(3.5 ,7)
a) b) Any integer between 3.5 and 7, including 7
b) Any integer between 3.5 and 7, excluding 7
c) The integer closest to the mean of 3.5 and 7
d) Error

4. What will be the output of the following Python code?
        random.randrange(0,91,5)
a) 18   b) 10   c) 79   d) 95

5. Which of the following is not a built in module in Python?
a) math   b) os   c) pi   d) random

6. What will the following code result as?
        import math
        x = 100

```
print(x > 0 and math.sqrt(x))
```
a) True   b) 1   c) 10   d) 10.0

7. What will the following code result as?
```
import statistics
seq = [10,20,20,30,12,10]
print(statistics.mean())
```
a) 30   b) 10   c) 17   d) 1

8. What may be the possible values printed by following statements?
```
import random
for I in range(3):
        print(random.randint(10,18))
```
a) 13 12 10   b) 11 18 19   c) 10 9 18   d) 10 9 8

Answers:

1	2	3	4	5	6	7	8
A	A	d	b	c	d	c	a

Q1) What is random module in Python?
Ans: Python Random module is an in-built module of Python that is used to generate random numbers in Python.

Q2) Write a code fragment to generate a random floating number between 45.0 and 95.0. Print this number along with its nearest integer greater than it.
Ans:
```
import random
import math
fnum = random.random() * (95 - 45) + 45
inum = math.ceil(fnum)
print("Random Numbers between 45...95: ")
print(fnum)
print("Nearest higher integer : ", inum)
```
Output
```
Random Numbers between 45...95:
56.31601558476624
Nearest higher integer :  57
```

Q2) Write a program to generate two random integers between 500 and 760. Print the average of these number along with these numbers.
Ans:
```
import random
num1 = random.randint(500,760) - 500
num2 = random.randint(500,760) - 500
avg = (num1 + num2)/2
print("Number 1 : ", num1)
print("Number 2 : ", num2)
```

```
    print("Average  : ", avg)
```

Output

```
    Number 1 :  147
    Number 2 :  153
    Average :  150.0
```

Q2) Given a list containing these values [22,13,28,13,22,25,7,13,25] . Write code to calculate mean, median and mode of this list?

Ans:

```
import statistics as s
L = [22,13,28,13,22,25,7,13,25]
LMean = s.mean(L)
LMedian = s.median(L)
LMode = s.mode(L)
print("List....... ")
print(L)
print("Mean : ", LMean)
print("Median : ", LMedian)
print("Mode  : ", LMode)
```

Output

```
    List........
    [22, 13, 28, 13, 22, 25, 7, 13, 25]
    Mean  :  18.666666666666668
    Median :  22
    Mode  :  13
```

DIGITAL FOOTPRINT

A digital footprint – refers to the trail of data you leave while using the internet. It includes websites you visit, emails you send, and information you submit online. A digital footprint can be used to track a person's online activities and devices.

Internet users create their digital footprint either actively or passively. A passive footprint is made when information is collected from the user without the person knowing this is happening. An active digital footprint
is where the user has deliberately shared information about themselves either by using social media sites or by
using websites.

Digital Footprint Examples

Online shopping
- Making purchases from e-commerce websites

Online banking
- Using a mobile banking app

Social media
- Using social media on your computer or mobile
- Sharing information, data, and photos with your connections

Health and fitness
- Using fitness trackers
- Using apps to receive healthcare

NETIQUETTE

It is the abbreviation of Internet etiquette or network etiquette, refers to online manners while using internet or working online. While online you should be courteous, truthful and respectful of others. It includes proper manners for sending e-mail, conversing online, and so on.

Some basic rules of netiquette are:
- Be respectful
- Think about who can see what you have shared.
- Read first, then ask
- Respect the privacy of others
- Do not share personal information

Communication Etiquettes

Digital communication includes email, texting, instant messaging, talking on the cell phone, audio or video conferencing, posting on forums, social networking sites, etc. All these are the popular ways to connect with people in order to exchange ideas, share data and knowledge.

- Be Precise
  - •Respect time
  - •Respect data limits
- Be Polite
- Be Credible

Social Media Etiquettes

Now a days, we are using different kinds social media and we may have an account on Facebook, Google+, Twitter, Instagram, Pinterest, or the YouTube channel. Social media are websites or applications that enable their users to participate in social networking by creating and sharing content with others in the community.

These platforms encourage users to share their thoughts and experiences through posts or pictures.

- **Be Secure**
  - Choose password wisely
  - Know who you be friend
  - Beware of fake information
- **Be Reliable**
  - Think before uploading

DATA PROTECTION

Data protection is a set of strategies and processes you can use to secure the privacy, availability, and integrity of the data. It is sometimes also called data security. A data protection strategy is very important for any organisation that collects, handles, or stores sensitive data.

Data Privacy v/s Data Protection
For data privacy, users can often control how much of their data is shared and with whom. For data protection, it is up to the companies handling data to ensure that it remains private. Data privacy is focused on defining who has access to data while data protection focuses on applying those restrictions.
How we can protect our personal data online
- Encrypt the Data
- Keep Passwords Private and secure
- Don't Share personal data on Social Networking Sites or share it wisely
- Use Security Software
- Avoid Phishing Emails
- Avoid using public Wi-Fi
- Safely Dispose of Personal Information

INTELLECTUAL PROPERTY RIGHTS (IPR)
Intellectual Property is a property created by a person or group of persons using their own intellect for ultimate use in commerce and which is already not available in the public domain.

Examples of Intellectual Property :
- an invention relating to a product or any process
- a new design
- a literary or artistic work and a trademark (a word, a symbol and / or a logo, etc.)

Intellectual Property Right (IPR) is the statutory right granted by the Government, to the owner(s) of the intellectual property or applicant(s) of an intellectual property (IP) to exclude others from exploiting the IP commercially for a given period of time, in lieu of the discloser of his/her IP in an IPR application.
Copyright laws protect intellectual property
Copyright It is a legal concept, enacted by most governments giving creator of original work exclusive rights to it, usually for a limited period.
Patent – A patent is a grant of exclusive right to the inventor by the government. Patent give the holder a right to exclude others from making, selling, using or importing a particular product or service, in exchange for full public disclosure of their invention.

Trademark – A Trademark is a word, phrase, symbol, sound, colour and/or design that identifies and distinguishes the products from those of others.

VIOLATION OF IPR

Violation of intellectual property right may happen in one of the following ways:

Plagiarism

Plagiarism It is stealing someone's intellectual work and representing it as your own work without citing the source of information.

Any of the following acts would be termed as Plagiarism:
- Using some other author's work without giving credit to the author
- Using someone else's work in incorrect form than intended originally by the author or creator.
- Modifying /lifting someone's production such as music composition etc. without attributing it to the creator of the work.
- Giving incorrect source of information.

Copyright infringement – When someone uses a copyrighted material without permission, or we have not paid for it, if it is being sold. it is called Copyright infringement. Suppose we download an image from the Internet and use it in our project.

Trademark Infringement

Trademark Infringement means unauthorised use of other's trademark on products and services. An owner of a trademark may commence legal proceedings against someone who infringes its registered trademark.

FREE AND OPEN-SOURCE SOFTWARE (FOSS)

OSS refers to Open Source Software, which refers to software whose source code is available to customers and it can be modified and redistributed without any limitation.

Free and open-source software (FOSS) is software that can be classified as both free software and open-source software. That is, anyone is freely licensed to use, copy, study, and change the software in any way, and the source code is openly shared so that people are encouraged to voluntarily improve the design of the software.

LICENSING AND COPYRIGHT

Licenses are the permissions given to use a product or someone's creation by the copyright holder. Copyright is a legal term to describe the rights of the creator of an original creative work such as a literary work, an artistic work, a design, song, movie or software etc.

The GNU General public license (GPL) and the Creative Commons (CC) are two popular categories of public licenses.
 CC is used for all kind of creative works like websites, music, film, literature, etc. CC enables the free distribution of an otherwise copyrighted work.
It is used when an author wants to give people the right to share, use and build upon a work that they have created. GPL is primarily designed for providing public licence to a software. GNU GPL is another free software license, which provides end users the freedom to run,study, share and modify the software, besides getting regular updates.

CYBER CRIME

Any criminal or illegal activity through an electric channel or through any computer network is considered as cyber crime.

Eg: Cyber harassment and stalking, distribution of child pornography,types of spoofing, credit card fraud ,. etc

CYBER LAW

It is the law governing cyberspace which includes freedom of expression, access to and usage of internet and online privacy.

The issues addressed by cyber law include cybercrime, e-commerce, IPR and Data protection.

HACKING

It is an act of unauthorised access to a computer, computer network or any digital system.

Hackers usually are technical expertise of hardware and software.

● Hacking when done with a positive intent is called as Ethical hacking or White hat.

● Hacking when done with a negative intent is called as Unethical hacking or Black hat.

EAVESDROPPING

The term eavesdropping has been derived from the literal practice of secretly listening to the conversations of people by standing under the eaves of a house. Unlike snooping, where the network traffic can be stored for later analysis, eavesdropping is an unauthorised real-time interception or monitoring of private communication between two entities over a network.

Also, the targets are usually the private communication channels like phone calls (VoIP), instant messages, video conference, fax transmission, etc.

PHISHING AND FRAUD EMAILS

It is an unlawful activity where fake websites or emails appear as original or authentic .This sites when clicked by the user will collect sensitive and personal details like usernames, password, credit card details etc. Phishing is an unlawful activity where fake websites or emails that look original or authentic are presented to the user to fraudulently collect sensitive and personal details, particularly usernames, passwords, banking and credit card details. The most common phishing method is through email spoofing where a fake or forged email address is used and the user presumes it to be from an authentic source. So you might get an email from an address that looks similar to your bank or educational institution, asking for your information,

RANSOMEWARE

This is another kind of cyber crime where the attacker gains access to the computer and blocks the user from accessing, usually by encrypting the data. The attacker blackmails the victim to pay for getting access to the data, or sometimes threatens to publish personal and sensitive information or photographs unless a ransom is paid. Ransomware can get downloaded when the users visit any malicious or unsecure websites or download software from doubtful repositories.

CYBER TROLL

The comments or posts demean other users or people, or their content is called Cyber Troll. An Cyber troll is an excellent example of social laws and ethics missing out. These are generally done to respond to any person or their posts negatively. Trolling can be done by sending hate direct through messages, posts, or comments. Their way of stating things is suppressive and oppressing, and trolls are visible on all social platforms such as Instagram, Twitter, Facebook, YouTube, etc. The main target of the people who create trolls is people with

good fan-following, whether influencers or celebrities

CYBER BULLYING
It is the use of technology to harass , threaten or humiliate a target .
Example: sharing of embarrassing photos or videos, posting false information, sending mean text., etc.

CYBER SAFETY

Cyber safety refers to safe and responsible use of Internet, to ensure safety and security of personal information and not posing threat to anyone else's information.

Safely Browsing The Web
Everyone must know the threats while browsing the web. Safe browsing on web needs to know many important things like:
• What are possible threats?
• How to avoid these threats/dangers?
• How to be safe while browsing web
• Not every site you visit is safe.
• Every post or activity we do online is visible to others.
• Not everything you see or is promised online is true.

Identity Protection while using Internet

- The online world is full of chances to interact and share with others. A lot of what you do and say online can be seen even if you delete it
- Anyone can accesses your profile on social networking sites. keep your material private.
- Use strong passwords and change them often. Don't share with others.
- Don't respond to inappropriate requests

Confidentiality of Information

- Never share your password or account numbers/Ban Details over an e-mail or message.
- Do not follow links from e-mails
- Beware of fraud callers, pop-ups, websites, or e-mails asking for personal information.
- Use secure passwords and change it regularly.
- Use anti-spyware, and antivirus softwares.

Malware
Malware is a short term used for Malicious softWARE. It is any software developed with an intention to damage hardware devices, steal data, or cause any other trouble to the user.
Viruses, Worms, Ransomware, Trojans, and Spyware are some of the kinds of malware.

Viruses
A virus is a piece of software code created to perform malicious activities and hamper resources of a computer

system like CPU time, memory, personal files, or sensitive information.
a computer virus infects other computer systems that it comes into contact with by copying or inserting its code into the computer programs or software (executable files).

Trojan
A Trojan is a malware, that looks like a legitimate software and once it tricks a user into installing it, it acts pretty much like a virus or worm. However, a Trojan does not self-replicate or infect other files, it spreads through user interaction such as opening an email attachment or downloading and executing a file from the Internet.

Adware
An Adware is a malware that is created to generate revenue for its developer. An adware displays online advertisements using pop-ups, web pages, or installation screens. Once an adware has infected a substantial number of computer systems, it generates revenue either by displaying advertisements or using "pay per click" mechanism to charge its clients against the number of clicks on their displayed ads.

E-waste - MANAGEMENT:
Various forms of electric and electronic equipment which no longer satisfy their original purpose are termed as Ewaste. This includes Desktop, Laptop, Projectors, Mobiles,etc
● MANAGEMENT: Sell back, gift/donate, reuse the parts giveaway to a certified e-waste
Recycler.
Some of the feasible methods of e-waste management are reduce, reuse and recycle.
• Reduce: We should try to reduce the generation of e-waste by purchasing the electronic or electrical devices only according to our need. Also, they should be used to their maximum capacity and discarded only after their useful life has ended. Good maintenance of electronics devices also increases the life of the devices.
• Reuse: It is the process of re-using the electronic or electric waste after slight modification. The electronic equipment that is still functioning should be donated or sold to someone who is still willing to use it. The process of re-selling old electronic goods at lower prices is called refurbishing.
 • Recycle: Recycling is the process of conversion of electronic devices into something that can be used again and again in some or the other manner. Only those products should be recycled that cannot be repaired, refurbished or re-used. To promote recycling of e-waste many companies and NGOs are providing door-to-door pick up facilities for collecting the e-waste from homes and offices.

ABOUT HEALTH CONCERNS RELATED TO THE USE OF TECHNOLOGY:
There are positive as well as negative impact on health due to the use of these technologies.
● POSITIVE IMPACT
▪ Various health apps and gadgets are available to monitor and alert
▪ Online medical records can be maintained
● NEGATIVE IMPACT
▪ One may come across various health issues like eye strain, muscle problems, sleep issues,etc
▪ Anti social behaviour, isolation, emotional issues, etc.

GENDER AND DISABILITY ISSUES WHILE TEACHING AND USING COMPUTERS GENDER ISSUES

- Preconceived notions

Notions like 'boys are better at technical things, girls are good at humanities, arts et girls must take up a career keeping in mind that they have to raise a family. They must not take up high involvement careers, and "Teaching is the best option for girls as it gives you half day off and ample number of holidays so that you can easily take care of your family, etc. have their impact in decision making of girls while taking up subjects.

- Lack of interest

During primitive years, children often play games on computers/ smartphones. Most games available today are boys-centric that increase their interest in computers Also, at homes boys get to play more on computers/smartphone (keeping in mind the entire India scenario) and develop more interest in computers than girls.

- Lack of motivation

Girls are pressurised to choose a career option which will give them 'work life balance in favour of family roles they have to play later on. Girls are always told directly/indirectly in households that you have to play important family role later on and indulging in a subject which will consume most of your time is not advisable as no matter what, whatever job option you choose, you cannot shy away from your family role.

- Lack of role models

Girls these days see less of role models in the field of 'Computer Science' whom they can imitate. TV, movies, advertisements, every where it is portrayed that is technical fields like 'Computers Science', are men's fields. All these things influence girls sub-psychologically and they infer that 'Computer Science' is for boys and do not take up the subject.

- Lack of encouragement in class

As there are lesser number of girls in a class, the teachers for most work-assignments end up choosing more boys. Also, less number of girls means, lesser peer-encouragement. Also, some teachers pin point on their roles in society such girls will get married and may not take it up as career.

- Unavailability of teaching material / aids

It has been observed that when, in schools, work-partners are chosen, boys prefer boys over girls. And even if a girl and a boy are made work-partners, boys prefer to work actively and make girls silent observers. Boys are not comfortable in situations where they are not playing active roles.

Disability Issues

In the specially abled students, there can be one or more disabilities:

- **(i) Locomotor disabilities –** Severe deformities, polio, leprosy, cerebral palsy.
- **(ii) Hearing and speech disabilities –** Hearing impairment, speech aphasia.
- **(iii) Cognitive impairment –** Specific learning deficits (Dyslexia, Dyscalculia). Down's syndrome, Autism.
- **(iv) Vision impairment.** low vision, blindness.

- Lack of special needs teachers

   For different types of special needs, if special needs teachers are available, disabled students get their needs addressed in right manner eg., for hearing impaired students, a teacher who is able to converse in sign language would be able to convey and explain the study material than traditional methods.

- There should be teachers who know what types of hardware, software, tools etc. can be used for the differently able students as per their specific needs, eg, special types of specialized hardware such as Braille keyboards, monitors, printers, synthetic speech generators etc., software assistants such as Google assistant etc.

- Lack of supporting curriculum.

Curriculum should be designed while keeping focus on inclusive education. There always should be possible alternatives keeping in mind special needs of the students. Software and programs should be so used so that the disabled students can easily work on that. For example, office software based curriculum can easily be implemented for all types of students as nearly all office software provide accessibility features.

MULTIPLE CHOICE QUESTIONS(1 mark)

1. Online posting of rumours, giving threats online, posting the victim's personal information, comments aimed to publicly ridicule a victim is termed as _____
a. Cyber bullying
b. Cyber crime
c. Cyber insult
d. All of the above

2. Ankit made a ERP - Enterprise resource planning solution for a renowned university and registered and copyrights for the same. Which of the most important option; Ankit got the copyrights.
a) To get society status
b) To get fame
c) To get community welfare
d) To secure finance protection

3. Which of the following is not an example of Social media platform?
a. Facebook
b. Pinterest
c. Google+
d. Social channel

4. A responsible netizen must abide by _____
a. Net etiquettes
b. Communication etiquettes
c. Social media etiquettes
d. All of the above

5. A _____ is some lines of malicious code that can copy itself and can have detrimental effect on the computers, by destroying data or corrupting the system.
a. Cyber crime
b. Computer virus
c. Program
d. Software

6. Which of the following activity is an example of leaving Active digital footprints?
a) Surfing internet
b) Visiting a website
c) Sending an email to a friend
d) None of the above

7. You are planning to go for a vacation. You surfed the internet to get answers for following queries.
a) Places to visit
b) Availability of air tickets and fares
c) Best hotel deals
d) All of these
Which of the above-mentioned actions might have created a digital footprint?

8. Legal term to describe the rights of a creator of original creative or artistic work is called……..
a) Copyright
b) Copyleft
c) GPL
d) BSD

9. Intellectual Property is legally protected through _____
a) copyright
b) patent
c) registered trademark
d) All of the above
10. _____ includes any visual symbol, word, name, design, slogan, label, etc., that distinguishes the brand from other brands.
a) Trademark
b) Patent
c) Copyright
d) None of the above

11. Gaining unauthorised access to a network or computer or digital files with malicious intentions, is called_____
a. Cracking
b. Hacking
c. Banging
d. Phishing

12. Legal term to describe the rights of a creator of original creative or artistic work is called_____
a. Copyright
b. Copyleft
c. GPL
d. None of these

13. OSS stands for
a. Open system security
b. Open system source
c. Open software and security
d. Open source software

14.Any fraudulent business practice that extracts money e from an unsuspecting, ignorant person is called_____
a. Stealing
b. Scam
c. Violation of copyright
d. Digital footprint

15._____means no price is to be paid for the software.
a. Free software
b. Freeware
c. shareware
d. Open source software

16.Any work / information that exist in digital form idea on internet or on an electronic device, is known as_____property.
a. Licence property
b. digital property
c. source code property
d. software property

17.Discarded electrical or or electronic devices are known as_____.
a. E waste
b. Software Waste
c. Hardware waste
d. Computer waste

18.The least restrictive open source licence is_____licence.
a. Apache Licence
b. MIT licence
c. GNU licence
d. BSD licence

19. The original code written by programmers for a software is known as_____
a. Object code
b. Source code
c. Python code
d. Language code

20. _____means freedom to use the software.
a. Plagiarism
b. Freeware
c. Open software
d. Free software

21. IAD means _____
a. Internet advanced data
b. Internet addiction disorder
c. Internet advanced digitalization
d. Internet aggregate data

22. The_____is the Digital trail of your activity on the internet.
a. Copyleft
b. Digital footprint
c. Digital data
d. Internet property

23.The_____the are the permissions given to use a product or someone's creator by the copyright holder.
a. Source code
b. Licence
c. Software authority
d. Digital rights

24._____is a licence that gives right opposite to copyright.
a. Left copy
b. Digital copy
c. Copyleft
d. IPR

25. A software that can be freely accessed and modified is called
a. synchronous software
b. package software
c. open source software
d. middleware.

26.Which of the following is an advantage of open source software?
a. You can edit the source code to customise it
b. you need to be an expert to edit code
c. you have to pay
d. can sometimes with two generic for specialist purposes.

27.Which of the following is a disadvantage of open source software?
a. high quality software with lots of features.
b. not as customizable
c. may not have been tested as much as proprietary software so might have bugs.
d. you can added the source code to customize it

28.Which of the following is an advantage of proprietary software?
a. It is usually free
b. thoroughly tested because people are paying to use it.
c. Not as customizable.
d. Can sometimes be to generate for specialist purposes.

29.Which of the following is a disadvantage of proprietary software?
a. You need to be an expert to edit code.
b. You have to pay for this type of software.
c. It's licensed.
d. It is launched after proper testing.

30.The generally recognized term for the government protection afforded to intellectual property written and electronic is called _____
a. Computer security law.
b. Aggregate information.
c. Copyright law
d. Data security standards.

31.Which of the following would be a creative work protected by copyright?
a. A list of all Indian President names
b. A Portrait of your family
c. A song you wrote
d. The name of your pet dog

32.Which of the following is not done by cyber criminals?
a. Unauthorised account access
b. Mass Attack using trojans as botnets
c. Email spoofing and spamming
d. report vulnerabilty in any system

33.What is the name of the IT law that India is having in the Indian legislature?
a. India's Technology IT Act 2000
b. India's Digital information technology DIT Act, 2000
c. India's Information Technology IT Act, 2000
d. The technology act, 2008.

34.What is meant by the term cybercrime?
a. Any crime that uses computers to jeopardize or attempt to jeoparadise in national security
b. The use of computer networks to commit financial or identity fraud
c. The theft of Digital information
d. Any crime that involves computers and networks

35.Every activity you perform on the internet is safe for how long?
a. 1 month
b. 1 year
c. As per my setting
d. Forever

Answers
1. a 2. d 3. d 4. D 5. B 6. C 7. d 8. a 9. D 10. A
11.b 12.a 13.d 14.b 15.b 16.b 17.a 18.b 19.b 20.d
21.b 22.b 23.b 24.c 25.c 26.a 27.c 28.b 29.b 30.c
31.c 32.d 33.c 34.d 35.d

CASE STUDY BASED QUESTIONS

1. After practicals, Atharv left the computer laboratory but forgot to sign off from his email account. Later, his classmate Revaan started using the same computer. He is now logged in as Atharv. He sends inflammatory email messages to few of his classmates using Atharv's email account. Revaan's activity is an example of which of the following cyber crime?
a) Hacking
b) Identity theft
c) Cyber bullying
d) Plagiarism

2. Rishika found a crumpled paper under her desk. She picked it up and opened it. It contained some text which was struck off thrice. But she could still figure out easily that the struck off text was the email ID and password of Garvit, her classmate. What is ethically correct for Rishika to do?
a) Inform Garvit so that he may change his password.
b) Give the password of Garvit's email ID to all other classmates.
c) Use Garvit's password to access his account.

3. Suhana is down with fever. So, she decided not to go to school tomorrow. Next day, in the evening she called up her classmate, Shaurya and enquired about the computer class. She also requested him to explain the concept. Shaurya said, "Mam taught us how to use tuples in python". Further, he generously said, "Give me some time, I will email you the material which will help you to understand tuples in python".
Shaurya quickly downloaded a 2-minute clip from the Internet explaining the concept of tuples in python. Using video editor, he added the text "Prepared by Shaurya" in the downloaded videoclip. Then, he emailed the modified video clip to Suhana. This act of Shaurya is an example of —
a) Fair use
b) Hacking
c) Copyright infringement
d) Cyber crime

4. After a fight with your friend, you did the following activities. Which of these activities is not an example of cyber bullying?
a) You sent an email to your friend with a message saying that "I am sorry".
b) You sent a threatening message to your friend saying "Do not try to call or talk to me".
c) You created an embarrassing picture of your friend and uploaded on your account on a social networking site.

5. Sourabh has to prepare a project on "Digital India Initiatives". He decides to get information from the Internet. He downloads three web pages (webpage 1, webpage 2,webpage 3)containing information on Digital India Initiatives. Which of the following steps taken by Sourabh is an example of plagiarism or copyright infringement?
a) He read a paragraph on "Digital India Initiatives" from webpage 1 and rephrased it in his own words. He finally pasted the rephrased paragraph in his project.
b) He downloaded three images of "Digital India Initiatives" from webpage 2. He made a collage for his project using these images.
c) He downloaded "Digital India Initiative" icon from web page 3 and pasted it on the front page of his project report.

6. Neerja is a student of Class XI. She has opted for Computer Science. Neerja prepared the project assigned to her. She mailed it to her teacher. The snapshot of that email is shown below.
Find out which of the following email etiquettes are missing in it.
a) Subject of the mail
b) Formal greeting
c) Self-explanatory terms
d) Identity of the sender
e) Regards

7. You are planning to go on a vacation to Kashmir. You surfed the internet for the following:
i) Weather conditions
ii) Availabilty of air tickets and fares
iii) Places to visit
iv) Best hotel deals
Which of the above mentioned acts might have left a digital footprint?
a) i and ii
b) i, ii and iii
c) i, ii and iv
d) all of these

8. Naveen received an email warning him of closure of his bank accounts if he did not update his banking information as soon as possible. He clicked the link in the email and entered his banking information. Next he got to know that he was duped.
i) This is an example of _____.
a. Online Fraud
b. Identity Theft
c. Phishing
d. Plagarism
ii) Someone steals Naveen's personal information to commit theft or fraud, it is called _____
a. Online Fraud
b. Identity Theft
c. Phishing
d. Plagarism
iii) Naveen receiving an Unsolicited commercial emails is known as _____
a. Spam
b. Malware
c. Virus
d. worms
iv) Naveen's Online personal account, personal website are the examples of?
a. Digital wallet
b. Digital property
c. Digital certificate
d. Digital signature
v) Sending mean texts, posting false information about a person online, or sharing embarrassing photos or videos to harass, threaten or humiliate a target person, is called _____
a. Eavesdropping
b. cyberbullying
c. Spamming
d. Phishing

9. Prathyush has to prepare a project on "Cyber Jaagrookta Diwas".He decides to get information from the Internet. He downloads three web pages (webpage1, webpage 2, webpage 3) containing information on the given topic.
1. He read a paragraph from webpage 1 and rephrased it in his own words. He finally pasted the rephrased paragraph in his project. And he put a citation about the website he visited and its web address also.
2. He downloaded three images of from webpage 2. He made a collage for his project using these images.
3. He also downloaded an icon from web page 3 and pasted it on the front page of his project report.

(i) Step1 is an act of……………
(a) Plagiarism
(b) copyright infringement
(c) Intellectual Property right
(d) None of the above
(ii) Step 2 is an act of_____.
(a) plagiarism
(b) copyright infringement
(c) Intellectual Property right
(d) Digital Footprints
(iii) Step 3 is an act of_____.
(a) Plagiarism
(b) Paraphrasing
(c) copyright infringement
(d) Intellectual Property right
(iv) _____is a small piece of data sent from a website and stored in a user's web browser while a user is browsing a website.
(a) Hyperlinks
(b) Web pages
(c) Browsers
(d) Cookies
(v) The process of getting web pages, images and files from a web server to local computer is called
(a) FTP
(b) Uploading
(c) Downloading
(d) Remote access

ANSWERS
CASE STUDY BASED QUESTIONS
1. b 2. a 3. c 4. a 5. b 6. A 7. d
8. i) c ii) b iii) a iv) b v) b
9. i) d ii) a iii) c iv) d v) c

SHORT ANSWER QUESTIONS(2 marks)

1. List any two health hazards related to excessive use of Technology

The continuous use of devices like smartphones, computer desktop, laptops, head phones etc cause a lot of health hazards if not addressed.

These are:

A. Impact on bones and joints: wrong posture or long hours of sitting in an uncomfortable position can cause muscle or bone injury.

B. Impact on hearing: using headphones or earphones for a prolonged time and on high volume can cause hearing problems and in severe cases hearing impairments.

C. Impact on eyes: This is the most common form of health hazard as prolonged hours of screen time can lead to extreme strain in the eyes.

D. Sleep problem: Bright light from computer devices block a hormone called melatonin which helps us sleep. Thus we can experience sleep disorders leading to short sleep cycles.

2. Priyanka is using her internet connection to book a flight ticket. This is a classic example of leaving a trail of web activities carried by her. What do we call this type of activity? What is the risk involved by such kind of activity?

call this type of activity as Digital Footprints

Risk involved : It includes websites we visit emails we send, and any information we submit online, etc., along with the computer's IP address, location, and other device specific details.

Such data could be used for targeted advertisement or could also be misused or exploited.

3. What do you understand by Net Ettiquetes? Explain any two such ettiquetes.

Net Ettiquets refers to the proper manners and behaviour we need to exhibit while being online.

These include :

1. No copyright violation: we should not use copyrighted materials without the permission of the creator or owner. We should give proper credit to owners/creators of open source content when using them.

2. Avoid cyber bullying: Avoid any insulting, degradingor intimidating online behaviour like repeated posting of rumours, giving threats online,posting the victim's personal information, or comments aimed to publicly ridicule a victim.

4. According to a survey, one of the major asian country generates approximately about 2 million tonnes of electronic waste per year. Only 1.5 % of the total e-waste gets recycled. Suggest some methods to manage e-waste .

Buy environmentally friendly electronics

Donate used electronics to social programs

Reuse , refurbish electronics

Recycling e-waste

Class: XI Session Ending: 2023-24
Computer Science (083)
Practice Paper (Theory)

Maximum Marks: 70   Time Allowed: 3 hours

General Instructions:
1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A have 18 questions carrying 01 mark each.
 4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 03 Long Answer type questions carrying 05 marks each.
7. Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
8. All programming questions are to be answered using Python Language only.

	SECTION A	
1.	_____is the part of the CPU that performs the arithmetic operations. A) ALU B) CU C) Memory D) None	1
2.	A nibble in computer memory is a group of_____. A) 8 bits B) 8 bytes C) 4 bits D) 4 bytes	1
3.	What is the importance of cache memory?	1
4.	What do you mean by application software?	1
5.	2 GB =____Bytes.	1
6.	Which of the following fall under utilities software? (i)Text editor (ii) backup (iii) Disk defragmenter (iv) All of the above	1
7.	Is python a case sensitive language? A) True B) False	1
8.	Which of the following can be used as valid variable identifiers in Python? i) 4th Sum ii) Totaliii) Number# iv) _Data	1
9.	To increase the value of k five times using an assignment operator, the correct expression will be : k += 5 B) k *=5 C) k = k**5 D) k =*5	1
10.	What is the value of the expression 4+2**5//10	1
11.	What will be the output of the following code:- x = 73 y = x%9 print(y)	1
12.	The_____statement forms the selection construct in Python. A) for B) while C) if	1

	D) None	
13.	Write logical expression for the following: place is either 'Delhi' or 'Goa' but not Jaipur	1
14.	Identify the type of error a=10 , b=0 c=a/b i) Semantics Error ii) Syntax Error iii) Run Time error iv)No Error	1
15.	A loop becomes an infinite loop if a condition never becomes true. a. True b. False	1
16.	What will be the output i=1 while i<=10: i=i+1 print(i)	1
Q17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as		

(i)   Both A and R are true and R is the correct explanation for A

(ii)   Both A and R are true and R is not the correct explanation for A

(iii)   A is True but R is False

(iv)   A is false but R is True

17.	Assertion(A): Comments in the python start with the hash character, #, and extend to the end of the physical line Reason(R): Comments are interpreted and shown on the output screen.	1
18.	Assertion(A): The input statement is used to get the output on the screen. Reason(R): The value inputted by the user while executing a program are fetched and stored in the variable using the input() function.	1
SECTION B		
19.	Draw logic circuit for following expression: (A+B)'. (B'+C)	2
20.	What is the purpose of count ( ) function in string ? Write an example of count ().	2
21.	Predict the output of the following code: x=1 if x>3:	2

	if x>4:	
	print('a')	
	else:	
	print('b')	
	elif x<2:	
	if (x!=0):	
	print('c')	
	print('d')	
22.	Convert the following for loop code in to while loop. for x in range (1,100,2): print(x)	2
23.	Explain use of % and //operators with example?	2
24.	What do you understand by syntax error? Give an example in this context.	2
25.	Define the term L- Value and R-Value with example.	2
SECTION C		
26.	State De Morgan's law and prove it with the help of truth table	3

27.	Find and write the output of the following python code :
	
	Text="Gmail@Com"
	
	Len=len(Text)
	
	ntext= " "
	
	for iin range(0,Len):
	
	    if Text[i].isupper():
	
	ntext=ntext+Text[i].lower( )
	
	elif Text[i].isalpha( ):
	
	ntext=ntext+Text[i].upper( )
	
	   else:
	
	ntext=ntext+'bb'
	
	print(ntext)
		3

28.	Write a program to print grade of a student as per input percentage as per criteria given below:-	3

Percentage range	Grade
More than or equivalent 90	A
More than 80	B
More than 60	C
More than 50	D
More Than 33	E
Less than 33	F

29.	Write a program to check whether an integer number input by a user is prime or not?	3
	OR	
	Write a program to input an integer value and display it in reverse order.	
30.	Explain Arithmetic, Relational and logical Operators with one example for all these operators.	3
	OR	
	What do you mean by data types? Explain different datatypes available in python with examples.	

<div align="center">SECTION D</div>

31.	Convert the following accordingly:	4+1
	(i) $(106)_{10} = (\ ? \ )_{16}$	
	(ii) $(78)_{10} = (\ ? \ )_2$	
	(iii) $((122)_{10} = \ (\ ? \ )_2$	
	(iv) $(13B)_{16} = (\ ? \ )_{10}$	
	(v) $(101101)_2 = (\ ? \ )_{10}$	
32.	a) Rewrite the following code after removing syntax error and underline the correction:	3+2
| | ```
x=int("Enter value for x:")
for y in range[0,11]:
    if x=y
        print(x+y)
    Else:
        Print x-y
``` | |
	a) Generate the series	
	1,2,4,8,16,32,64 by using loop.	
33.	a. What is the output of this expression, print('Hello'=='Hello') ?	1+2+2
	b. What will be the output of following code:	
| | ```
x, y = 2, 6
x, y = y, x + 2
print(x,y)
``` | |
	c. Evaluate the following expressions	
	i) 12 + (3 ** 4 - 6) / 2	
	ii) 12 + 3 * 3-6 / 2	

<div align="center">SECTION E</div>

34	Write a python code to read a string and Count alphabets, digits, and special symbols from a given string	4
	Given:str1 = "P@#yn26at^&i5ve"	
	Expected Outcome:	
	Total counts of chars, digits, and symbols	
	Alphabets = 8	

	Digits = 3		
	Symbol = 4		
35	i) Write logical expression for the following: Name is Raj and age is between 18 and 25 ii) if….elif…..,else are not block or compound statement (True/False) iii) Write a program to input an alphabet and check it is a vowel or not. **OR (Choice is only for Part (iii)** Write a program to input a number and check it is odd/even.		4

************* End of Paper ******************

Class: XI Session Ending : 2023-24
Computer Science (083)
Practice Paper (Theory)

Maximum Marks: 70   Time Allowed: 3 hours

General Instructions:
1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A have 18 questions carrying 01 mark each.
 4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 03 Long Answer type questions carrying 05 marks each.
7. Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
8. All programming questions are to be answered using Python Language only.

	SECTION A	
1.	Ans: (A)Arithmetic Logic Unit (ALU) *1 mark for correct answer*	1
2.	Ans : 4 bits *1 mark for correct answer*	1
3.	*(1 mark for correct answer)*	1
4.	*(1 mark for correct answer)*	1
5.	2147483648 (*1 mark for correct Answer)*	1
6.	(iv) All of the above *(1 mark for correct answer)*	1
7.	*A) True* *(1 mark for correct answer)*	1
8.	Total, _Data	1
9.	k*=5 *(1 mark for correct answer)*	1
10.	**7**	1
11.	*1 mark for correct answer*	1
12.	C) if	1
13.	(place=='Delhi' or place=='Goa') and place!='Jaipur'	1
14.	iii) Run Time error	1

15.	b. False	1
16.	11	1
17.	Option (iii) is correct	1
18.	Option (iv) is correct	1

	SECTION B	
19.	*2 mark for each correct logic circuit*	2
20.	1 Marks for Purpose 1 Marks for Example	2
21.	C d	2
22.	**½ mark for correct initialization** **1 mark for correct while loop** **½ mark for correct increment**	2
23.	% modules operator gives remainder 1 Mraks // Floor division 1 Marks	2
24.	1 Marks for definition 1 Marks for example	2
25.	1 Marks for definition 1 Marks for example	2

	SECTION C	
26.	Prove de morgan'slaw . (1.5 mark for each correct statement) (1.5 mark for correct prove)	3
27.	Find and write the output of the following python code : gMAILbbcOM (1 mark for character correctly, 1 mark for digit and 1 mark for rest character)	3
28.	*(1 mark for correct input+1 mark for proper use of if-elif + 1 mark for correct logic)*	3
| 29. | ```
num=int(input("Enter number "))
d=2
while d<=num:
   r=num%d
   if r==0:
     break
   else:
     d=d+1

if d==num:
``` | 3 |

117

	print("It is a prime number") else: print("It is not a prime number ") OR 3 Marks for correct code 1 mark for input 1 and half mark for while loop and condition 1 mark for if else and print output (Any other correct code of program to do the given task should also be accepted)	
30.	2 marks for correct explanation of operators 1 marks for example OR 1 mark for correct definition. 02 marks for correct explanation of datatypes.	3
SECTION D		
31.	Convert the following accordingly: (i) (106)10 =(1101010)2 (ii) (78)10=(001110)2 (iii) 1111010) (iv) 315 (v) 45 (1 marks for each correct answer)	4+1

32.	a) x=<u>int(input("Enter value for x:")</u>)
	for y in range<u>(0,11)</u>:
	    if <u>x==y</u> :
	      print(x+y)
	   <u>else</u>:
	      <u>print (x-y)</u>
	
	(*3 mark for all corrections)*
	b) a=1
	while a<=64:
	    print(a)
	    *a=a*2*
		5

33.	a. True b. 4 6 **c.** i) 49.5 ii) 21.0	1+2+2
SECTION E		
34	1 mark for accepting the string 2 marks each for correct condition for countingalphabets, digits and special symbols	4

	1 mark for printing		

35	i)
	      age<=25)
	ii)
	iii)
	    OR
	n=int(input("Enter a number"))
	if n%2==0:
	  print("even")
	else:
	   print("odd")
		Name=="Raj" and (age>=18 and
		
		False
		2 marks for correct code
			1+1+2

Subject: Computer Science(083)

Time: 3:00 Hours   **Class XI**   **Max. Marks: 70**
Instructions :
- Question num 1 to 18 are of 1 mark each.
- Question num 19 to 27 are of 2 marks each.
- Question num28 to 34 are of 3 marks each.
- Question num 35 to 36 are of 4 marks each.
- Question num 37 is of 5 marks .

1. Find the invalid identifier from the following
   a. none   b. address c.Name   d. Roll No

2. Given a Tuple tup1= (10, 20, 30, 40, 50, 60, 70, 80, 90).
What will be the output of print (tup1 [3:7:2])?
   a. (40,50,60,70,80)
   b. (40,50,60,70)
   c. [40,60]
d.(40,60)

3. The return type of the input() function is
   a. string   b) integer c)list   d).tuple
4. Which of the following symbol is used in Python for single line comment?
   a) / b)/*   c) //   d)#
5. How will you convert a string to an integer in python?
6. The physical components of computer system are known as _____
   a) Software   b)Humanware   c)Hardware d)Operating System

7.   8 bits makes _____
                 A. 1 Byte B. 1 KB   C. 1 MB   D.1 Nibble

8. Identify the mutable data types?

         List   Tuple   String   All of the above
9. What will be the output of the following code segment?

   a,b=8,7b,a=a,b print(a,"+",b)

      a. 8+ 7   b.15   c.   7 + 8   d)Error

   10. Select appropriate operator to calculate reminder (modulus)from the following:

         a) /   b)//   c)%   d)Both a) & b)
11Jatin wants to terminates the while loop at the end of program. Suggest him a suitable keyword from the
following:

         a)terminate   b)continue   c)break   d)stop

120

12Observe the given code and select an appropriate output:

a='hello'

b=str(30)

print(a+b)

      a) h   b)30   c)hello   d)hello30

13 Dinesh wants to access a second last list element of list object L. Help him to select an appropriate option to accomplish his task.

      b. L[2]   b)L[len(l)-2]   c)L[-2]   d)L-2

14What will be the output:
```
fori in range(20,30,2):
print(i)
```
15Observe the given declarations:
    i.   d={}

    ii. d=dict()

    iii. d=Dict()

    iv. d=dict.fromkeys()

Which of the following are correct ways to create an empty dictionary?
    a)i and ii b)i,iii and iv c) i,ii and iv   d)i and iii
16Which act protects against cybercrime in India?
    a) Indian IT Act

    b) India Computer Security Act

    c) Indian Cyber Law

    d) Indian Data Security Law

17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as

(A) Both (A) and (R) are true and (R) is the correct explanation (A)

(B) Both (A) and (R) are true and R is not the correct explanation (A)

(C) (A) is True but (R) is False

(D) (A) is false but (R) is True

17. **Assertion(A):** Data submitted online intentionally known as active digital foot print.

Reasoning(R): Active digital footprints includes emails, replies, comments or posts made on different websites or apps.

18. **Assertion(A):** Python lists allows to modify their elements by indexes easily.

Reasoning(R): Python lists are mutable.

19 Which of the following are hardware and software?
(i) Capacitor (ii) Internet Explorer (iii) Hard disk (iv) UNIX

20 Draw logical circuit for the following equation:
a)$A.(B+C')$ b)$AB' + C'$

21 Find the output of the following:
```
word='green vegetables'
print(word.find('g',2))
print(word.find('tab',2,15))
```

22 Differentiate between append() and extend() functions of list.

23. Create a dictionary to assign day number as key and day name as value.

24. List any four benefits of e-waste management.

OR

Mention any four net etiquettes.

25 Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.
```
num= input("Enter a number")
for  in range[1,num]:
sum  = + i
print(" Sum of series" sum)
print("Thank You")
```

26. Name the input or output device used to do the following:

i) To make hard copy of a text file ii)To enter audio-based command

27. Convert the following numbers system

(i) $(25)_{10} = (?)_2$ (ii) $(110110101)_2 = (?)_8$

28. Whatis the difference between List, Tuple and dictionary?

29 Explain Cyber Bullying, Eavesdropping, Malware.

30Deepak has downloaded an image from internet and used it in his presentation. But the image has copyright does not permit the free useit.

a) What do you mean by IPR?

b) Which type of violation of IPR has been done by Deepak here?

c) Can he use this image without any problem? Explain.

31Write the output of the following:

a) num1 = 4

num2 = num1 + 1

num1 = 2

print (num1, num2)

b) num1, num2 = 2, 6

num1, num2 = num2, num1 + 2

print (num1, num2)

c) num1, num2 = 2, 3

num3, num2 = num1, num3 + 1

print (num1, num2, num3)

32Consider the following string mySubject:

mySubject = "Computer Science"

What will be the output of:

i.   print(mySubject[0:len(mySubject)])

ii. print(mySubject[-7:-1])
iii. print(mySubject[::2])

33. Write a program to accept n number of elements and add them into a list. Find the sum of all values present in the list.

34Write a program to create a dictionary as follows: d={'empno':123,'ename':'Rohan','salary':45000}

Print the names of employees who earns more than 20000 salary.

35Consider the following tuples, tuple1 and tuple2:

tuple1 = (23,1,45,67,45,9,55,45)

tuple2 = (100,200)

Find the output of the following statements:

i.   print(tuple1.index(45))

ii. print(tuple1.count(45))

iii. print(tuple1 + tuple2)

iv. print(len(tuple2))

v.   print(max(tuple1))

vi. print(min(tuple1))

vii.   print(sum(tuple2))

viii.   print(sorted(tuple1))
print(tuple1)

36. a)Convert the following for loop code in to while loop.

```
for x in range (1,100,2):
    print(x)
```

b)What will be the value of following code

```
print(17%3)
```

```
print(21//6)
```

37.Identify the type of cyber crime for the following situations:

1. Sabhya quickly downloads a 2-minute clip from the internet explaining the concept of dictionary in Python. Using video editor, he adds the text "Prepared by Sabhya" in the downloaded video clip. He then emails the modified video clip to Ahaana. This act of Sabhya is an example of:

   (a) Fair use   (b) Hacking   (c) Copyright infringement   (d) Cybercrime

2. Ms. Kavita complains that her debit/credit card is safe with her still somebody has done shopping /ATM transaction on this card.

3. A person complains that somebody has created a fake profile of Facebook and defaming his/her character with abusive comments and pictures.

4. Ravi received an email from First Generic Bank (as shown below). On clicking the link, he was taken to a site designed to imitate an official looking website. He uploaded some important information on it.

5. After a fight with your friend, You created an embarrassing picture of your friend and uploaded

KENDRIYA VIDYALAYA SANGATHAN
MARKING SCHEME
Subject: Computer Science (083)

Time: 3:00 Hours   **Class XI**   **Max. Marks: 70**

Instructions :

- Question num 1 to 18 are of 1 mark each.
- Question num 19 to 27 are of 2 marks each.
- Question num 28 to 34 are of 3 marks each.
- Question num 35 to 36 are of 4 marks each.
- Question num 37 is of 5 marks .

1.invalid identifier   d. Roll No

2.d.(40,60)

3.a.string

4. d)#

5.using int( ) function

 8.   c)Hardware

 9.   A. 1 Byte

8.List

9. c.   7 + 8

10. c)%

11c)break

12   d)hello30

13c)L[-2]

 14the output:

           20
           22
           24
           26
           28

 15 a)i and ii

 16 a)Indian IT Act

17   (A)

18   (A)

19

Hardware :(i) Capacitor (iii) Hard disk

Software : (ii) Internet Explorer (iv) UNIX

20

21   the output:

        8
        10

22

Append()	**Extend()**
Append() allows to insert a single element to the list at a time.	Extend() allows to insert multiple elements at a time.
Append() accepts a single value as a parameter.	Extend() accepts lists as a parameter.
Example: L=[2,4,6] L.append(8)	Example: L=[2,4,6] L.extend([3,2,5])

23
d={1:'Monday',2:'Tuesday',3:'Wednesday',4:'Thursday', 5:'Friday',6:'Saturday',7:'Sunday'}

    24

- Saves the environment and natural resources

- Allows for recovery of precious metals

- Protects public health and water quality

- saves landfill space

OR

- No copyright violation

- Share the expertise with others on the internet

126

- Avoid teasing other/cyber bullying

- Respect other's privacy and diversity

.

25

```
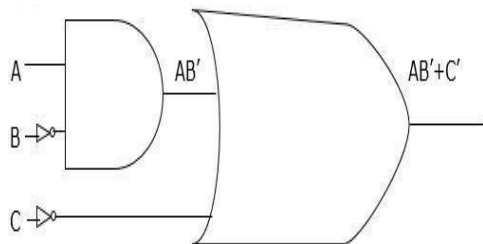num= int (input("Enter a number"))
for  in range(1,num):
sum  += i
  print(" Sum of series", sum)
   print("Thank You")
```

26. i) Printer ii) Mic

27.

(i) $(25)_{10}$ = ($11001)_2$ (ii) $(110110101)_2$ =($665)_8$

28.

A list is a collection of ordered data.
A tuple is an ordered collection of data.
A dictionary is an unordered collection of data that stores data in key-value pairs.

30

Any insulting, degrading or intimidating online behaviour like repeated posting of rumours, giving threats online, posting the victim's personal information, sexual harassment or comments aimed to publicly ridicule a victim is termed as **cyber bullying.**
Eavesdropping is the act of secretly or stealthily listening to the private conversation or communications of others without their consent.
Malware, or malicious software, is any program or file that is intentionally harmful to a computer, network or server

30

a) Intellectual property refers to the inventions, literary and artistic expressions, designs and symbols, names and logos. The ownership of such concepts lies with the creator, or the holder of the intellectual property.
b) Copyright
c) Yes, he can use this image legally with written permission of user.

31 Write the output of the following:
   a) 2   5
   b) 6 4
   c) NameError: name 'num3' is not defined

32:

   i.   Computer Science
   ii.   Scienc
   iii. Cmue cec

33.

L=[ ]

```
n=int(input ("enter how many numbers?"))
for i in range (0,n):
        val=int(input("enter value"))
        L.append(val)
print("The sum is ", sum(L))
```

34

```
d={'empno':123,'ename':'Rohan','salary':45000}
if d['salary']>20000:
        print(d['ename'])
```

35

    i.   2
   ii.   3
  iii.   (23, 1, 45, 67, 45, 9, 55, 45, 100, 200)
   iv.   2
    v.   67
   vi.   1
  vii.   300
 viii.   [1, 9, 23, 45, 45, 45, 55, 67]
            (23, 1, 45, 67, 45, 9, 55, 45)

36. a)   x=1

```
          while (x<100):
              print(x)
              x=x+2
```

    b) 2

        3

37.Identify the type of cyber crime for the following situations:

1. (c) 2. Hacking 3. Identity Theft 4. Phishing 5. Cyber Bullying

TIME: 3 HRS
MM:70

S.NO	QUESTION	MM
1.	What is the full form of IPO i. Input process Output ii. Input print output iii. Internet print output iv. Internet process output	1
2	What is the full form of RAM? i. Read only memory ii. Random access memory iii. Raw Access memory iv. Right Access Memory	1
3	Which of the following falls under utilities? i. Text editor ii. Backup iii. Disk defragmenter iv. All of these	1
4	What is the full form of ISCII i. International standard code for information interchange ii. Indian script code for information interchange iii. International script code for information interchange iv. None of these	1
5	Which of the following are the sub-units that make the CPU? i. Control unit ii. ALU iii. A and B both iv. None of these	1
6	One megabyte is equivalent to: i. 210 bytes ii. 220 bytes iii. 230 bytes iv. None of these	1
7	What is the base of octal number system i. 2 ii. 10 iii. 8 iv. 16	1
8	Convert $(43)_{10}$ into binary number system i. $(101011)_2$ ii. $(110011)_2$ iii. $(110101)_2$ iv. $(110010)_2$	1
9	Which of the following is not a binary number? i. 1111	1

| | ii. 101 | |
| | iii. 11E | |
	iv. 000	

10	Hexadecimal number system if composed of?
	    i. 2 symbols
	    ii. 10 symbols
	    iii. 8 symbols
	    iv. 16 symbols
		1

11	Which one for the following is not a language translator?
	    i. Compiler
	    ii. Interpreter
	    iii. Coder
	    iv. Assembler
		1

12	ALU stands for……………………..
	    i. Arithmetic and login unit
	    ii. Automatic and logical unit
	    iii. Arithmetic and logical unit
	    iv. Arithmetic and legal unit
		1

13	Which one from the following is not a type of printer?
	    i. Dot Matrix printer
	    ii. Laser Printer
	    iii. Inkjet Printer
	    iv. Utility Printer
		1

14	ROM is …………………
	    i. Volatile Memory
	    ii. Non-Volatile Memory
	    iii. Both A and B
	    iv. None of these
		1

15	Storage of 1KB means the following number of bytes
	    i. 1000
	    ii. 964
	    iii. 1024
	    iv. 1064
		1

16	Which numbering system uses numbers and letters as symbols?
	    i. Decimal
	    ii. Binary
	    iii. Octal
	    iv. Hexadecimal
		1

17	Which one of the following software applications would be the most appropriate for performing numerical and statistical calculations?
	    i. Database
	    ii. Document processor
	    iii. Graphics package
	    iv. Spreadsheet
		1

18	What is the full form of USB?
	    i. Unshielded System Board
	    ii. Universal System Board
	    iii. Unidentified System Bus
	    iv. Universal System Bus
		1

19	Name the term Buses in computer?
	    i. Parallel bus
	    ii. Control bus
	    iii. Register
	    iv. RAM
		1

20	Terminology Track, Sector, Cylinder is related to
	    i. PROM
	    ii. USB
	    iii. HDD
	    iv. VDU
		1

21	What is type Casting? Give example.	2
22	What are the three types of Language Processor? EXPLAIN.	3
23	Write a program to accept the cost price of bike and display the road tax to be paid according to the following criteria: **Cost Price** **Tax** >100000 15% >50000 <=100000 10% <=50000 5%	3
24	Write a program to print fibnocci series.	3
25	Write a program to check the number whether it is Prime or Not	3
26	Write a program to print the following pattern: 1 * 12 * * 123 * * *	3
27	Draw a flow chart to add two numbers along with algorithm in simple English.	3

Unsolved questions :

MCQs

Q1 :   How do we differentiate the body of the loop from the rest of the code?
   5.   Writing loop above.
   6.   Writing loop below the whole code.
   7.   Using proper indentation.
   8.   All are correct.

Ans : 3. Using proper indentation

Q2 . Which of the following is False regarding loops in Python?

A. Loops are used to perform certain tasks repeatedly.

B. While loop is used when multiple statements are to executed repeatedly until the given condition becomes False

C. While loop is used when multiple statements are to executed repeatedly until the given condition becomes True.

D. for loop can be used to iterate through the elements of lists.

Ans : C

Q3 : The_____statement skips the rest of the loop statements and causes the next iteration of the loop to take place.

> 5. Break
> 6. Continue
> 7. Raise
> 8. Pass

2. Continue

VSA (2marks)

Q1. Rewrite the following code after removing syntax errors :

```
name = ("Enter Name :" )
age = int(input("Enter Age: ")
if age >=18
        print(name, "is eligible for driving license")
else
print(name, "isot eligible for driving license")
```

Ans :

```
name = input("Enter Name :" )
age = int(input("Enter Age: ") )
if age >=18 :
        print(name, "is eligible for driving license")
else :
print(name, "is not eligible for driving license"
```

Q2 . Find Output

```
i=0
    while (i<10):
    i=i+1
        if i==5:
            break
print(i,end=" ")
```

Ans : 1 2 3 4

Q3 Find ouput of following code :

```
for x in range(0,10,2):
        print(x,"#", end=' ')
```

Ans: 0#2#4#6#8#

SA (3 marks)

Q1. Write a program to find sum of all even numbers from 1 to 100.

```
Ans :  sum=0
            for i in range (1,101):
                if(i%2==0):
                  sum=sum+i
            print("sum=",sum)
```

Q2.Write a program which accept Sales Amount from user then calculate and print discount amount per

following criteria :

Sales Amount	Discount
Less than 5000	5% of Sales Amount
5001 to 10000	7% of sales Amount
More than 10000	10% of Sales Amount

(e.g. if Sales amount is 400 then Discount amount would be 400*5/100 i.e. 20)

Ans :

```
   amount= int(input("enter sales amount"))
   If(amount<5000):
        D=.05*amount
elif(amount> 5001 and amount < 10000) :
       D=.07*amount
Elif(amount>100000):
        D=0.1 * amount
   Print ("discount=" D)
```

LA (5 marks)

   Q1
   A)   Write a python program to accept age of a person from user and check whether he has
      completed 18 years or more. If yes print 'Eligible for Voting' or otherwise print 'Minor'. (3 mark)

B) Write a program in python to print the table of a number given by the user using for loop (2 mark)

Ans Q1 A)

```
age=int(input("Enter your age")):
        If(age >=18):
            print("Your are eligible to vote")
else:
            Print("you are not eligible to vote")
```

Ans Q1 B)
```
num=int(input("enter number whose table is to be printed")
        for x in range (1,11) :
            print(num, "*" , x , "=" , num*x)
```

Subject: Computer Science(083)

Time: 3:00 Hours　　　　　　**Class XI**　　　　　**Max. Marks: 70**
Instructions :
- Question num 1 to 18 are of 1 mark each.
- Question num 19 to 27 are of 2 marks each.
- Question num28 to 34 are of 3 marks each.
- Question num 35 to 36 are of 4 marks each.
- Question num 37 is of 5 marks .

1.Find the invalid identifier from the following
　　　　b. none   b. address c.Name   d. Roll No

2.Given a Tuple tup1= (10, 20, 30, 40, 50, 60, 70, 80, 90).
What will be the output of print (tup1 [3:7:2])?
　　　　d. (40,50,60,70,80)
　　　　e. (40,50,60,70)
　　　　f. [40,60]
d.(40,60)

3.The return type of the input() function is
　　　　　b. string   b) integer c)list   d).tuple
4.Which of the following symbol is used in Python for single line comment?
　　　a) / b)/*   c) //   d)#
5.How will you convert a string to an integer in python?
6.The physical components of computer system are known as ＿＿＿＿＿
　　b) Software   b)Humanware   c)Hardware d)Operating System

 10. 8 bits makes ＿＿＿＿＿
　　　　　　　B. 1 Byte B. 1 KB   C. 1 MB   D.1 Nibble

8.Identify the mutable data types?

　　　　List   Tuple   String   All of the above
9.What will be the output of the following code segment?

    a,b=8,7b,a=a,b print(a,"+",b)

　　　　a. 8+ 7   b.15   c.   7 + 8   d)Error

   10.Select appropriate operator to calculate reminder (modulus)from the following:

　　　　a) /   b)//   c)%   d)Both a) & b)
11Jatin wants to terminates the while loop at the end of program. Suggest him a suitable keyword from the following:

　　　　a)terminate   b)continue   c)break   d)stop

12Observe the given code and select an appropriate output:

    a='hello'

    b=str(30)

    print(a+b)

            b) h   b)30   c)hello   d)hello30

13 Dinesh wants to access a second last list element of list object L. Help him to select an appropriate option

to accomplish his task.

            b. L[2]   b)L[len(l)-2]   c)L[-2]   d)L-2

 14What will be the output:
    fori in range(20,30,2):
    print(i)
15Observe the given declarations:
        ix. d={}

        x. d=dict()

        xi. d=Dict()

        xii. d=dict.fromkeys()

    Which of the following are correct ways to create an empty dictionary?
            a)i and ii   b)i,iii and iv   c) i,ii and iv   d)i and iii
 16Which act protects against cybercrime in India?
                e) Indian IT Act

                f) India Computer Security Act

                g) Indian Cyber Law

                h) Indian Data Security Law

17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as

    (E) Both (A) and (R) are true and (R) is the correct explanation (A)

    (F) Both (A) and (R) are true and R is not the correct explanation (A)

    (G) (A) is True but (R) is False

    (H) (A) is false but (R) is True

19. **Assertion(A):** Data submitted online intentionally known as active digital foot print.

    Reasoning(R): Active digital footprints includes emails, replies, comments or posts made on different

    websites or apps.

20. **Assertion(A):** Python lists allows to modify their elements by indexes easily.

    Reasoning(R): Python lists are mutable.

19 Which of the following are hardware and software?

(i) Capacitor (ii) Internet Explorer (iii) Hard disk (iv) UNIX

20 Draw logical circuit for the following equation:

c) A.(B+C')   b)AB' + C'

21 Find the output of the following:

word='green vegetables'
print(word.find('g',2))
print(word.find('tab',2,15))

23 Differentiate between append() and extend() functions of list.

25. Create a dictionary to assign day number as key and day name as value.

26. List any four benefits of e-waste management.

OR

Mention any four net etiquettes.

25 Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.

num= input("Enter a number")
for in range[1,num]:
sum = + i
print(" Sum of series" sum)
print("Thank You")

26. Name the input or output device used to do the following:

i) To make hard copy of a text file ii)To enter audio-based command

27. Convert the following numbers system

(i) $(25)_{10}$ = (?)$_2$ (ii) $(110110101)_2$ =(?)$_8$

28. Whatis the difference between List, Tuple and dictionary?

31 Explain Cyber Bullying, Eavesdropping, Malware.

30Deepak has downloaded an image from internet and used it in his presentation. But the image has copyright does not permit the free useit.

d) What do you mean by IPR?

e) Which type of violation of IPR has been done by Deepak here?

f) Can he use this image without any problem? Explain.

31Write the output of the following:

a) num1 = 4

num2 = num1 + 1

num1 = 2

print (num1, num2)

b) num1, num2 = 2, 6

num1, num2 = num2, num1 + 2

print (num1, num2)

c) num1, num2 = 2, 3

num3, num2 = num1, num3 + 1

print (num1, num2, num3)

32Consider the following string mySubject:

mySubject = "Computer Science"

What will be the output of:

j.   print(mySubject[0:len(mySubject)])

ii. print(mySubject[-7:-1])
iii. print(mySubject[::2])

33. Write a program to accept n number of elements and add them into a list. Find the sum of all values present in the list.

34Write a program to create a dictionary as follows: d={'empno':123,'ename':'Rohan','salary':45000}

Print the names of employees who earns more than 20000 salary.

35Consider the following tuples, tuple1 and tuple2:

tuple1 = (23,1,45,67,45,9,55,45)

tuple2 = (100,200)

Find the output of the following statements:

j.   print(tuple1.index(45))

ii. print(tuple1.count(45))

iii. print(tuple1 + tuple2)

iv. print(len(tuple2))
xiii.   print(max(tuple1))

xiv.   print(min(tuple1))

xv.   print(sum(tuple2))
xvi.   print(sorted(tuple1))
print(tuple1)

138

36. a)Convert the following for loop code in to while loop.

```
for x in range (1,100,2):
    print(x)
```

b)What will be the value of following code

```
print(17%3)
```

```
print(21//6)
```

37.Identify the type of cyber crime for the following situations:

1. Sabhya quickly downloads a 2-minute clip from the internet explaining the concept of dictionary in Python. Using video editor, he adds the text "Prepared by Sabhya" in the downloaded video clip. He then emails the modified video clip to Ahaana. This act of Sabhya is an example of:

   (a) Fair use   (b) Hacking   (c) Copyright infringement   (d) Cybercrime

2. Ms. Kavita complains that her debit/credit card is safe with her still somebody has done shopping /ATM transaction on this card.

3. A person complains that somebody has created a fake profile of Facebook and defaming his/her character with abusive comments and pictures.

4. Ravi received an email from First Generic Bank (as shown below). On clicking the link, he was taken to a site designed to imitate an official looking website. He uploaded some important information on it.

5. After a fight with your friend, You created an embarrassing picture of your friend and uploaded

Time: 3:00 Hours   **Class XI**   **Max. Marks: 70**

Instructions :

- Question num 1 to 18 are of 1 mark each.
- Question num 19 to 27 are of 2 marks each.
- Question num 28 to 34 are of 3 marks each.
- Question num 35 to 36 are of 4 marks each.
- Question num 37 is of 5 marks .

1.invalid identifier   d. Roll No

2.d.(40,60)

3.a.string

4. d)#

5.using int( ) function

 11. c)Hardware

 12.   A. 1 Byte

8.List

9. c.   7 + 8

10. c)%

11c)break

12   d)hello30

13c)L[-2]

 14the output:

                        20
                        22
                        24
                        26
                        28

 16 a)i and ii

 16 a)Indian IT Act

17   (A)

18   (A)

19

Hardware :(i) Capacitor (iii) Hard disk

Software : (ii) Internet Explorer (iv) UNIX

20

24 the output:

        8
        10
25

Append()	**Extend()**
Append() allows to insert a single element to the list at a time.	Extend() allows to insert multiple elements at a time.
Append() accepts a single value as a parameter.	Extend() accepts lists as a parameter.
Example: L=[2,4,6] L.append(8)	Example: L=[2,4,6] L.extend([3,2,5])

23
d={1:'Monday',2:'Tuesday',3:'Wednesday',4:'Thursday', 5:'Friday',6:'Saturday',7:'Sunday'}

    24

- Saves the environment and natural resources

- Allows for recovery of precious metals

- Protects public health and water quality

- saves landfill space

OR

- No copyright violation

- Share the expertise with others on the internet

141

- Avoid teasing other/cyber bullying

- Respect other's privacy and diversity

.

25

```
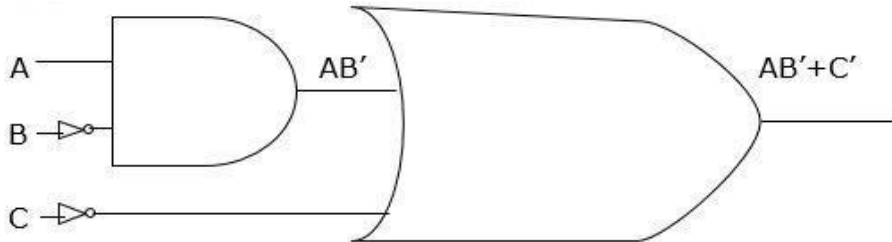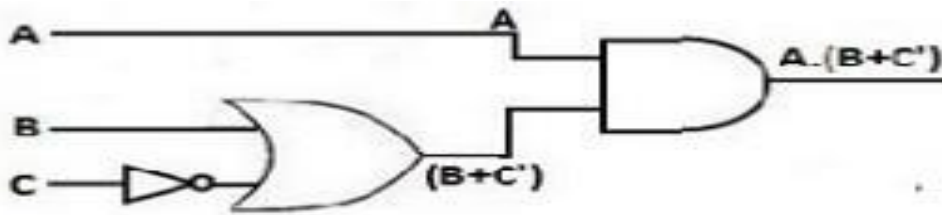num= int (input("Enter a number"))
 for  in range(1,num):
sum  += i
  print(" Sum of series", sum)
   print("Thank You")
```

26. i) Printer ii) Mic

27.

(i) $(25)_{10}$ = ($11001)_2$ (ii) ($110110101)_2$ =($665)_8$

28.
A list is a collection of ordered data.
A tuple is an ordered collection of data.
A dictionary is an unordered collection of data that stores data in key-value pairs.

32
Any insulting, degrading or intimidating online behaviour like repeated posting of rumours, giving threats online, posting the victim's personal information, sexual harassment or comments aimed to publicly ridicule a victim is termed as **cyber bullying.**
Eavesdropping is the act of secretly or stealthily listening to the private conversation or communications of others without their consent.
Malware, or malicious software, is any program or file that is intentionally harmful to a computer, network or server

30

d) Intellectual property refers to the inventions, literary and artistic expressions, designs and symbols, names and logos. The ownership of such concepts lies with the creator, or the holder of the intellectual property.
e) Copyright
f) Yes, he can use this image legally with written permission of user.

32 Write the output of the following:
   d) 2   5
   e) 6 4
   f) NameError: name 'num3' is not defined

32:

   iv.   Computer Science
   v.   Scienc
   vi.   Cmue cec

33.

```
L=[ ]
n=int(input ("enter how many numbers?"))
for i in range (0,n):
        val=int(input("enter value"))
        L.append(val)
print("The sum is ", sum(L))
```

34

```
d={'empno':123,'ename':'Rohan','salary':45000}
if d['salary']>20000:
        print(d['ename'])
```

35

    ix.   2
    x.   3
    xi.   (23, 1, 45, 67, 45, 9, 55, 45, 100, 200)
    xii.   2
    xiii.   67
    xiv.   1
    xv.   300
    xvi.   [1, 9, 23, 45, 45, 45, 55, 67]
          (23, 1, 45, 67, 45, 9, 55, 45)

36. a)   x=1

```
while (x<100):
    print(x)
    x=x+2
```

    d) 2

       3

37.Identify the type of cyber crime for the following situations:

1. (c) 2. Hacking 3. Identity Theft 4. Phishing 5. Cyber Bullying