



केन्द्रीय विद्यालय संगठन KENDRIYA VIDYALAYA SANGATHAN

एर्नाकुलम क्षेत्र **ERNAKULAM REGION**

PART A - COMPENDIOUS
STUDENT SUPPORT MATERIAL

2023-24

COMPUTER SCIENCE (083)

CLASS XII

Based on the latest CBSE Exam Pattern for the Session 2023-24

CHIEF PATRON



Mr.Santhosh Kumar N
Deputy Commissioner, KVS RO Ernakulam

PATRONS



श्री गनेश स. ईन्द्राले ,Mrs Deepti Nair, पाटिल रमेश अभिमन्यू
Assistant Commissioners, KVS RO Ernakulam

PRINCIPAL IN-CHARGE



Mr Alex Jose
Principal I/C, K V Konni

MESSAGE BY THE DEPUTY COMMISSIONER

I am delighted to announce the release of Support Material/Study material for the students of class X and XII. In our relentless pursuit of academic excellence, we have been constantly revising and upgrading our teaching methodologies and resources. And one of the important resources is the support material which is prepared by Kendriya Vidyalayas for the students of class X and XII. This Support material is in two parts: Part A is the core concepts/topics of all subjects which aims minimum level of learning for each student and Part B is a detailed topics/lessons with practice questions which aims to foster a deeper understanding of subjects, stimulate critical thinking and helps in achieving better score in CBSE exam. Whereas Part A is planned to be printed and distributed amongst all students whereas Part B which is the larger one is planned to disseminate through electronic media/blogs.

I hope this support material in two parts will greatly benefit the academic journey of class X and XII not only in pursuit of good result in CBSE exams but also helpful for various entrance examinations.

Let's march ahead with dedicated minds and relentless endeavours for better future through better education.

With warm regards,

**Shri. Santosh Kumar N
Deputy Commissioner
KVS Ernakulam Region**

CONTENT AND REVIEW

BY PGT COMPUTER SCIENCE OF ERNAKULAM REGION

Teacher Coordinator

- ❖ Mr.SREEJITH K V,KV ARMY CANTT.PANGODE

Content preparation & compilation

- ❖ Mrs. LIJINA T,K V AFS AKKULAM(Revision of Python)
- ❖ Mrs. ANJANA K K,K V NO.2CALICUT (Revision of Python)
- ❖ Mrs. DEEPA P R,K V SAP PEROORKADA(Functions)
- ❖ Mrs. SINDHU S,K V KOLLAM(Exception Handling)
- ❖ Mrs. RAGENDHU S P,KV CHENNEERKARA(Introduction to files &Text File)
- ❖ Mr. VINOD B,K V NTPC KAYAMKULAM(Binary file)
- ❖ Mr. SHABIN MUHAMMED,K V PAINAVU ,IDUKKI(CSV file)
- ❖ Mrs. K VIMALA THOMAS,K V INS DRONACHARYA(Data Structure)
- ❖ Mrs. HEMA C N,K V No.1 KOCHI(Evolution of networking)
- ❖ Mr. ABHILASH V JOSE,K V CRPF PERINGOME(Data communication)
- ❖ Mr. ARUN PRASANTH P V,K V KANJIKODE(Network devices)
- ❖ Mr. P C SAJESH,K V MALAPPURAM(Network topologies, Protocol)
- ❖ Mrs. SOUMYAMOL D,K V KANHANGAD(Database concepts)
- ❖ Mr. PRAJUN P P,KV NO.1 KASARAGOD(SQL & JOINS)
- ❖ Mr. SHAJI M,KV EZHIMALA(Interface of python with an SQL database)
- ❖ Mr. JIMMY JOHN K V OTTAPALAM (PART A – Compilation)
- ❖ Mrs.REENA P V,K V PAYYANUR (PART B – Compilation)
- ❖ Mr. AJITH N K,K V KALPETTA (Sample Paper)
- ❖ Mrs.ANU MATHEW,KV RB KOTTAYAM (Sample Paper)

Final content review

- ❖ Mrs. AMBILY KRISHNAN, K V CRPF PALLIPURAM
- ❖ Mrs. VIDYA R PRABHU, K V No.1 PALAKKAD
- ❖ Mrs. ANEESA N ALI, K V NO.I CALICUT
- ❖ Mrs. RESHMA SURENDRAN, K V No.2 KOCHI
- ❖ Mrs. MANJU N, K V THRISSUR



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Computer Science
CLASS-XII
Code No. 083
2023-24

1. Prerequisites

Computer Science- Class XI

2. Learning Outcomes

Student should be able to

- a) apply the concept of function.
- b) explain and use the concept of file handling.
- c) use basic data structure: Stacks
- d) explain basics of computer networks.
- e) use Database concepts, SQL along with connectivity between Python and SQL.

3. Distribution of Marks:

Unit No.	Unit Name	Marks	Periods	
			Theory	Practical
I	Computational Thinking and Programming – 2	40	70	50
II	Computer Networks	10	15	...
III	Database Management	20	25	20
	Total	70	110	70

4. Unit wise Syllabus

Unit I: Computational Thinking and Programming – 2

- Revision of Python topics covered in Class XI.
- Functions: types of function (built-in functions, functions defined in module, user defined functions), creating user defined function, arguments and parameters, default

parameters, positional parameters, function returning value(s), flow of execution, scope of a variable (global scope, local scope)

- Exception Handling: Introduction, handling exceptions using try-except-finally blocks
- Introduction to files, types of files (Text file, Binary file, CSV file), relative and absolute paths
- Text file: opening a text file, text file open modes (r, r+, w, w+, a, a+), closing a text file, opening a file using with clause, writing/appending data to a text file using write() and writelines(), reading from a text file using read(), readline() and readlines(), seek and tell methods, manipulation of data in a text file
- Binary file: basic operations on a binary file: open using file open modes (rb, rb+, wb, wb+, ab, ab+), close a binary file, import pickle module, dump() and load() method, read, write/create, search, append and update operations in a binary file
- CSV file: import csv module, open / close csv file, write into a csv file using writer(),writerow(),writerows() and read from a csv file using reader()
- Data Structure: Stack, operations on stack (push & pop), implementation of stack using list.

Unit II: Computer Networks

- Evolution of networking: introduction to computer networks, evolution of networking (ARPANET, NSFNET, INTERNET)
- Data communication terminologies: concept of communication, components of data communication (sender,receiver, message, communication media, protocols), measuring capacity of communication media (bandwidth, data transfer rate), IP address, switching techniques (Circuit switching, Packet switching)
- Transmission media: Wired communication media (Twisted pair cable, Co-axial cable, Fiber-optic cable), Wireless media (Radio waves, Micro waves, Infrared waves)
- Network devices (Modem, Ethernet card, RJ45, Repeater, Hub, Switch, Router, Gateway, WIFI card)
- Network topologies and Network types: types of networks (PAN, LAN, MAN, WAN), networking topologies (Bus, Star, Tree)
- Network protocol: HTTP, FTP, PPP, SMTP, TCP/IP, POP3, HTTPS, TELNET, VoIP
- Introduction to web services: WWW, Hyper Text Markup Language (HTML), Extensible Markup Language (XML), domain names, URL, website, web browser, web servers, web hosting

Unit III: Database Management

- Database concepts: introduction to database concepts and its need
- Relational data model: relation, attribute, tuple, domain, degree, cardinality, keys (candidate key, primary key, alternate key, foreign key)
- Structured Query Language: introduction, Data Definition Language and Data Manipulation Language, data type (char(n), varchar(n), int, float, date), constraints (not null, unique, primary key), create database, use database, show databases, drop database, show tables, create table, describe table, alter table (add and remove an attribute, add and remove primary key), drop table, insert, delete, select, operators (mathematical, relational and logical), aliasing, distinct clause, where clause, in, between, order by, meaning of null, is null, is not null, like, update command, delete command, aggregate functions (max, min, avg, sum, count), group by, having clause,

- joins: cartesian product on two tables, equi-join and natural join
- Interface of python with an SQL database: connecting SQL with Python, performing insert, update, delete queries using cursor, display data by using connect(), cursor(), execute(), commit(), fetchone(), fetchall(), rowcount, creating database connectivity applications, use of %s format specifier or format() to perform queries

5. Practical

S.No	Unit Name	Marks (Total=30)
1	Lab Test: 1. Python program (60% logic + 20% documentation + 20% code quality)	8
	2. SQL queries (4 queries based on one or two tables)	4
2	Report file: <ul style="list-style-type: none"> • Minimum 15 Python programs. • SQL Queries – Minimum 5 sets using one table / two tables. • Minimum 4 programs based on Python - SQL connectivity 	7
3	Project (using concepts learnt in Classes 11 and 12)	8
4	Viva voce	3

6. Suggested Practical List:

Python Programming

- Read a text file line by line and display each word separated by a #.
- Read a text file and display the number of vowels/consonants/uppercase/lowercase characters in the file.
- Remove all the lines that contain the character 'a' in a file and write it to another file.
- Create a binary file with name and roll number. Search for a given roll number and display the name, if not found display appropriate message.
- Create a binary file with roll number, name and marks. Input a roll number and update the marks.
- Write a random number generator that generates random numbers between 1 and 6 (simulates a dice).

- Write a Python program to implement a stack using list.
- Create a CSV file by entering user-id and password, read and search the password for given userid.

Database Management

- Create a student table and insert data. Implement the following SQL commands on the student table:
 - ALTER table to add new attributes / modify data type / drop attribute
 - UPDATE table to modify data
 - ORDER By to display data in ascending / descending order
 - DELETE to remove tuple(s)
 - GROUP BY and find the min, max, sum, count and average
- Similar exercise may be framed for other cases.
- Integrate SQL with Python by importing suitable module.

7. Suggested Reading Material

- NCERT Textbook for COMPUTER SCIENCE (Class XII)
- Support Materials on the CBSE website.

8. Project

The aim of the class project is to create something that is tangible and useful using Python file handling/ Python-SQL connectivity. This should be done in groups of two to three students and should be started by students at least 6 months before the submission deadline. The aim here is to find a real world problem that is worthwhile to solve.

Students are encouraged to visit local businesses and ask them about the problems that they are facing. For example, if a business is finding it hard to create invoices for filing GST claims, then students can do a project that takes the raw data (list of transactions), groups the transactions by category, accounts for the GST tax rates, and creates invoices in the appropriate format. Students can be extremely creative here. They can use a wide variety of Python libraries to create user friendly applications such as games, software for their school, software for their disabled fellow students, and mobile applications, of course to do some of these projects, some additional learning is required; this should be encouraged. Students should know how to teach themselves.

The students should be sensitized to avoid plagiarism and violations of copyright issues while working on projects. Teachers should take necessary measures for this.

REVIEW OF PYTHON

Characteristics of Python: Object-Oriented, Open-Source, Portable, Platform-independent, interpreted Language developed by Guido Van Rossum in 1991.

Character Set of Python: Set of all characters recognised by python. It includes:

- Letters: A- Z and a -z
- Digits: 0-9
- Special Symbols: + , - , / , % , ** , * , [] , { } , # , \$ etc.
- White spaces: Blank space, tabs, carriage return, newline, form feed
- Other Characters: All ASCII and UNICODE characters.

Tokens: Tokens are smallest identifiable units in a python program. Different tokens are:

- **Keywords:** reserved words which are having special meaning. Examples: int, print, input, for, while
- **Identifiers:** name given by programmer to identify variables, functions, constants, etc.
- **Literals:** literals are constant values.
- **Operators:** Operators trigger an operation. Parameters provided to the operators are called operands. Examples: + - * % ** / //
- **Delimiters:** Symbols used as separators. Examples: { } , [] ; :

Rules for identifier names:

- Keywords cannot be used
- Can contain A-Z,a-z,0-9 and underscore(_)
- Cannot start with a number.
Example: engmark, _abc , mark1, mark2

Variables and data types: Variables are used to store data. Data types of variables:

- Numeric Types: int, float, complex
- Boolean – True or False values.
- None – a special type with an unidentified value or absence of value.
- Sequence: an ordered collection of elements. String, List and Tuples are sequences.
- Mappings – Dictionaries are mappings. Elements of dictionaries are key-value pairs.

Mutable and Immutable types:

Mutable -Values can be changed in place. E.g. List, Dictionary

Immutable: Values cannot be changed in place in memory. E.g., int, float, str, tuple.

Assigning Values to Variables:

The assignment operator (=) is used to assign values to variables. E.g. a = 100

Multiple Assignments:

- Assigning same value to multiple variables - a = b = c = 1

- Different values to different variables- a, b, c = 5,10,20

print statement: used to display output. If variables are specified i.e., without quotes then value contained in variable is displayed.

E.g., <code>x = "kve "</code> <code>print(x)</code>	Output: kve
--	----------------

To combine both text and a str variable, Python uses the “+” character:

Example

<code>x = "awesome"</code> <code>print("Python is " + x)</code>	Output: Python is awesome
--	------------------------------

Expressions: An expression is combination of values, variables and operators. E.g. – `x= 3*3//5`

Operators: Operators trigger an operation. Some operators need one operand, some need more than one operand to perform the operation. Types of operators:

- Arithmetic Operators: + - * / (division) // (Floor division) % (remainder) ** (power)
- Relational Operators > < >= <= == (equality) != (inequality)
- Logical Operators: not and or

Precedence of Operators: The operator having high priority is evaluated first compared to an operator in lower order of precedence when used in an expression.

Order of Precedence	Operators	Description
1	**	Exponentiation (raise to the power)
2	~, +, -	Complement, unary plus and unary minus
3	*, /, %, //	Multiply, divide, modulo and floor division
4	+, -	Addition and subtraction
5	<, <=, >, >=, ==, !=	Relational and Comparison operators
6	=, %=, /=, //=, -=, +=, *=, **=	Assignment operators
7	is, is not	Identity operators
8	in, not in	Membership operators
9	not	Logical operators
10	and	
11	or	

Examples:

1. <code>x = 7 + 3 * 2</code> 13 * has higher precedence than +, so it first multiplies 3*2 and then adds into 7	2. <code>>>> 3+4*2</code> 11 Multiplication gets evaluated before the addition operation
--	---

Comments: Comments are ignored by the Python interpreter. Comments gives some message to the Programmer. It can be used to document the code. Comments can be:

- Single-line comments: It begins with a hash(#) symbol and the whole line is considered as a comment until the end of line.
- Multi line comment is useful when we need to comment on many lines. In python, triple double quote (" " ") and single quote (' ') are used for multi-line commenting.

Example:

```
# This is a single line comment
''' I am a multi
line comment '''
```

input() function: An input() function is used to receive the input from the user through the keyboard. Example: `x=input('Enter your name')`

```
age = int( input ('Enter your age'))
```

Selection Statements: It helps us to execute some statements based on whether the condition is evaluated to True or False.

if statement: A decision is made based on the result of the comparison/condition. If condition is True then statement(s) is executed otherwise not.

Syntax:

```
if <expression>:
    statement(s)
```

Example:

<pre>a = 3 if a > 2: print(a, "is greater") print("done")</pre>	<p>Output: 3 is greater done</p>
--	---

If-else statement:

If condition is True then if-block is executed otherwise else-block is executed.

Syntax:

```
if test expression:
    Body of if stmts
else:
    Body of else
```

Example:

<pre>a=int(input('enter the number')) if a>5: print("a is greater") else: print("a is smaller than the input given")</pre>	<p>Output: enter the number 2 a is smaller than the input given</p>
---	--

If-elif-else statement: The elif statement allows us to check multiple expressions for TRUE and execute a block of code as soon as one of the conditions evaluates to TRUE.

Syntax:

If <test expression>:

 Body of if stmts

elif < test expression>:

 Body of elif stmts

else:

 Body of else stmts

Example:

<pre>var = 100 if var == 200: print("1 - Got a true expression value") print(var) elif var == 150: print("2 - Got a true expression value") print(var) elif var == 100: print("3 - Got a true expression value") print(var) else: print("4 - Got a false expression value") print(var)</pre>	<p>Output: 3 - Got a true expression value 100</p>
--	---

Iteration/Repetition: Repeated execution of a set of statements is called iteration. The for-statement and while- statements can be used

While loop: while loop keeps iterating a block of code defined inside it until the desired condition is met.

<p>Syntax: while(expression): Statement(s)</p>	<p>Example: i=1 while i<=3: print("KV School") i=i+1</p>	<p>Output: KV School KV School KV School</p>
---	--	---

For loop: for loop iterates over the items of lists, tuples, strings, the dictionaries and other iterable objects.

Syntax:

for <loopvariable> in <sequence>:

 Statement(s)

<p>Example 1: L = [1, 2, 3, 4, 5] for var in L: print(var, end=' ')</p>	<p>Output is: 1 2 3 4 5</p>
<p>Example 2:</p>	<p>output: 0,1,2,3,4,5,6,7,8,9</p>

<pre>for k in range(10): print(k, end =', ')</pre>	
--	--

‘break’ statement: Terminates the loop upon execution

‘continue’ Statement: Skips the current iteration / rest of the and continues on with the next iteration in the loop.

Strings: A string is a sequence of characters. E.g. 'banana', "apple", "orange"

String slices: A segment or a part of a string is called a slice.

Syntax: string_object[Start: stop: steps]

- Slicing will start from index and will go up to stop(excluding stop) in step of steps.
- steps default is 1. If negative step then sequence will be decreasing order
- Default value of start is 0 if step is positive and the last item if step is negative

Example:

<pre>str = 'Hello World!' print (str[2:5]) print (str[2:])</pre>	<p>Output: llo llo World!</p>
---	--

String concatenation: ‘+’ is string concatenation operator.

String repetition operators: ‘*’ is called repetition operator

<pre>print ('hello' * 2) print('hello' + 'world')</pre>	<p>Output: hellohello helloworld</p>
---	---

String functions and methods:

Sno	Method name	Description
1.	isalnum()	Returns true if string has at least 1 character and all characters are alphanumeric and false otherwise.
2.	isalpha()	Returns true if string has at least 1 character and all characters are alphabetic and false otherwise.
3.	isdigit()	Returns true if string contains only digits and false otherwise.
4.	islower()	Returns true if string has at least 1 cased character and all cased characters are in lowercase and false otherwise.
5.	isnumeric()	Returns true if a string contains only numeric characters and false otherwise.
6.	isspace()	Returns true if string contains only whitespace characters and false otherwise.
7.	istitle()	Returns true if string is properly “titlecased” and false otherwise.
8.	isupper()	Returns true if string has at least one cased character and all cased characters are in uppercase and false otherwise.
9.	replace(old,new[, max])	Replaces all occurrences of old in string with new or at most max occurrences if max given.

10.	split()	Splits string according to delimiter str (space if not provided) and returns list of substrings;
11.	count()	Occurrence of a string in another string
12.	find()	Finding the index of the first occurrence of a string in another string
13.	swapcase()	Converts lowercase letters in a string to uppercase and viceversa
14.	startswith(str, beg=0, end=len(string))	Determines if string or a substring of string (if starting index beg and ending index end are given) starts with substring str; returns true if so and false otherwise.

List: Lists are ordered mutable data types enclosed in square brackets. E.g., ['A', 87, 23.5]

Python has a set of built-in methods that you can use on lists

Method	Description
append()	Adds an element at the end of the list
clear()	Removes all the elements from the list
copy()	Returns a copy of the list
count()	Returns the number of elements with the specified value
extend()	Add the elements of a list (or any iterable), to the end of the current list
index()	Returns the index of the first element with the specified value
insert()	Adds an element at the specified position
pop()	Removes the element at the specified position
remove()	Removes the first item with the specified value
reverse()	Reverses the order of the list
sort()	Sorts the list

Basic List Operations:

Lists respond to the + and * operators much like strings; they mean concatenation and repetition here too, except that the result is a new list, not a string.

Python Expression	Results	Description
len([1, 2, 3])	3	Length
[1, 2, 3] + [4, 5, 6]	[1, 2, 3, 4, 5, 6]	Concatenation
['Hi!'] * 4	['Hi!', 'Hi!', 'Hi!', 'Hi!']	Repetition
3 in [1, 2, 3]	True	Membership
for x in [1, 2, 3]: print x,	1 2 3	Iteration

Note: indexing and slicing are similar to that of strings. For example:

L= ['kvsch', 'school', 'KVSCH!']

Python Expression	Results	Description
L[2]	KVSCH	Offsets start at zero
L[-2]	school	Negative: count from the right
L[1:]	['school', 'KVSCH!']	Slicing fetches sections

Tuples: A tuple is a collection which is ordered and unchangeable. In Python tuples are created by enclosing items within round brackets. Tuple is immutable. We can create tuple in different ways.

X=() # an empty tuple

X=(1,2,3) # a tuple with three elements

X=tuple(list1)

X=1,2,3,4

Accessing elements of a tuple:

We can use index to access the elements of a tuple. From left to right, index varies from 0 to n-1, where n is total number of elements in the tuple. From right to left, the index starts with -1 and the index of the leftmost element will be -n, where n is the number of elements.

T = (1, 2,4,6) print(T[0]) print(T[-1])	Output: 1 6
--	-------------------

Some important functions which can be used with tuple:

count (): Returns the number of times a specified value occurs in a tuple

>>> x=(1,2,3,4,5,6,2,10,2,11,12,2) >>> x.count(2)	output: 4
--	-----------

index (): Searches the tuple for a specified value and returns its position in the tuple.

>>> x=(1,2,3,4,5,6,2,10,2,11,12,2) >>> x.index(2)	Output: 1
--	-----------

len(): To know the number of items or values present in a tuple, we use len().

>>> x=(1,2,3,4,5,6,2,10,2,11,12,2) >>> y=len(x) >>> print(y)	output: 12
--	------------

Dictionaries: A dictionary is a collection which is unordered, changeable and indexed. In Python dictionaries are created with curly brackets, and they have keys and values. Values can be of any type. Keys should be distinct and immutable data type.

Example: X={1:'A',2:'B',3:'c'}
X=dict([('a',3) ('b',4)])
X=dict(A=1, B=2)

Functions available for handling dictionary:

Method	Description
clear()	Remove all items form the dictionary.
copy()	Return a shallow copy of the dictionary.
fromkeys(seq[, v])	Return a new dictionary with keys from seq and value equal to v (defaults to None).
get(key[,d])	Return the value of key. If key does not exit, return d (defaults to None).
items()	Return a new view of the dictionary's items (key, value).
keys()	Return a new view of the dictionary's keys.
pop(key[,d])	Remove the item with key and return its value or d if key is not found. If d is not provided and key is not found, raises KeyError.
popitem()	Remove and return an arbitrary item (key, value). Raises KeyError if the dictionary is empty.
setdefault(key[,d])	If key is in the dictionary, return its value. If not, insert key with a value of d and return d (defaults to None).
update([other])	Update the dictionary with the key/value pairs from other, overwriting existing keys.
values()	Return a new view of the dictionary's values
remove()	It removes or pop the specific item of dictionary
del()	Deletes a particular item
len()	we use len() method to get the length of dictionary

Multiple Choice Questions

- Which of the following is not a keyword?
a) Eval b) assert c) nonlocal d) pass
- What is the order of precedence in python?
(i) Parentheses ii) Exponential iii) Multiplication iv) Division v) Addition vi) Subtraction
a) i,ii,iii,iv,v,vi
b) ii,i,iii,iv,v,vi
c) ii,i,iv,iii,v,vi
d) i,ii,iii,iv,vi,v
- What will be the value of X in the following Python expression?
 $X = 2+9*((3*12)-8)/10$
a) 30.0 b) 30.8 c) 28.4 d) 27.2
- Which of the following can be used as valid variable identifier(s) in Python?

- a) total b) 7Salute c) Que\$tion d) global

8. Which of the following statement is correct for an AND operator?
- a) Python only evaluates the second argument if the first one is False
 - b) Python only evaluates the second argument if the first one is True
 - c) Python only evaluates True if any one argument is True
 - d) Python only evaluates False if any one argument is False
10. Which point can be considered as difference between string and list?
- a. Length c. Indexing and Slicing
 - b. Mutability d. Accessing individual elements
11. Which of the following statement is true for extend () list method?
- a) adds element at last c) adds multiple elements at last
 - b) adds element at specified index d) adds elements at random index
12. The statement `del l[1:3]` do which of the following task?
- a) delete elements 2 to 4 elements from the list
 - b) delete 2nd and 3rd element from the list
 - c) deletes 1st and 3rd element from the list
 - d) deletes 1st, 2nd and 3rd element from the list
13. If `l=[11,22,33,44]`, then output of `print(len(l))` will be
- a)4 b)3 c) 8 d) 6
15. The step argument in `range()` function_____.
- a. indicates the beginning of the sequence
 - b. indicates the end of the sequence
 - c. indicates the difference between every two consecutive numbers in the sequence
 - d. generates numbers up to a specified value
16. If `D=1,2,3`
What will be the data type of D?
- a)List b)tuple c)set d)invalid type
17. Consider the following code
- ```
L=['a','b','c','d']
L.pop(-1)
print(L)
```
- What would be the output?
- a)'d'                      b)['a','b','c','d']                      c)['a','b','c']                      d)error
- 18 What is the output when the following code is executed?
- ```
>>>name=['Aadi','Beena','Charlie','David']  
>>>print(name[-1][-1])
```
- a)'d' b)'D' c)'i' d)Charlie

19. T = ("See You")

What is the data type of T?

- a) tuple b) string c) List d) set

20. Assertion(A): After adding element in a list, its memory location remains same

Reason(R): List is a mutable data type

- 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
d) A is False but R is True

21. Assertion(A): An identifier may be combination of letters and numbers.

Reason(R): No special symbols are permitted in an identifier name

- 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
d) A is False but R is True

Answers of MCQ:

- 1) a 2) a 3) b 4) a 5) d 6) c 7) a 8) b 9) d 10) b 11) b 12) b 13) a 14) c
15) c 16) b 17) c 18) a 19) b 20) a 21) c

Very Short Answer Type Questions

1. Give the output of the following

```
Sum = 0
for k in range(5):
    Sum = Sum+k
print(Sum)
```

2. Give the output of the following

```
Sum = 0
for k in range(10, 1, -2):
    Sum = Sum+k
print(Sum)
```

3. Give the output of the following

```
for k in range(4):
    for j in range(k):
        print('*', end = ' ')
    print()
```

4. Give the output of the following

```
for k in range(5, 0, -1):
    for j in range(k):
```

```
print('*', end=' ')
print()
```

5. How many times the following loop will execute? Justify your answer

```
A = 0
while True:
    print(A)
    A = A + 1
```

6. Give the output of the following. Also find how many times the loop will execute.

```
A = 0
while A < 10:
    print(A, ' ', ')
    A = A + 1
```

7. Give the output of the following. Also find how many times the loop will execute.

```
A = 0
while A < 10:
    print(A, ' ', ')
    A = A + 1
print('\n', A)
```

8. Give the output of the following

```
T = (5)
T = T * 2
print(T)
```

9. Give the output of the following

```
T = (5, )
T = T * 2
print(T)
```

10. What kind of error message will be generated if the following code is executed

```
A = 5
B = 'hi'
d = A + B
print(D)
```

11. Give the output of the following

```
L = [1,2,3,4,5,6,7,8,9]
print(L[:])
```

12. Give the output of the following

```
L = [1,2,3,4,5,6,7,8,9]
print(L[: -1])
```

13. Find the output of the following

```
S = 'abcdefgh'
```

```
L = list(S)
print(L[1:4])
```

14. Give the output of the following

```
L = [1,2,3,4,5,6,7,8,9]
print(L.count(2))
print(L.index(2))
```

15. Write python code to sort the list, L, in descending order.

16. Give the output of the following

```
x=[4,5,66,9]
y=tuple(x)
print( y)
```

17. Guess the output?

```
if 8:
    print("Hello")
if(-5):
    print("Hai")
```

18. Find output.

```
vowels=['a','e','i']
vowels.append('o')
vowels.append(['u'])
vowels.extend(['A','E'])
print("New List:",vowels)
```

19. Given the following declaration, what will be the output of the following:

```
Lst=(1,2,3,4,5)
del Lst[2]
print(Lst)
```

20. Identify the statement(s) from the following options which will raise TypeError exception.

- a) print('5'*'3')
- b) print(5*3)
- c) print('5'+3)
- d) print('5'+'3')
- e) print('5'*3)

Answers for VSA Questions

1)10

2)30

3)

```
*
* *
* * *
```

4) * * * * *

```
* * * *
* * *
* *
*
*
```

5)infinite loop. Condition / test expression is always True.

6) 0,1,2,3,4,5,6,7,8,9

7) 0,1,2,3,4,5,6,7,8,9
10

8) 10 Note: here T is an integer

9) (5, 5), Note: here T is tuple

10)TypeError

11) [1,2,3,4,5,6,7,8,9]

12) [1,2,3,4,5,6,7,8]

13) ['b', 'c', 'd']

14) 1
1

15) L.sort(reverse= True)

16) (4, 5, 66, 9)

17)Hello

Hai

18) New List: ['a', 'e', 'i', 'o', ['u'], 'A', 'E']

19)Error

20) a)print('5'*3')

c)print('5'+3)

Short Answer Type Questions

1.Consider the following dictionary 'D'. Display all the items of the dictionary as individual tuple

D = {'A': 20, 'B': 30, 'C':40. 'D': 50}

2. Write Python code to remove an element as entered by the user from the list, L
3. Create a list k, by selecting all the odd numbers within the given range, m and n. User will input the values of m, n at run time
4. Write Python code to create and add items to a dictionary. Ask the user to input key value pairs. Continue as long as the user wishes.
5. Write Python code to find whether the given item is present in the given list using for loop.
6. Create a list, L, with the squares of numbers from 0 to 10
7. Write a program to accept a list of numbers and to create a dictionary with two keys ODD and EVEN whose values are all the odd numbers from the list and all the even numbers from the list respectively.
8. Mr. Rahul wants created a dictionary to store the details of his students and to manipulate the data. He wrote a code in Python, help him to complete the code:

```

studentDict = _____ # stmt 1
n = int(input("How Many Students you Want To Input?"))
for i in range(____):      # stmt 2 - to enter n number of students data
    rollno = input("Enter Roll No:")
    name = input("Enter Name:")
    physicsMarks = int(input("Enter Physics Marks:"))
    chemistryMarks = int(input("Enter Chemistry Marks:"))
    mathMarks = int(input("Enter Maths Marks:"))
    studentDict[rollno]=_____ # stmt 3

```

Answers /Hints: Short answer Type Questions.

- 1) for k in D.items():
 print(k)
- 2) a =int('input the item to be deleted')
 l.remove(a)
- 3) m = int(input('lower limit'))
 n = int(input('upper limit'))
 n = n+1
 L = [x for x in range(m, n) if x%2!=0]
- 4) D = { }
 while True:
 K = input('type a key')
 V = int(input('type the value'))
 D[K] = V
 C = input('type 'y' to add more')
 if C!='y':
 break
- 5) flag = 0
 L = eval(input('input a list on numbers'))

```

E = int(input('item to be searched'))
K = len(L)
for p in range(K):
    if E == L(p):
        flag = 1
        print('found and index is ', p)
if flag == 0:
    print('not found')

```

6) list1=[]

```

for x in range(10):
    list1.append(x**2)

```

list1

Output:

[0, 1, 4, 9, 16, 25, 36, 49, 64, 81]

OR

```

list1=list(map(lambda x:x**2, range(10)))

```

7) L=eval(input("Enter a list"))

```

D={"ODD":[],"EVEN":[]}

```

```

for i in L:

```

```

    if i%2!=0:

```

```

        D["ODD"].append(i)

```

```

    else:

```

```

        D["EVEN"].append(i)

```

```

print(D)

```

8) Statement 1 : StudentDict = dict()

Statement 2 = for i in range(n):

Statement 3: studentDict[rollno]=[name, physicsMarks, chemistryMarks, mathMarks]

FUNCTIONS

Functions: A function is a named sequence of statement(s) that performs a computation. They can be categorized as: Built-in function, Functions defined in module and User defined functions

- a) **Built-in functions:** Built in functions are the function(s) that are built into Python and can be accessed by a programmer. We don't have to import any module to use these functions.

Name of the function	Description	Example
abs (x)	It returns the positive value of x.	<pre>>>>abs(-45) 45 >>>abs(119) 119</pre>
range(start, stop[, step])	It is used to generate a sequence of numbers.	<pre>>>> range(10) [0, 1, 2, 3, 4, 5, 6, 7, 8, 9] >>> range(1, 11) [1,2, 3, 4, 5,6, 7, 8, 9, 10] >>>range(0, 30, 5) [0, 5, 10,15,20, 25]</pre>
round(x [, n])	It returns float x rounded to n digits from the decimal point, where x and n are numeric expressions. If n is not provided then x is rounded to 0 decimal digits.	<pre>>>>round(80.23456, 2) 80.23 >>>round(-100.000056, 3) -100.0 >>> round (80.23456) 80</pre>

- b) **Functions defined in module:** A module is a file containing Python definitions (i.e., functions) and statements. To use these modules in the program, a programmer needs to import the module by using either the import statement or the from statement.

import statement: It is simplest and most common way to use modules in our code. syntax is:
 import modulename1 [, modulename2, ...]

Example: `import math`

To use/ access/invoke a function, you will specify the module name and name of the function-separated by dot (.). This format is also known as dot notation.

Example: `>>> value= math.sqrt (25) # dot notation`

From Statement: It is used to get a specific function in the code instead of the complete module file. For modules having large no. of functions, it is recommended to use from instead of import. Its syntax is:

`>>> from modulename import functionname [, functionname.....]`

`>>>from modulename import * (Import everything from the file)`

Example: `>>> from math import sqrt`
`value = sqrt (25)`

Some functions from math module are:

Name of function	Description	Example
ceil(x)	It returns the smallest integer not less than x, where x is a numeric expression.	math.ceil(-45.17) -45.0 math.ceil(100.12) 101.0 math.ceil(100.72) 101.0
floor(x)	It returns the largest integer not greater than x, where x is a numeric expression.	math.floor(-45.17) -46.0 math.floor(100.12) 100.0 math.floor(100.72) 100.0
fabs(x)	It returns the absolute value of x, where x is a numeric value.	math.fabs(-45.17) 45.17 math.fabs(100.12) 100.12 math.fabs(100.72) 100.72
exp(x)	It returns exponential of x: e ^x , where x is a numeric expression.	math.exp(-45.17) 2.41500621326e-20 math.exp(100.12) 3.03084361407e+43 math.exp(100.72) 5.52255713025e+43
pow(x, y)	It returns the value of x ^y , where x and y are numeric expressions.	math.pow(100, 2) 10000.0 math.pow(100, -2) 0.0001 math.pow(2, 4) 16.0 math.pow(3, 0) 1.0
sqrt(x)	It returns the square root of x for x > 0, where x is a numeric expression.	math.sqrt(100) 10.0 math.sqrt(7)- 2.6457513110645907

Some functions from random module are:

Name of the function	Description	Example
random ()	It returns a random float x, such that 0 ≤ x < 1	>>>random.random() 0.281954791393 >>>random.random() 0.309090465205
randint (a, b)	It returns a int x between a & b such that a ≤ x ≤ b	>>> random.randint (1,10) 5 >>> random.randint (2,20) -1
uniform (a,b)	It returns a floating point number x, such that a ≤ x < b	>>>random.uniform (5, 10) 5.52615217015

randrange([start, stop[,step]])	It returns a random item from the given range	>>>random.randrange(100,1000,3) 150
------------------------------------	---	--

Some functions from statistics module are:

Name of the function	Description	Example
mean(x)	It returns arithmetic mean	>>>statistics.mean([11,24,32,45,51]) 32.6
median(x)	It returns median (middle value) of x	>>>statistics.median([11,24,32,45,51]) 32
mode(x)	It returns mode (the most repeated value)	>>>statistics.mode([11,24,11,45,11]) 11 >>>statistics.mode(("red","blue","red")) red

c) User defined functions

- The keyword def is used to define a function.
- After the keyword comes an identifier i.e. name of the function, followed by parenthesized list of parameters and the colon which ends up the line.
- Next follows the block of statement(s) that are the part of function.

Syntax:

```
def function_name([parameter1, parameter2,....]) :
```

```
    statement1
```

```
    statement2
```

```
    ...
```

```
    [return <value1, value2, ...> ]
```

Formal Parameters or Parameters: These are the values provided in Parenthesis when we write a function Header.

Actual Parameters or Arguments: These are the values passed to the function when it is called/invoked.

Example:

<pre>def area_of_circle(radius): # radius Formal Parameter parameter print("Area of circle = ",3.1416*radius*radius) r=int(input("Enter radius of circle")) ar=area_of_circle(r) # r - Actual Parameter or Argument</pre>	<p>OUTPUT</p> <p>Enter radius of circle 10</p> <p>Area of circle = 314.16</p>
--	---

(i) Default Parameters: The parameters which are assigned with a value in function header while defining the function are known as default parameters. **Default parameters will be written in the end of the function header, which means positional parameter cannot**

appear to the right side of default parameter. If no value is provided in function call, then the default value will be taken by the parameter.

Example:

```
def SICal(amount, rate, time=10): #time has default parameter
```

(ii) Positional Parameters/ Required Arguments: The function call statement must match the number and positional order of arguments as defined in the function definition, then it is called the positional parameters.

Example:

```
def Test(x,y,z): # x,y,z are positional parameters
```

Then we can call function using following statements p,q,r=3,4,6

```
Test(p,q,r) #3 variables are passed
Test(4,q,r) # 1 literal and 2 variables are passed
```

Function returning value(s)

A function can return multiple values. The return values should be a comma separated list of values. The multiple return values are returned as a tuple. We can unpack the received value by specifying the same number of variables on the left side of the function call.

<p>Example 1:</p> <pre>def add10(x,y,z): return x+10,y+10,z+10 x=10 y=20 z=30 result=add10(x,y,z) print(result)</pre>	<p>Output</p> <p>(20, 30, 40)</p>
<p>Example 2:</p> <pre>def add10(x,y,z): return x+10,y+10,z+10 x=10 y=20 z=30 a,b,c=add10(x,y,z) #unpack</pre>	<p>Output:</p> <p>20 30 40</p>

SCOPE OF VARIABLES: Scope of a variable is the portion of a program where the variable is recognized and can be accessed therein. There are two types of scope for variables:

1.Local Scope: A variable declared in a function-body is said to have local scope. It cannot be accessed outside the function.

2. Global Scope: A variable declared in top level segment (main) of a program is said to have a global scope.

Example 1:

```

def Sum(x , y) : #x,y,z local
    z = x + y
    return z
a = 5          #a,b global
b = 7
s = Sum(a , b)
print(s)

```

Practice Questions (1 MARK)

1	<p>Which of the following is a valid function name?</p> <p>a) Start_game() b) start game() c) start-game() d) All of the above</p>
2	<p>If the return statement is not used in the function then which type of value will be returned by the function?</p> <p>a)int b) str c) float d) None</p>
3	<p>What is the minimum and maximum value of c in the following code snippet?</p> <pre> import random a=random.randint(3,5) b = random.randint(2,3) c = a + b print(c) </pre> <p>a) 3 , 5 b) 5, 8 c) 2, 3 d) 3, 3</p>
4	<p>pow() function belongs to which library ?</p> <p>a) math b) string c) random d) maths</p>
5	<p>What data type is the object below?</p> <p>L = (1, 23, 'hello',1)</p> <p>a) list b) dictionary c) array d) tuple</p>
6	<p>What is returned by int(math.pow(3, 2))?</p> <p>a) 6 b) 9 c) error, third argument required d) error, too many arguments</p>
7	<p>Which of the following is not a type conversion functions?</p> <p>a) int() b) str() c) input() d) float()</p>
8	<p>Identify the module to which the following function load () belong to?</p> <p>a) math b) random c) pickle d) sys</p>
9	<p>How many argument(s) a function can receive</p> <p>a) Only one b) 0 or many c) Only more than one d) At least one</p>
10	<p>Give the output</p> <pre> def fun(): global a a=10 print(a) a=5 fun() print(a) </pre> <p>a) 10 b) 5 c) 5 d) 10</p> <p>10 10 5 5</p>

11	Value returning functions should be generally called from inside of an expression a) True b) False
12	The variable declared inside the function is called a _____ variable a) global b) local c) external d) none of the above
13	These are predefined functions that are always available for use. For using them we don't need to import any module a) built in function b) pre-defined function c) user defined function d) none of the above
14	The _____ of a variable is the area of the program where it may be referenced a) external b) global c) scope d) local
15	If you want to communicate between functions i.e. calling and called statement, then you should use _____ a) values b) return c) arguments d) none of the above
16	Which of the following function header is correct? a) def mul(a=2, b=5,c) b) def mul(a=2, b, c=5) c) def mul(a, b=2, c=5) d) def mul(a=2, b, c=5)
17	Find the flow of execution of the following code: 1. def calculate (a, b): 2. res=a**b 3. return res 4. 5. def study(a): 6. ans=calculate(a,b) 7. return ans 8. 9. n=2 10. a=study(n) 11. print(a) a) 1 > 5 > 9 > 10 > 6 > 2 > 3 > 7 > 11 b) 5 > 9 > 10 > 6 > 2 > 3 > 7 > 11 c) 9 > 10 > 5 > 1 > 6 > 2 > 3 > 7 > 11 d) None of the above
18	A _____ can be skipped in the function call statements a) named parameter b) default parameter c) keyword parameters d) all of the above

ANSWERS	
1	a)Start_game()
2	d) None
3	b) 5, 8
4	a) math
5	d) tuple
6	b) 9

7	c) input()
8	c)pickle
9	b) 0 or many
10	a) 10 10
11	a) True
12	b) local
13	a) built in function
14	c) scope
15	c) arguments
16	c) def mul(a, b=2, c=5)
17	a) 1 > 5 > 9 > 10 > 6 > 2 > 3 > 7 > 11
18	b) default parameter

<u>Practice Questions (2 MARKS)</u>	
1.	<p>What is the output of the following code?</p> <pre>def cube(x): return x * x * x x = cube(3) print(x)</pre> <p>a) 9 b)3 c)27 d) 30</p>
2	<p>Which of the following items are present in the function header?</p> <p>a) function name b) parameter list c) return value d) Both A and B</p>
3	<p>Choose correct answer</p> <pre>def fun1(num): return num+5 print(fun1(5)) print(num)</pre> <p>a) Print value 10 b) Print value 5 c) Name Error d) 25</p>
4.	<p>Predict the output of the following code</p> <pre>def func1(list1): for x in list1: print(x.lower(),end="#") func1(["New","Dehli"])</pre> <p>A. [New,Dehli] B. new#dehli# C. newdehli# D. New#Dehli#</p>

12	<p>Give the output of the following program</p> <pre>def check(a): for i in range(len(a)): a[i]=a[i]+5 return a b=[1,2,3,4] c=check(b) print(c)</pre> <p>a) [6, 8, 8, 9] b) [6,7,8,9] c) [7, 7, 8, 9] d) [6,7,9,9]</p>
14	<p>Predict the output of the following code snippet:</p> <pre>def Execute(M): if M%3==0: return M*3 else: return M+10; def Output(B=2): for T in range (0,B): print(Execute(T),"*",end="") print() Output(4) Output() Output(3)</pre>
15	<p>Find the output of the following program:</p> <pre>def ChangeIt(Text,C): T="" for K in range(len(Text)): if Text[K]>='F' and Text[K]<='L': T=T+Text[K].lower(); elif Text[K]=='E' or Text[K]=='e': T=T+C; elif K%2==0: T=T+Text[K].upper() else: T=T+T[K-1] print(T) OldText="pOwERALone" ChangeIt(OldText,"% ") (a) PPW%RRLLN% (b) PPWCRRRIINC (c) PPW%RRlIN% (d) PpW%RrllN%</pre>
16	<p>What possible outputs are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the maximum value that can be assigned to each of the variables L and U.</p> <pre>import random Arr=[10,30,40,50,70,90,100]</pre>

21	<p>Choose the correct option:</p> <p>Statement1: Local Variables are accessible only within a function or block in which it is declared.</p> <p>Statement2: Global variables are accessible in the whole program.</p> <p>a. Statement1 is correct but Statement2 is incorrect</p> <p>b. Statement2 is correct but Statement1 is incorrect</p> <p>c. Both Statements are Correct</p> <p>d. Both Statements are incorrect</p>
22	<p>Consider the following code and choose correct answer:</p> <pre>def nameage(name, age): return [age,name] t=nameage('kishan',20) print(type(t))</pre> <p>a) tuple b) list c) (kishan,20) d) None of all</p>
23	<p>Write the output of the following:</p> <pre>a=(10, 12, 13, 12, 13, 14, 15) print(max(a) + min(a) + a.count(2))</pre> <p>a) 13 b) 25 c) 26 d) Error</p>
24	<p>Consider the code given below and Identify how many times the message “Hello All” will be printed.</p> <pre>def prog(name): for x in name: if x.isalpha(): print('Alphabet') elif x.isdigit(): print('Digit') elif x.isupper(): print('Capital Letter') else: print('Hello All') prog('vishal123@gmail.com')</pre> <p>a) 0 b) 2 c) 1 d) 3</p>
25	<p>Find and write the output of the following Python code:</p> <pre>def changer(p,q=10): p=p/q q=p%q print(p, "#",q) return p a=200</pre>

	<pre> b=20 a=changer(a,b) print(a,"\$",b) a=changer(a) print(a,"\$",b) </pre>
--	---

ANSWERS	
1.	Ans. C) 27
2	Ans.d Both A and B
3	Ans c)Name Error
4.	Ans. B)new#dehli#
5.	Ans. C)No Output
6	Ans.c) def fun(x=1,y=1,z=2)
7	Ans. A) A) x is now 50
9	Ans. d) x=25 x=20
10	Ans. a) 5 5 6 3 12 5
12	Ans. b) [6, 7, 8, 9]
14	Ans. 0 *11 *12 *9 * 0 *11 * 0 *11 *12 *
15.	Ans: c) PPW%RRiIN%
16	Ans. Options i and iii i)40 @50 @ iii) 40 @50 @70 @90 @ Maximum value of L and U : L=2 ,U=5
18	Ans : a)12 12
19	Ans. The new string is : cBsEeXaMs@2022cbs
20	Ans. iv) 7 \$ Maximum value of x is 2 Minimum value of x is 1
21	Ans.c) Both Statements are correct
22	Ans : b)
23	Ans : b) 25

24	Ans: b) 2
25	Ans. 10.0 # 10.0 10.0 \$ 20 1.0 # 1.0 1.0 \$ 20

ASSERTION AND REASONING QUESTIONS(1 mark)	
(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 (d)A is false but R is True	
2	Assertion(A): If the arguments in a function call match the number and order of arguments as defined in the function definition, such arguments are called the positional arguments. Reasoning(R): During a function call, the argument list first contains default arguments followed by positional arguments.
3	Assertion(A): The random module is a built-in module to generate the pseudo-random variables. Reason(R): The randrange() function is used to generate a random number between the specified range in its parameter.
4	Assertion (A): Global variable is declared outside the all the functions. Reasoning (R): It is accessible through out all the functions.
5	Assertion (A): The math.pow(2,4) gives the output: 16.0 Reason (R): The math.pow() method receives two float arguments, raise the first to the second and return the result.
7	Assertion (A): Built-in function are predefined in the language that are used directly. Reason (R): print() and input() are built-in functions
8	Assertion (A):- In Python, statement return [expression] exits a function. Reasoning (R):- Return statement passes back an expression to the caller. A return statement with no arguments is the same as return None.
9	Assertion (A): When passing a mutable sequence as an argument, function modifies the original copy of the sequence. Reasoning (R): Function can alter mutable sequences passes to it.

ANSWERS	
2	(c) A is True but R is False
3	(b)Both A and R are true and R is not the correct explanation for A
4	(a) Both A and R are true and R is the correct explanation for A
5	(b)Both A and R are true and R is not the correct explanation for A
7	(a) Both A and R are true and R is the correct explanation for A
8	(a) Both A and R are true and R is the correct explanation for A
9	(b)Both A and R are true and R is not the correct explanation for A

Additional Practice Questions (2/3 MARKS)

1	Python function oddeven(L) to print positive numbers in a list L. Example: Input: [4, -1, 5, 9, -6, 2, -9, 8] Output: [4, 5, 9, 2, 8]
2	Write a function listchange(Arr,n)in Python, which accepts a list Arr of numbers and n is an numeric value depicting length of the list. Modify the list so that all even numbers doubled and odd number multiply by 3 Sample Input Data of the list: Arr= [10,20,30,40,12,11], n=6 Output: Arr = [20,40,60,80,24,33]
3	Write definition of a method/function AddOddEven(VALUE) to display sum of odd and even values separately from the list of VALUES. For example : If the VALUES contain [15, 26, 37, 10, 22, 13] The function should display Even Sum: 58 Odd Sum: 65
4	Write a function in Shift(Lst), Which accept a List 'Lst' as argument and swaps the elements of every even location with its odd location and store in different list eg. if the array initially contains 2, 4, 1, 6, 5, 7, 9, 2, 3, 10 then it should contain 4, 2, 6, 1, 7, 5, 2, 9, 10, 3
5	Define a function ZeroEnding(SCORES) to add all those values in the list of SCORES, which are ending with zero (0) and display the sum. For example : If the SCORES contain [200, 456, 300, 100, 234, 678] The sum should be displayed as 600
6	Write a function countNow(PLACES) in Python, that takes the dictionary, PLACES as an argument and displays the names (in uppercase)of the places whose names are longer than 4 characters. For example, Consider the following dictionary PLACES={1:"Delhi",2:"London",3:"Paris",4:"New York",5:"Doha"} The output should be: LONDON NEW YORK
10	Write a function LISTELE(L), where L is the list of elements passed as argument to the function. The function returns another list named 'indexList' that stores the indices of all Non-Zero Elements of L. For example: If L contains [12,4,0,11,0,56] The indexList will have - [0,1,3,5]

Exception Handling

An exception is a python object that represents an error. The exception needs to be handled by the programmer so that the program does not terminate abruptly.

Eg:

```
>>> print( 0 / 0)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
ZeroDivisionError: integer division or modulo by zero
```

Try and Except Block: An exception is caught in the try block and handled in except block. An exception is said to be caught when a code designed to handle a particular exception is executed.

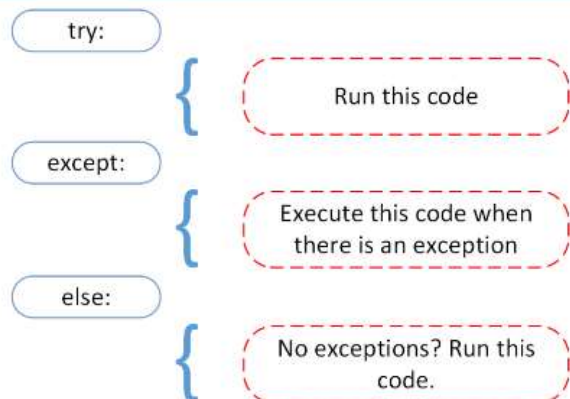
```
try:
    statements
except Exception_Name:
    statements for handling exception
```

While executing the program if an exception is encountered further execution of the code inside the try block is stopped and the control is transferred to the except block.

```
print ("Practicing for try block")
try:
    numerator=50
    denom=int(input("Enter the denominator"))
    quotient=(numerator/denom)
    print ("Division performed successfully")
except ZeroDivisionError:
    print ("Denominator as ZERO... not allowed")
print("OUTSIDE try..except block")
```

try...except...else clause:

We can put an optional else clause along with the try...except clause. An except block will be executed only if some exception is raised in the try block. But if there is no error then none of the except blocks will be executed. In this case, the statements inside the else clause will be executed.



Eg:

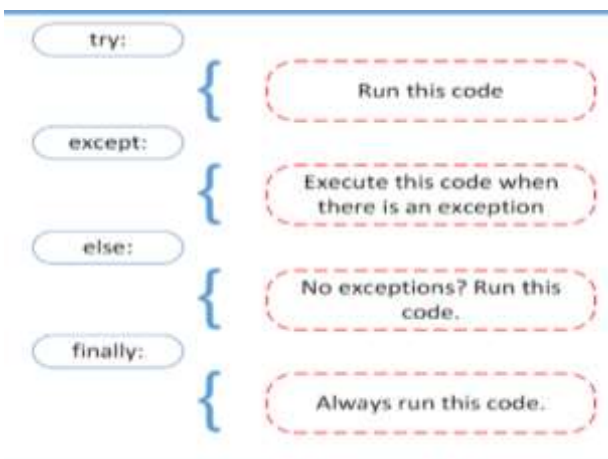
```

try:
    numerator=50
    denom=int(input("Enter the denominator: "))
    quotient=(numerator/denom)
    print ("Division performed successfully")
except ZeroDivisionError:
    print ("Denominator as ZERO is not allowed")
except ValueError:
    print ("Only INTEGERS should be entered")
else:
    print ("The result of division operation is ", quotient)

```

Finally clause:

The try statement in Python can also have an optional finally clause. The statements inside the finally block are always executed regardless of whether an exception has occurred in the try block or not.



```

print (" Learning Exceptions...")
try:
    num1= int(input (" Enter the first number"))
    num2= int(input("Enter the second number"))
    quotient=(num1/num2)
    print ("Both the numbers entered were
correct")
except ValueError: # to enter only integers
    print (" Please enter only numbers")
except ZeroDivisionError: # Denominator should
not be zero
    print(" Number 2 should not be zero")
else:
    print(" Great .. you are a good
programmer")
finally : # to be executed at the end
print(" JOB OVER... GO GET SOME REST")

```


Some of the commonly occurring built-in exceptions are :

S. No	Name of the Built-in Exception	Explanation
1	SyntaxError	It is raised when there is an error in the syntax of the Python code.
2	ValueError	It is raised when a built-in method or operation receives an argument that has the right data type but mismatched or inappropriate values.
3	IOError	It is raised when the file specified in a program statement cannot be opened.
4	KeyboardInterrupt	It is raised when the user accidentally hits the Delete or Esc key while executing a program due to which the normal flow of the program is interrupted.
5	ImportError	It is raised when the requested module definition is not found.
6	EOFError	It is raised when the end of file condition is reached without reading any data by input().
7	ZeroDivisionError	It is raised when the denominator in a division operation is zero.
8	IndexError	It is raised when the index or subscript in a sequence is out of range.
9	NameError	It is raised when a local or global variable name is not defined.
10	IndentationError	It is raised due to incorrect indentation in the program code.
11	TypeError	It is raised when an operator is supplied with a value of incorrect data type.
12	OverflowError	It is raised when the result of a calculation exceeds the maximum limit for numeric data type.
13	Key-Error	Python raises a KeyError whenever a dict() object is requested (using the format a= adict[key]) and the key is not in the dictionary.

MCQ Question based on Exception Handlihng

1. Which block lets you test a block of code for errors?

- A. try
- B. except
- C. finally
- D. None of the above

Ans : A

Explanation: The try block lets you test a block of code for errors.

2. What will be output for the following code?

```
try:
    print(x)
except:
    print("""An exception occurred""")
```

- A. x
- B. An exception occurred
- C. Error
- D. None of the above

Ans : B

Explanation: An exception occurred be the output for the following code because the try block will generate an error, because x is not defined.

4. How many except statements can a try-except block have?

- A. 0
- B. 1
- C. more than one
- D. more than zero

Ans : D

Explanation: There has to be at least one except statement.

5. Can one block of except statements handle multiple exception?

- A. yes, like except TypeError, SyntaxError [...]
- B. yes, like except [TypeError, SyntaxError]
- C. No
- D. None of the above

Ans : A

Explanation: Each type of exception can be specified directly. There is no need to put it in a list.

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

```
lst = [1, 2, 3]
```

```
lst[3]
```

- a) NameError
- b) ValueError
- c) IndexError
- d) TypeError

Answer: c

Explanation: The snippet of code shown above throws an index error. This is because the index of the list given in the code, that is, 3 is out of range. The maximum index of this list is 2.

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

```
int('65.43')
```

- a) ImportError
- b) ValueError
- c) TypeError
- d) NameError

Answer: b

Explanation: The snippet of code shown above results in a value error. This is because there is an invalid literal for int() with base 10: '65.43'.

DATA FILE HANDLING

File- A file is a sequence of bytes on the disk/permanent storage.

Types of File in Python:

- **Text file:** A text file is simply a sequence of ASCII or Unicode characters. Text file can be created using any text editor. Ex. Myfile.txt.
- **Binary file:** A binary file stores the data in the same way as stored in the memory. The .exe files, mp3 file, image files, word documents are some of the examples of binary files.
- **CSV file:** CSV (Comma Separated Values) is a simple text file format in which data is organized with one record on each line and each field is separated by comma.

Absolute Path – It is a full path of the file from the root directory.

Ex : - C:\\Users\\Tanmay\\Desktop\\Delete\\file_handling.txt

```
f=open("C:\\Users\\Tanmay\\Desktop\\Delete\\file_handling.txt",r)
```

Relative Path – Relative Path is the hierarchical path that locates a file or folder on a file system starting from the current working directory.

```
f=open("file_handling.txt", r)
```

Operation On Text Files In python

Opening a file - file_object = open("read_sample.txt", 'r') # Relative Path

1. Read/Write file – Read Functions – read() , readline(), readlines()
Write Functions – write() , writelines()
2. Close the File – close() Function
3. Remove the file – os.remove() #Function of OS Module
4. Rename the file–os.rename("oldname", "newname") #Function of OS Module

open() function

syntax: open(filename, mode). If mode not specified, default mode is 'r' i.e., read text file

Modes Description

1. **r,rb** Read only
2. **r+, rb+** Read and write
3. **w,wb** Write only
4. **w+, wb+** Write and Read.
5. **a,ab** Append.
6. **a+, ab+** Append and read.

b stands for binary file, otherwise opens in text mode

r In all r modes file must exist prior to open otherwise error is thrown. File pointer is placed at beginning.

w In all w modes, if file exists then it is removed and it always creates a blank file. File pointer placed at beginning

a In all a modes, if file exists then newly added data is added at the end. If file does not exist then a new file is created.

Reading from a file

There are three ways to read data from a text file.

read() : Returns the read bytes in form of a string. Reads n bytes, if no n specified, reads the entire file.

File_object.read([n])

readline() : Reads a line of the file and returns in form of a string. For specified n, reads at most n bytes. However, does not reads more than one line, even if n exceeds the length of the line.

File_object.readline([n])

readlines() : Reads all the lines and return them list in which each line as a string element

File_object.readlines()

Writing onto text files:

write() function

The write() function will write the content in the file without adding any extra characters.

file_name.write(content)

writelines() function

This function writes the content of a list to a file.

file_name.writelines(list_of_lines)

Setting Offsets in a File

If we want to access data in a random fashion, then Python gives us seek() and tell() functions to do so

The tell() method: This function returns an integer that specifies the current position of the file object in the file. E.g., A=file_object.tell()

The seek() method: This method is used to position the file object at a particular position in a file. The syntax of seek() is: file_object.seek(offset ,[reference_point])

In the above syntax, offset is the number of bytes by which the file object is to be moved. reference_point indicates the starting position of the file object. That is, with reference to which position, the offset has to be counted. It can have any of the following values:

- 0 - beginning of the file
- 1 - current position of the file
- 2 - end of file

By default, the value of reference_point is 0, i.e. the offset is counted from the beginning of the file. For example, the statement fileObject.seek(5,0) will position the file object at 5th byte position from the beginning of the file.

SAMPLE PROGRAMS

1. Write a program to write roll no and name to xiib.txt

```
f=open("xiib.txt","w")
while (input("enter ur choice")== 'y'):
    a=int(input("enter roll no"))
    n=input("enter name")
    f.write(str(a))
    f.write(n)
    f.write('\n')
f.close()
```

2. Write read contents from story.txt and count no: of independent words "to" in the file

```

f=open("story.txt","r")
s=f.read()
l=s.split()
c=0
for i in s:
    if i=="to":
        c+=1
f.close()
print(c)

```

3. _____ is the return type of readline()

Ans: string

PRACTICE QUESTIONS (TEXT FILES)

1. Write a program to read contents from the text file story.txt and count no:of vowels in it
2. Write a program to read contents from the text file myfile.txt and find average word count
3. Write a program to read contents from the text file library.txt and count "is" as independent word
4. Write a program to read contents from the text file diary.txt and count number of lines with Starting letter "T" or "M"
5. Write a program to read contents from the text file mydiary.txt and count number of lines with ending letter "r"

MULTIPLE CHOICE QUESTIONS

1	<p>If a text file is opened in w+ mode, then what is the initial position of file pointer/cursor?</p> <ol style="list-style-type: none"> a. Beginning of file b. End of the file c. Beginning of the last line of text file d. Undetermined
2	<p>Which of the following statements are true?</p> <ol style="list-style-type: none"> a. When you open a file for reading, if the file does not exist, an error occurs b. When you open a file for writing, if the file does not exist, a new file is created c. When you open a file for writing, if the file exists, the existing file is overwritten with the new file d. All of the mentioned
3	<p>To read the entire remaining contents of the file as a string from a file object myfile, we use</p> <ol style="list-style-type: none"> a. myfile.read(2) b. myfile.read() c. myfile.readline() d. myfile.readlines()
4	<p>A text file is opened using the statement f = open('story.txt'). The file has a total of 10 lines.</p> <p>Which of the following options will be true if statement 1 and statement 2 are executed in order.</p> <p>Statement 1: L1 = f.readline()</p> <p>Statement 2: L2 = f.readlines()</p> <ol style="list-style-type: none"> a. L1 will be a list with one element and L2 will be list with 9 elements. b. L1 will be a string and L2 will be a list with 10 elements.

	<p>c. L1 will be a string and L2 will be a list with 9 elements.</p> <p>d. L1 will be a list with 10 elements and L2 will be an empty list.</p>
5	<p>Which function of a file object can be used to fetch the current cursor position in terms of number of bytes from beginning of file?</p> <p>a. seek()</p> <p>b. bytes()</p> <p>c. tell()</p> <p>d. fetch()</p>
6.	<p>The contents of a text file named 'quote.txt' is as shown below</p> <p>All the kings horses and all the kings men cannot fix what isn't broken.</p> <p>What will be the output of the following code?</p> <pre> fin = open('fracture.txt') data = fin.read(10) print(data[0:3], end= '') data = fin.readline(5) print(data[0:3] , end= '') fin.seek(0) data = fin.read(4) print(data[0:3] , end= '') </pre> <p>a. AllngsAll</p> <p>b. AllcanAll</p> <p>c. Allcancan</p> <p>d. Allngscan</p>
7	<p>What will be the most correct option for possible output of the following code, given that the code executes without any error.</p> <pre> f = open('cricket.txt') data = f.read(150) print(len(data)) </pre> <p>a. It will always be 150</p> <p>b. 151</p> <p>c. More than or equal to 150</p> <p>d. Less than or equal to 150</p>
8.	<p>For the following python code, what will be the datatype of variables x, y, z given that the code runs without any error?</p> <pre> f = open('story.txt') x = f.read(1) y = f.readline() z = f.readlines() </pre> <p>a. string, list, list</p> <p>b. None, list, list</p> <p>c. string, string, list</p> <p>d. string, string, string</p>
	ANSWERS:
	1. a. Beginning of file

- | | |
|----|---|
| 2. | d. All of the mentioned |
| 3. | b. myfile.read() |
| 4. | c. L1 will be a string and L2 will be a list with 9 elements. |
| 5. | c. tell() |
| 6. | a. AllngsAll |
| 7. | d. Less than or equal to 150 |
| 8. | c. string, string, list |

VERY SHORT ANSWER TYPE QUESTIONS

1. **Differentiate between file modes r+ and w+ with respect to python?**

Ans: r+ opens a text file for reading and writing.

w+ opens a text file for reading and writing. It overwrites the file if it exists, create a file if it doesn't.

2. **Write a statement in Python to open a text file "ABC.TXT" in reading mode.**

Ans: F=open("ABC.TXT","r")

3. **In _____ files each line terminates with EOL or '\n' or carriage return, or '\r\n'.**

Ans: Text File

4. **Observe the following code and answer the questions that follow.**

```
File=open("MyData","a")
_____ #Blank1
File.close()
```

a) What type (text/binary) of file is MyData ?

b) Fill the Blank1 with statement to write "ABC" in the file "Mydata"

Ans: a) Text File

c) File.write("ABC")

5. **What are files?**

Ans: A named entity, usually stored on a hard drive that contains a stream of characters are called files.

2 SHORT ANSWER TYPE QUESTIONS

1. **Explain seek() method in python.**

In Python, seek() function is used to change the position of the File Handle to a given specific position.

Syntax: fi.seek(offset, from_where), where fi is the file pointer

Offset: This is used for defining the number of positions to move forward.

from_where: This is used for defining the point of reference. It can take

0: beginning of the file. **1:** current position of the file. **2:** end of the file.

2. **Write a function in Python that counts the number of "the" or "this" words present in a text file "myfile.txt".**

Example: If the "myfile.txt" contents are as follows:

This is my first class on Computer Science. File handling is the easiest topic for me and Computer Networking is the most interesting one.

The output of the function should be: Count of the/this in file: 3

Answer:

```

def displayTheThis():
    num=0
    f=open("myfile.txt","r")
    N=f.read()
    M=N.split()
    for x in M:
        if x=="the" or x== "this":
            print(x)
            num=num+1
    f.close()
    print("Count of the/this in file:",num)

```

3. Write a function `countVowels()` in Python, which should read each character of a text file “myfile.txt”, count the number of vowels and display the count.

Example: If the “myfile.txt” contents are as follows:

This is my first class on Computer Science.

The output of the function should be: Count of vowels in file: 10

Answer:

```

def countVowels():
    fobj = open("myfile.txt")
    data = fobj.read()
    count = 0
    vowels=['a','e','I','o','u']
    for ch in data:
        if ch in vowels:
            count +=1
    print("Count of vowels in file:", count)

```

4. Write a Python program to count all the line having 'a' as last character.

Answer:

```

count =0
f=open('fracture.txt','r')
data=f.readlines()
for line in data:
    if line[-2] == 'a':
        count=count+1
print("Number of lines having 'a' as last character is/are : " ,count)
f.close()

```

Binary file: A binary file is a file whose content is in a binary format consisting of a series of sequential bytes, each of which is eight bits in length.

Opening a Binary file in Python

Syntax: file_object= open (file_name, access_mode)

Example: myObject=open(“myfile.txt”, “ab+”)

Pickling: The process of converting the structure (lists and dictionary etc.) into a byte stream just before writing to the file. This is also called as object serialization. It converts a Python object (list, dictionary, etc.) into a character stream.

Unpickling: A reverse of pickling process where information from byte stream gets converted into object structure.

Pickle module: Python pickle module is used for serializing and de-serializing a Python object structure. Any object in Python can be pickled so that it can be saved on disk.

First, we need to import the module.

```
import pickle
```

It provides two main methods for the purpose- dump and load.

1. **pickle.dump():** This function is used to pickle the data object into byte stream and stores it in the binary file.
2. **Pickle.load() :** This function reads pickled objects from a file, whereas loads() deserializes them from a bytes-like object.

Example1: #writing a binary file

```
import pickle
f=open('datafile.dat','wb')
x=[1,2,3,4,5]
pickle.dump(x,f)
f.close()
```

Example2: #reading a binary file

```
import pickle
f=open('datafile.dat','rb')
L=pickle.load(f)
f.close()
print(L)
```

Output:

```
[1,2,3,4,5]
```

Example3: Write/Append data in Binary File using dictionary

```
def bf_append():
    f = open("sports.dat","ab")
    print("Append Data")
    pcode = int(input("Enter the Player code:"))
    pname = input("Enter Player Name:")
    score = int(input("Enter individual score:"))
    rank = int(input("Enter Player Rank:"))
    rec={'Pcode':pcode,'Pname':pname,'Score':score,'Rank':rank}
    pickle.dump(rec,f)
    f.close()
bf_append()
```

Example4: Search for record in binary file using dictionary

```
def bf_search():
```

```

f = open("Sports.dat","rb")
pc = int(input("Player to code to search:"))
flag=False
while True:
    try:
        rec= pickle.load(f)
        if rec['Pcode']==pc:
            print("Player Name:",rec['Pname'])
            print("Individual Score:",rec['Score'])
            print("Rank:",rec['Rank'])
            flag = True
        except Exception:
            f.close()
    if flag==False:
        print("Record not found...")
    f.close()
bf_search()

```

Example5: Update a record in binary file using dictionary

```

def bf_update():
    f = open('student.dat','rb')
    reclst = []
    while True:
        try:
            rec = pickle.load(f)
            reclst.append(rec)
        except EOFError:
            break
    f.close()
pc=int(input("Enter player code to update:"))
pn=input("Enter new name:")
ps=int(input("Enter Player Score:"))
pr=int(input("Enter Player Rank:"))
for i in range (len(reclst)):
    if reclst[i]['Pcode']==pc:
        reclst[i]['Pname'] = pn
        reclst[i]['Score'] = ps
        reclst[i]['Rank'] = pr
f = open('sports.dat','wb')
for i in reclst:
    pickle.dump(i,f)
f.close()
bf_update()

```

Question and Answers (Binary Files)

1. Which functions is used to close a file in python?

- (A) close (B) cloose() (C) Close() (D) close()

Ans: (D) close()

3. Which of the following python statement will bring the read pointer to 10th character from the end of a file containing 100 characters, opened for reading in binary mode.

- a) File.seek(10,0) b) File.seek(-10,2) c) File.seek(-10,1) d) File.seek(10,2)

Ans: File.seek(-10,2)

4. Which of the file opening mode will open the file for reading and writing in binary mode.

- a) rb b) rb+ c) wb d) a+

Ans: b) rb+

5. ASSERTION AND REASONING based questions.

Mark 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
(d) A is false but R is True

Assertion (A): A binary file in python is used to store collection objects like lists and dictionaries that can be later retrieved in their original form using pickle module.

Reasoning (A): A binary files are just like normal text files and can be read using a text editor like notepad.

Ans: A is True and R is False

6. A binary file data.dat needs to be created with following data written it in the form of Dictionaries.

Rollno	Name	Age
1001	TOM	17
1002	BOB	16
1003	KAY	16

Write the following functions in python accommodate the data and manipulate it.

- a) A function insert() that creates the data.dat file in your system and writes the three dictionaries.
b) b) A function read() that reads the data from the binary file and displays the dictionaries whose age is 16.

Ans: a)import pickle

def insert():

```
d1 = {'Rollno':1001, 'Name':'TOM', 'Age':17}
```

```
d2 = {'Rollno':1002, 'Name':'BOB', 'Age':16}
```

```
d3 = {'Rollno':1003, 'Name':'KAY', 'Age':16}
```

```
f = open("data.dat", "wb")
```

```
pickle.dump(d1,f)
```

```
pickle.dump(d2,f)
```

```

        pickle.dump(d3,f)
        f.close()
b)
def read():
    f = open("data.dat", "rb")
    while True:
        try:
            d = pickle.load(f)
            if d['Age']==16:
                print(d)
        except EOFError:
            break
    f.close()

```

7. Which of the following mode will refer to binary data?

- (a)r (b) w (c) + (d) b

Ans: (d) b

8. Which file mode can be used to open a binary file in both append and read mode?

- a) w+ b) wb+ c) ab+ d) a+

Ans: (c) ab+

9. Sheela is a Python programmer. She has written a code and created a binary file “book.dat” that has structure [BookNo, Book_Name, Author, Price]. The following user defined function CreateFile() is created to take input data for a record and add to book.dat and another user defined function CountRec(Author) which accepts the Author name as parameter and count and return number of books by the given Author. As a Python expert, help her to complete the following code based on

the requirement given above:

```

import _____ #statement1
def createFile():
    fobj = open("book.dat", "_____") #statement2
    BookNo = int(input("Book number:"))
    Book_Name = input("Book Name:")
    Author = input("Author:")
    Price = int(input("Price:"))
    rec = [BookNo, Book_Name, Author, Price]
    pickle._____ #statement3
    fobj.close()
def Count_Rec(Author):
    fobj = open("book.dat", "rb")
    num = 0
    try:
        while True:
            rec = pickle._____ #statement4

```

```

        if Author == rec[2]:
            num=num+1
    except:
    fobj.close()
    return num

```

- (i) Which module should be imported in the program? (Statement 1)
- (ii) Write the correct statement required to open a file named book.dat.(Statement 2)
- (iii) Which statement should be filled in Statement 3 to write the data into the binary file, book.dat?
- (iv) Statement 4 to read the data from the file, book.dat?

Ans:

- (i) pickle
- (ii) ab
- (iii) dump(rec, fobj)
- (iv) load(fobj)

10. Mr. Deepak is a Python programmer. He has written a code and created a binary file “MyFile.dat” with empid, ename and salary. The file contains 15 records. He now has to update a record based on the employee id entered by the user and update the salary. The updated record is then to be written in the file “temp.dat”. The records which are not to be updated also have to be written to the file “temp.dat”. If the employee id is not found, an appropriate message should be displayed. As a Python expert, help him to complete the following code based on the requirement given above:

```

import _____ #Statement 1
def update_rec():
    rec={}
    fin=open("MyFile.dat","rb")
    fout=open("_____") #Statement 2
    found=False
    eid=int(input("Enter employee id to update salary : "))
    while True:
        try:
            rec=_____ #Statement 3
            if rec["empid"]==eid:
                found=True
                rec["salary"]=int(input("Enter new salary : "))
                pickle._____ #Statement 4
            else:
                pickle.dump(rec,fout)
        except:
            break
    if found==True:
        print("The salary of employee id ",eid," has been updated.")
    else:
        print("No employee with such id is not found")

```

```
fin.close()
fout.close()
```

- (i) Which module should be imported in the program? (Statement 1)
(ii) Write the correct statement required to open a temporary file named temp.dat.(Statement 2)
(iii) Which statement should Deepak fill in Statement 3 to read the data from the binary file, record.dat and in Statement 4 to write the updated data in the file, temp.dat?

Ans: (i) Ans: pickle
(ii) fout=open('temp.dat', 'wb')
(iii) Statement 3: pickle.load(fin)
iv)Statement 4: pickle.dump(rec,fout)

CSV FILE: A Comma Separated Values (CSV) file is a plain text file that contains the comma-separated data. These files are often used for exchanging data between different applications.

CSV File Structure sample

```
Name, DOB, City
Ram, 12-Jul-2001, Delhi
Mohan, 23-Jan-2005, Delhi
```

Python CSV Module: To work with CSV Files, programmer has to import CSV Module.
import csv

Methods of CSV Module :

- writer() – returns writer object used for writing rows of data to csv file
- reader() – returns reader object used for reading rows of data from csv file

writer() Object Methods : The writer object has two functions that can be used:

- w_obj . writerow(<Sequence>) : Write a Single Line/row
- w_obj . writerows (<Nested Sequence>) : Write Multiple Lines/rows

Example:-

```
## writerow()

import csv
row=['Nikhil', 'CEO', '2', '9.0']
f=open("myfile.csv", 'w')
w_obj = csv.writer(f)
w_obj.writerow(row)
f.close()

## writerows()

import csv
rows = [['Nikhil','CEO','2','9.0'],
        ['Sanchit','CEO','2','9.1']]
f=open("myfile.csv",'w')
```

```
w_obj = csv.writer(f)
w_obj.writerows(rows)
f.close()
```

reader() Methods: This function returns a reader object which is used to iterate over lines of a given CSV file. Each iteration over the reader object returns a list of strings

```
r_obj = csv.reader(csvfile_obj)
```

Example: reading a csv file:

```
import csv
f=open("myfile.csv",'r')
r_obj = csv.reader(f)
for data in r_obj:
    print(data)
f.close()
```

SAMPLE QUESTIONS (CSV Files)

1. Write a program to read entire data from file data.csv

<pre>import csv f=open("data.csv", 'r') d=csv.reader(f) for row in d: print(row)</pre>	<p>OUTPUT:</p> <pre>['Admno', 'Name', 'Class', 'Sec', 'Marks'] ['1231', 'Amit', 'XII', 'A', '45'] ['1224', 'Anil', 'XII', 'B', '49'] ['1765', 'Suman', 'XI', 'A', '42'] ['2132', 'Naman', 'XII', 'C', '38']</pre>
--	---

2. Write a program to add/insert records in file “data.csv”. Structure of a record is roll number, name and class.

```
import csv
field = ["Roll no" , "Name" , "Class"]
f = open("data.csv" , 'w')
d=csv.writer(f)
d.writerow(field)
rn=int(input("Enter Roll number: "))
nm = input("Enter name: ")
cls = input("Enter Class: ")
rec=[rn,nm,cls]
d.writerow(rec)
f.close()
```

Multiple Choice Questions:

1. CSV stands for :
 - a. Comma Separated Values
 - b. Comma Separated Variables
 - c. Comma Stored Values
 - d. Comma Stored Variables
2. The separator character of CSV Files is called a
 - a. EOL
 - b. Delimiter
 - c. EOF
 - d. Default
3. The default delimiter for a CSV file is :
 - a. Semi colon
 - b. Colon
 - c. Comma
 - d. Hyphen
4. _____ module of Python provides the functionality to read and write tabular data in CSV file.
 - a. pickle
 - b. csv
 - c. file
 - d. ccv
5. Which function is used to open a csv file ?
 - a. Open()
 - b. csv.open()
 - c. writer()
 - d. csv.writer()
7. Which among the following is not a function of csv module?
 - a. reader()
 - b. read()
 - c. writer()
 - d. writerows()
8. In Python, default newline character is :
 - a. \f
 - b. \t
 - c. \n
 - d. \v
9. CSV module allows to write multiple rows using function.
 - a. writerows()
 - b. writerow()
 - c. writer()
 - d. None of the above
10. The opening function of a csv file is similar to the opening of:
 - a. Binary file
 - b. Text File

- c. Both of them
- d. None of them

11. The _____ argument of open function is to specify how Python handle the newline characters in csv file

- a. newline
- b. line
- c. mode
- d. char

12. Which among the following is an iterable object?

- a. writer
- b. file
- c. reader
- d. All of the above

13. To specify a different delimiter while writing into a csv file, argument is used with writer object:

- a. newline
- b. separator
- c. character
- d. delimiter

14. Which mode opens the file for exclusive creation, which fails in the case where file already exists

- a. a
- b. w
- c. x
- d. r

15. The file mode to open a CSV file for reading as well as writing is _____.

- a. a+
- b. w+
- c. r+
- d. All the above.

16. Identify the line number which may cause an error:

```
import csv #Line1
line=[[1,2,3],[4,5,6]]#Line 2
with open("sample.csv","w",newline="") as csvfile: #Line3
    writer=csv.writer(csvfile,delimiter="|") #Line4
    for line in writer: #Line5
        writer.writerow(line)
```

- a. Line1
- b. Line2
- c. Line 4
- d. Line

17. The CSV files are files.

- a. Plain text file
- b. Binary
- c. Data
- d. Python

18. The writer () function has how many mandatory parameters?

- a. 1
- b. 2
- c. 3
- d. 4

19. Which of the following parameter needs to be added with open function to avoid blank row followed by each record in the CSV file?

- a. quotechar

- b. quoting
- c. newline
- d. skiprow

20. Ajaikrishna wants to separate the values by a \$ sign. Suggests him a pair of function and parameter to use it.

- a. open, quotechar
- b. writer, quotechar
- c. open, delimiter
- d. writer, delimiter

21. Tejalakshmi of Class 12 have written the below code. Observe and fill in the given blanks so that it opens the file “data.csv” and read and print all the records.

```
import csv
with _____ as f: #1
    r = _____(f) #2
    for row in _____ : #3

    print(_____) #4
```

I. What must be filled in line 1?

- a. Open(“data.csv”,”r”)
- b. open(“data.csv”)
- c. “data.csv”
- d. File

II. What must be filled in Line 2?

- a. csv.reader()
- b. csv.read()
- c. csv.write()
- d. csv.writer()

III. What must be filled in line 3?

- a. data.csv
- b. f
- c. r
- d. None

IV. What must be filled in line 4?

- a. data
- b. f
- c. “File”
- d. row

V. What is the default data type of data read from this file?

- a. List
- b. String
- c. Tuple
- d. Integer

22. Sudev, a student of class 12th, is learning CSV File Module in Python. During examination, he has been assigned an incomplete python code to create a CSV file ‘customer.csv’. Help him in completing the code which creates the desired CSV file.

Cus_No	Name	Ph_No
11	Rohit	8567843243
12	Sonal	9645342345

```

_____csv #Statement 1
def Create_CSV():
    fw=open("customer.csv","w")
    _____=csv.writer(fw) #Statement2
    csvwriter.writerow(["Cus_No","Name","Ph_No"])
    n=int(input("Enter total number of Customer"))
    for i in range(n):
        cusno=int(input("Enter Customer no.))
        Name=input("EnterName")
        Ph_No=int(input("EnterPhone No.))
        Rec=[cusno,Name,Ph_No]
        csvwriter.writerow(_____) #Statement 3
    fw.close()

def Display_CSV():
    fr=open(_____, "r") #Statement 4
    cusreader=csv.reader(fr)
    i=0
    for _____ in cusreader: #Statement 5if
        i%2==0:
            print(rec[0],'\t',rec[1],'\t',rec[2])
        else:
            pass
        i+=1
    fr.close()

Create_CSV()
Display_CSV()

```

- I. Identify suitable code for the blank space in line marked as Statement-1.
 - a) include
 - b) add
 - c) Import
 - d) import

- II. Identify the missing code for the blank space in line marked as Statement-2.
 - a) Customer

- b) reader
- c) csvwriter
- d) writer

III. Identify the argument name for the blank space in line marked as Statement-3?

- a) Row
- b) Rec
- c) row
- d) rec

IV. Identify the missing file name for the blank space in line marked as Statement-4?

- a) customer
- b) customer.csv
- c) customer.txt
- d) customer.dat

V. Identify the object name for the blank space in line marked as Statement-5?

- a) i
- b) Rec
- c) row
- d) rec

23. Daya of class 12 is writing a program to create a CSV file “empdata.csv” with empid, name & mobile number. Also, to search a particular empid and display its record details. He has written the following code. As a programmer, help him to successfully execute the given task.

```
import _____ #Line1
fields=['empid','name','mobile_no']
rows=[['101','Rohit','8982345659'],['102','Shaurya','8974564589']]
filename="empdata.csv"
f=open(filename,'w',newline=")
csv_w= _____ #Line2
```

```

for row in rows:
    csv_w._____#Line3
f.close()
f=open(filename,'r')
csv_r=_____#Line4
ans='y'
while ans=='y':
    found=False
    emplid=input("Enter employee id to search=")
    for row in csv_r:
        if len(row)!=0:
            print(row[0])
            if_____==emplid: #Line5
                print("Name : ",row[1])
                print("Mobile No : ",row[2])
                found=True
                break
    if not found:
        print("Employee id not found")
    ans=input("Do you want to search more? (y)")

```

I. Choose the module he should import in Line1.

- a) math b) pickle c) csv d) random

II. Choose a code to write the column heading from fields list in Line2.

- a) writerows(fields) b) writerow(field)
c) writerow(fields) d) writerows(fields)

III. Choose a code to write the row from rows list in Line3.

- a) writerows(row) b) writerow(row)
c) writerow(rows) d) write_row(row)

IV. Choose a code for line 4 to read the data from a csv file.

- a) csv.reader(f) b) csv.read(f) d) pickle.load(f) e)f.read()

V. Choose the correct variable (list value) to check “emplid” in Line5

- a) Row[0]
b) Rec[0]
c) row[0]
d) rec[0]

25. Rinsha of class 12 is writing a program to create a CSV file “user.csv” which will contain user name and password for some entries. She has written the following code. As a programmer, help her to successfully execute the given task.

```

import _____ # Line 1

def addCsvFile (UserName, PassWord): # to write / add data into the CSV file

    f = open ('user.csv', ' _____ ') # Line 2
    newFileWriter = csv . writer ( f )
    newFileWriter . writerow ( [ UserName, PassWord])
    f . close ( )

# csv file reading code
def readCsvFile ( ):
    with open ('user.csv', 'r') as newFile:
        newFileReader = csv . _____ (newFile) #Line3
        for row in newFileReader :
            print (row[0], row [1])
            newFile . _____ # Line 4

addCsvFile ("Biplab", "123@456")
addCsvFile("Arunima", "aru@nima")
addCsvFile("Poonam", myname@FRD")
readCsvFile ( ) # Line 5

```

I. Name the module she should import in Line 1.

- a. CSV b. csv c. math d. File

II. In which mode, Rinsha should open the file to add data into the file.

- a. r b. a c. w d. w+

III. Fill in the blank in Line 3 to read the data from a csv file.

- a. writer()
b. reader()
c. write()
d. read()

IV. Fill in the blank in Line 4 to close the file.

- a. End() b. Close() c. close() d. end()

ANSWERS

QNO	OPT	QNO	OPT	QNO	OPT	QNO	OPT
1	A			11	a	16	d
2	B	7	b	12	c	17	a
3	C	8	c	13	d	18	a
4	B	9	a	14	c	19	c
5	B	10	b	15	d	20	d

QNO		OPT	QNO		OPT	QNO		OPT
21	I	b	22	I	d	23	I	c
	II	a		II	c		II	c
	III	c		III	b		III	b
	IV	d		IV	b		IV	a
	V	b		V	d		V	c

QNO		OPT
25	I	b
	II	b
	III	b
	IV	c

28. Vedansh is a Python programmer working in a school. For the Annual Sports Event, he has created a csv file named Result.csv, to store the results of students in different sports events. The structure of Result.csv is : [St_Id, St_Name, Game_Name, Result]

Where

St_Id is Student ID (integer)

ST_name is Student Name (string)

Game_Name is name of game in which student is participating(string)

Result is result of the game whose value can be either 'Won', 'Lost' or 'Tie'

For efficiently maintaining data of the event, Vedansh wants to write the following user defined functions:

Accept() – to accept a record from the user and add it to the file Result.csv. The column headings should also be added on top of the csv file.

wonCount() – to count the number of students who have won any event.

As a Python expert, help him complete the task.

ANSWER:

```
def Accept():
    sid=int(input("Enter Student ID "))
    sname=input("Enter Student Name")
    game=input("Enter name of game")
    res=input("Enter Result")
    headings=["Student ID","Student Name","Game Name","Result"]
    data=[sid, sname, game, res]
    f=open("Result.csv", "a", newline="")
    csvwriter=csv.writer(f)
    csvwriter.writerow(headings)
    csvwriter.writerow(data)
    f.close()

def wonCount():
    f=open("Result.csv","r")
    csvreader=csv.reader(f,delimiter=",")
    head=list(csvreader)
    print(head[0])
    for x in head:
        if x[3]=="WON":
            print (x)
    f.close()
```

29. Kiran is a Python programmer working in a shop. For the employee's tax collection, he has created a csv file named protax.csv, to store the details of professional tax paid by the employees. The structure of protax.csv is : [empid, ename, designation, taxpaid]

Where,

empid is employee id (integer)

ename is employee name (string)

designation is employee designation(string)

taxpaid is the amount of professional tax paid by the employee(string)

For efficiently maintaining data of the tax, Kiran wants to write the following user defined functions:

Collection() – to accept a record from the employee and add it to the file protax.csv.

Totaltax() – to calculate and return the total tax collected from all the employees.

As a Python expert, help him complete the task.

ANSWER:

```
def Accept():
    empid=int(input("Enter Employee ID "))
    ename=input("Enter Employee Name")
    designation=input("Enter the Designation")
    taxpaid=input("Enter the tax amount")
    data=[empid, ename, designation, taxpaid]
    f=open("protax.csv", "a", newline="")
```



```
csvwriter=csv.writer(f)
csvwriter.writerow(data)
f.close()
```

```
def Totaltax():
    f=open("protax.csv","r")
    csvreader=csv.reader(f,delimiter=",")
    content=list(csvreader)
    total=0
    for row in content:
        total+=int(row[3])
    f.close()
    return total
```

30. Arun of class 12 was writing a program to read the CSV file “mydata.csv” which will contain user name and password for some entries. As a programmer, help him to write the following user defined functions:

adddata() – to add a new entry to the file “mydata.csv.

display() – to display the content of the file “mydata.csv”.

ANSWER:

```
def adddata():
    userid=input("Enter Username:")
    passwd=input("Enter th password: ")
    entry=[userid,passwd]
    f=open("mydata.csv", "a", newline="")
    csvwriter=csv.writer(f)
    csvwriter.writerow(entry)
    f.close()
```

```
def display():
    f=open("mydata.csv","r")
    csvreader=csv.reader(f,delimiter=",")
    content=list(csvreader)
    for rec in content:
        print(rec)
    f.close()
```

DATA STRUCTURE

Data Structure: Data structures deal with how the data is organized and held in the memory.

Stack: Stack is a data structure in which insertion and deletion can take place only at one end according to the Last-In-First-Out (LIFO) concept.

Applications of Stack

1. Reversing a word/line: This can be accomplished by pushing each character on to a stack as it is read. When the line is finished, characters are popped off the stack and they will come off in the reverse order.
2. The compilers use stacks to store the previous state of a program when a function is called during recursion.
3. Backtracking is a form of recursion. But it involves choosing only one option out of possibilities. Used in solving Puzzle Sudoku.
4. Undo mechanism in Text editors by keeping all the text changes in a stack.

Implementation of stack – menu oriented program

1. Write the Python Code to implement stack.

```
L = []
def PUSH():
    N = int(input("Enter the Number:"))
    L.append(N)

def POP():
    if L == []:
        print("List is Empty - UNDERFLOW")
    else:
        N = L.pop()
        print("The Element Deleted in Stack is :", N)

def DISPALL():
    if L == []:
        print("List is Empty")
    else:
        print("List in LIFO ORDER:")
        for i in range(len(L)-1, -1, -1):
            print(L[i], end='<--')

while True:
    print("\n\n\tMENU:")
    print("\t----")
    print("1. PUSH")
```

```

print("2. POP")
print("3. DISPLAY ALL")
print("4. EXIT")
ch= int(input("Enter the Choice:"))
if ch == 1:
    PUSH()
elif ch == 2:
    POP()
elif ch == 3:
    DISPALL()
elif ch == 4:
    break
else:
    print("Give correct choice")

```

QUESTIONS – BASED ON CBSE PATTERN

1	<p>A list, NList contains following record as list elements: [City, Country, distance from Delhi] Each of these records are nested together to form a nested list. Write the following user defined functions in Python to perform the specified operations on the stack named travel.</p> <p>(i) Push_element(NList): It takes the nested list as an argument and pushes a list object containing name of the city and country, which are not in India and distance is less than 3500 km from Delhi.</p> <p>(ii) Pop_element(): It pops the objects from the stack and displays them. Also, the function should display “Stack Empty” when there are no elements in the stack.</p> <p>For example: If the nested list contains the following data: NList=[["New York", "U.S.A.", 11734], ["Naypyidaw", "Myanmar", 3219], ["Dubai", "UAE", 2194], ["London", "England", 6693], ["Gangtok", "India", 1580], ["Columbo", "Sri Lanka", 3405]]</p> <p>The stack should contain: ['Naypyidaw', 'Myanmar'], ['Dubai', 'UAE'], ['Columbo', 'Sri Lanka']</p> <p>The output should be: ['Columbo', 'Sri Lanka'] ['Dubai', 'UAE'] ['Naypyidaw', 'Myanmar'] Stack Empty</p>	3
---	--	---

A n s	<pre> travel = [] def Push_element(NList): for L in NList: if L[1] != "India" and L[2]<3500: travel.append([L[0],L[1]]) def Pop_element(): while len(travel): print(travel.pop()) else: print("Stack Empty") </pre>	
2.	A stack S contains Name of countries. Write a function POP(A), to remove Name from stack. Function should handle underflow condition and should return removed element.	3
A n s	<pre> def POP(A): if len(A) == 0: print("UNDERFLOW") else: val=A.pop() return val </pre>	
3.	Write a function PUSH(STACK,Name) to add new name to the STACK data structure . Also display all the names having at least 4 characters from the stack.	3
A n s	<pre> def PUSH(STACK,Name): STACK.append(Name) #code for displaying if len(STACK)==0: print("Empty stack") else: top=len(STACK)-1 for i in range(top,-1,-1): if len(STACK[i])>=4: print(STACK[i]) </pre>	
5.	<p>UNSOLVED EXERCISE:</p> <p>Coach Abhishek stores the races and participants in a dictionary. Write a program, with separate user defined functions to perform the following operations:</p> <ol style="list-style-type: none"> Push() Push the names of the participants of the dictionary onto a stack, where the distance is more than 100. PoP() Pop and display the content of the stack. 	3

	<p>For example:</p> <p>If the sample content of the dictionary is as follows: Races = { 100:'Varnika', 200 :'Jugal', 400:'Kushal', 800:'Minisha' }</p> <p>The output from the program should be: Minisha Kushal Jugal</p>	
--	---	--

SAMPLE QUESTIONS:

MCQ/Very Short Answer Type Questions(1-mark)

1. Which list method can be used to perform Push operation in a stack implemented by list?
 - a) append()
 - b) extend()
 - c) push()
 - d) insert()

2. Which list method can be used to perform Pop operation in a stack implemented by list?
 - a) pop()
 - b) pop(1)
 - c) remove()
 - d) pop(0)

6. What do you mean by Data Structure?
7. LIFO data structure is?
8. Can we have nested list?
9. Name one linear data structure.
10. Name one non-linear data structure.
11. Name the operation for insertion in a stack.
12. Name the operation for deletion from a stack.
13. Name the function to find length of a list.
14. Indexing in list starts from?

Short Answer Type Questions(2-marks)

1. How is Data Structure different from Data Type?
2. Define Stack and Queue
3. Name some operations commonly performed on data structures?
4. What is a list?
5. What is traversing? Write python code to traverse a list.
6. Name the methods used for inserting and deleting elements from a list.
7. Write some applications of stack.

Application based Short Answer Type Questions(2-marks)

8. Predict the output with respect to the list L=[40,20,30,10,50]
 - (a) print(L)
 - (b) print(len(L))
 - (c) L.pop() ; print(L)
 - (d) L.append(70); print(L)
 - (e) L.sort(); print(L)

9. Find the output:

- (a) `secondlist=[1,2,3,[4,5,[6,7,8],9],10,11]`
`print(len(secondlist))`
`L=[1, 2, 3, [4, 5, [6, 7, 8], 9],10, 11]`
- (b) `L[1]`
- (c) `L[3]`
- (d) `L[3][1]`
- (e) `L[3][2][0]`
- (f) `L[3][2]`
- (g) `L[3][2][1]`
- (h) `L[3][3]`

10. Predict the output:

- (a) `b=[[9,6],[4,5],[7,7]] X=b[:2]`
`X.append(10)`
`print(X)`
- (b) `b=[[9,6],[4,5],[7,7]] X=b[:2]`
`X[1].append(10)`
`print(X)`

11. Consider `STACK=['a','b','c','d']`. Write the `STACK` content after each operations:

- a) `STACK.pop()`
- b) `STACK.append('e')`
- c) `STACK.append('f')`
- d) `STACK.pop()`

12. Write a program to implement a stack for the students(studentno, name). Just implement Push.

13. Write a program to implement a stack for the students(studentno, name). Just implement Pop and display.

14. If `L=["Python", "is", "a", ["modern", "programming"], "language", "that", "we", "use"]`, then find the output:

- a) `L[0][0]`
- b) `L[3][0][2]`
- c) `L[3:4][0]`
- d) `L[3:4][0][1]`
- e) `L[3:4][0][1][3]`
- f) `L[0:9][0]`
- g) `L[0:9][0][3]`
- h) `L[3:4][1]`

15. What is the difference between `pop()` and `pop(0)`?

Long Answer Type Questions (3-marks)

1. Write a function in Python Push (nums), where **nums** is a list of numbers. From this list push all odd numbers into a stack implemented by using a list. Display the stack if it has at least one element, otherwise display appropriate error message.

2. Write a function in Python PUSH(pbook), where pbook is a dictionary of phone book (name and mobile numbers), from this dictionary push all phone numbers of persons whose name contains the letter 'a' in their names to a stack implemented by using list and also display the stack if it has at least one element, otherwise display "stack empty" message

```
>>>mydict={"Shyam":9999123123,"Veena:8888345345, "Minu":9999123123, "Tejas::  
7777678678}
```

```
>>> push(mydict)
```

Stack elements after push operation :

```
[9999123123, 7777678678]
```

3. Write a function in Python nameadd(L), where L is a list of names. The function should add all the names whose length is longer than 5 characters on to the stack. It should also display the stack if it has at least one element, otherwise display "stack empty" message.

For example: nameadd(['Shyamlal', 'Gopi', 'Anand', 'Mritunjay'])

The above function call should give output as: Stack is: ['Shyamlal', 'Mritunjay']

4. Write a function in Python PUSH(mydict), where mydict is a dictionary of phone book (name and mobile numbers), from this dictionary push only phone numbers having 10 digits into a stack implemented by using list . Display the stack if it has at least one element, otherwise display "stack empty" message.

```
>>>mydict={ 1234567890:"Shyam",94567892:"Ram",8657456789012:"Karun",  
9674123789:"Tharun" }
```

```
>>> push(mydict)
```

after push operation output : Stack is: [9674123789, 1234567890]

ANSWER KEY

1. MCQ/ Very Short Answer Type Questions(1-mark)

2. (a) append()

3. (a) pop()

6. Data Structure means organization of data. A data structure has well defined operations or behaviour.

7. STACK

8. Yes

9. Lists

10. Graphs

11. PUSH

- 12. pop
- 13. len()
- 14. 0

Short Answer Type Questions(2-marks)

1. Data Structure provides information regarding organization of data whereas Data Type provides information regarding the domain of values and operations that can be performed on data.
2. Stack – A stack is a linear list also known as LIFO list with the special property that items can be added or removed from only one end called the top.
Queue – A queue is a linear list also known as FIFO list with the special property that items can be added at one end and removed from the other.
3. Traversal, Insertion, Deletion, Searching, Sorting, Merging etc.
4. A list is a mutable sequence of data elements indexed by their position. A list is represented using [] . e.g L=[10,20,30]
5. Traversing means accessing or visiting or processing each element of any data structure.
L=[10,20,30,40,50]
for x in L:
 print(x)
6. Various methods for inserting elements in a list are - insert(), append(), extend() and methods used for deleting items from a list are – pop() , remove(), clear()
7. Reversing a string, compilers use stack to store previous state of program, undo mechanism in text editors and backtracking.

Application based Short Answer Type Questions(2-marks)

8. (a) Ans: [40, 20, 30, 10, 50]
(b) Ans: 5
(c) Ans:50
 [40, 20, 30, 10]
(d) Ans: [40, 20, 30, 10, 70]
(e) Ans: [10, 20, 30, 40, 70]
9. (a) Ans:6
(b) Ans: 2
(c) Ans:[4, 5, [6, 7, 8], 9]
(d) Ans:5
(e) Ans:6
(f) Ans: [6, 7, 8]
(g) Ans:7
(h) Ans:9
10. (a) Ans: [[9, 6], [4, 5], 10]
(b) Ans: [[9, 6], [4, 5, 10]]
11. Ans: ['a', 'b', 'c']
 Ans: ['a', 'b', 'c', 'e']
 Ans: ['a', 'b', 'c', 'e', 'f']

Ans: ['a', 'b', 'c', 'e']

12.

```
stk=[]
def PUSH():
    sno=int(input('Enter student number:'))
    sname=input('Enter student name:')
    s=[sno,sname]
    stk.append(s)
```

13.

```
stk=[]
def stkpop():
    if stk==[]:
        print('Stack empty')
    else:
        print('Element popped:', stk.pop())
```

```
def display():
    if stk==[]:
        print('Stack empty')
    else:
        print('Stack is:', stk[: :-1])
```

14. (a) Ans: 'P'
 (b) Ans: 'd'
 (c) Ans: ['modern', 'programming']
 (d) Ans: 'programming'
 (e) Ans: 'g'
 (f) Ans: 'Python'
 (g) Ans: 'h'
 (h) Ans: IndexError: list index out of range

15. Ans: pop() will delete the last element of a list whereas pop(0) will delete element at index zero of a list

Long Answer Type Questions (3-marks)

1.

```
stk=[]
def Push(nums):
    for i in nums:
        if i%2==1:
            stk.append(i)

    if stk==[]:
        print('stack is empty')
```

```
else:  
    print('stack is:', stk[: :-1])
```

2.

```
stk=[]  
def push(pbook):  
    for k in d:  
        if 'a' in k:  
            stk.append(d[k])  
  
    if stk==[]:  
        print('stack empty')  
    else:  
        print('stack is:', stk)
```

3.

```
stk=[]  
def nameadd(L):  
    for i in L:  
        if len(i)>5:  
            stk.append(i)  
  
    if stk==[]:  
        print('stack empty')  
    else:  
        print('stack is:', stk)
```

4.

```
stk=[]  
def push(mydict):  
    phonebook=list(mydict.keys())  
    for mob in phonebook:  
        if len(str(mob)) == 10:  
            stk.append(mob)  
    if stk==[]:  
        print('stack empty')  
    else:  
        print('stack is:', stk)
```

COMPUTER NETWORKS

A group of two or more similar things or people interconnected with each other is called network. Examples are social network and mobile network

Computer Network: A Computer network is an interconnection among two or more computers or computing devices. The advantages of computer networks are:

- Resource Sharing
- Collaborative Interaction
- Cost Saving
- Increased storage
- Time Saving

Evolution of Network:

(I) ARPANET (Advanced Research Project Agency Network)

- It came into existence in 1960s
- A project for interconnecting, US department of defense with academic and research organization across different places for scientific collaboration.

(II) NSFNET (National Science Foundation Networks)

- It came into existence in 1986
- It was the first large-scale implementation of Internet technologies in a complex environment of many independently operated networks

(III) INTRANET

- It is a local or restricted communication system
- It is managed by a person or organization.
- Intranet users can avail services from internet but Internet user cannot access intranet directly

(III) INTERNET

- It came into existence in 1960s
- It is known as Network of Networks
- A global computer network providing variety of information and communication facilities consisting of interconnected networks using standardized communication protocols.

DATA COMMUNICATION TERMINOLOGIES

DATA: Data means information in digital form such as text, audio, video which is stored processed and exchanged between digital devices like computer, mobile phones or laptop. Computers process the raw data into meaningful information. Information is processed data.

COMMUNICATION: The exchange of information between two or more networked or interconnected devices is called communication

COMPONENTS OF DATA COMMUNICATION

a) **SENDER:** Sender is a device which is capable of sending data over a communication network. In data communication Sender is also called Source.

b) RECEIVER: Receiver is a device which is capable of receiving data over a communication network. In data communication Receiver is also called Destination.

c) MESSAGE: message is the information being exchanged between a sender and a receiver over a communication network.

d) COMMUNICATION MEDIUM: Communication medium is the path or channel through which the information is moved from the sender to the receiver. A communication medium can be either wired/guided or wireless/unguided.

e) PROTOCOLS: The set of standard rules which are followed in data communication are known as Data Communication Protocols. All the communicating devices like sender receiver and other connected devices in the network should follow these protocols.

Why Protocols are needed?

The communicating devices may be in different geographical areas. The speed of these devices may be different. Also, the data transfer rates of different networks may be different. These complexities make it necessary to have a common set of rules to ensure the secure communication of data. Some commonly used Protocols in data communication are:

- Transmission Control Protocol (TCP)
- Internet Protocol (IP)
- File Transfer Protocol (FTP)
- Simple Mail Transport Protocol (SMTP)
- Hyper Text Transfer Protocol (HTTP)

MEASURING CAPACITY OF COMMUNICATION MEDIA

Capacity of a communication channel means the maximum quantity of signals that a communication channel can carry. The capacity of a communication medium is measured by its bandwidth and data transfer rate.

BANDWIDTH: Bandwidth is the difference between the highest and lowest frequencies a transmission media can carry. The unit of bandwidth is Hertz.

DATA TRANSFER RATES: Data transfer rate is the number of bits transmitted through a channel per unit of time. Data transfer rate is measured in bits per second (bps). It is also measured in Kilobits per second (Kbps), Megabits per second (Mbps) or Gigabits per second (Gbps).

IP ADDRESS: IP address or Internet Protocol address is a unique numeric address assigned to every device connected to a network. It uniquely identifies every node connected to a local network or internet. Example IP address: 24.171.248.170

SWITCHING TECHNIQUES

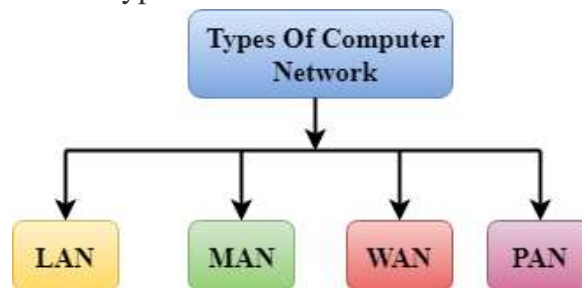
In large networks, there may be more than one paths for transmitting data from sender to receiver. The process of selecting a path of data out of the available paths is called switching. There are two popular switching techniques – circuit switching and packet switching.

1. Circuit Switching : In circuit switching, whenever a source end node wants to send a message to the destination end node a physical link is first established between the source and the destination. Then only the data transmission takes place. Example: telephone network

2. Packet Switching : In the packet switching technique, the whole message is split into small packets. Now, these packets are transmitted one by one from sender to the receiver through the intermediary switches in the network. The packets will take shortest path as possible.

Computer Network Types

A computer network can be categorized by their size, complexity and geographical spread. A computer network is mainly of four types:



- LAN (Local Area Network)
- PAN (Personal Area Network)
- MAN (Metropolitan Area Network)
- WAN (Wide Area Network)

PAN (Personal Area Network): Personal Area Network is a network of information technology devices (laptop, mobile phones, media player and play stations) arranged within the range of an individual person, typically within a range of 10 meters / covers an area of 30 feet.

LAN (Local Area Network): Local Area Network is a group of computers connected to each other in a small area such as a building, office through a communication medium such as twisted pair, coaxial cable, etc to share resources.

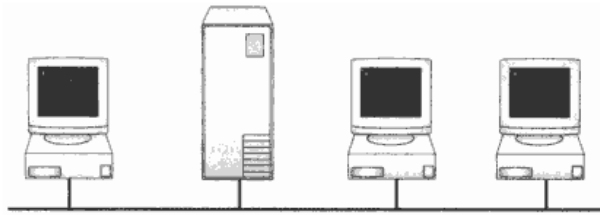
MAN (Metropolitan Area Network): A metropolitan area network is a network that covers a larger geographic area that is spread over an area as big as a city by interconnecting different LAN to form a larger network through a telephone exchange line.

WAN (Wide Area Network): A Wide Area Network is a network that extends over a large geographical area such as states or countries through a telephone line, fiber optic cable or satellite links. The internet is one of the biggest WAN in the world.

Networking Topologies

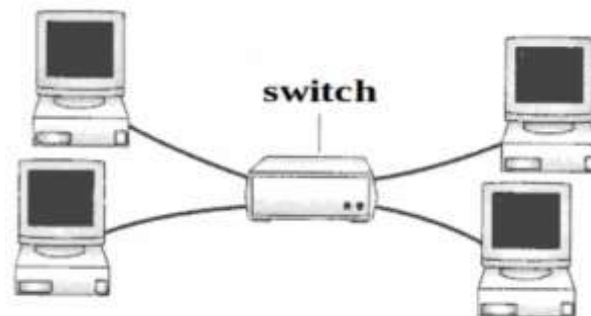
Bus

It uses a single cable, called a trunk or segment, along which all the computers of the network are connected



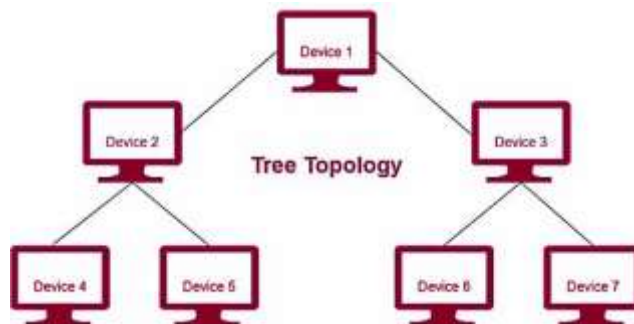
Star

All computers are connected using cable segments to a central component called a switch. The signals from the transmitting computer go through the switch to all the others.



Tree

Tree Topology is a topology which is having a tree structure in which all the computers are connected like the branches which are connected with the tree.



NETWORK PROTOCOL: A protocol means the rules that are applicable for a network. Protocols defines standardized formats for data packets, techniques for detecting and correcting errors etc.

TCP/IP (Transmission Control Protocol/ Internet Protocol)

- The IP protocol ensures that each computer or node connected to the Internet is assigned an IP address, which is used to identify each node independently.
- TCP ensures that the message or data is broken into smaller chunks, called IP packets. Each of these packets are routed (transmitted) through the Internet, along a path from one router to the next, until it reaches the specified destination. TCP guarantees the delivery of packets on the designated IP address. It is also responsible for ordering the packets so that they are delivered in sequence.

FTP (File Transfer Protocol): It is a standard internet protocol provided by TCP/IP used for transmitting the files from one host to another. It is mainly used for transferring the web page files from their creator to the computer that acts as a server for other computers on the internet. It is also used for downloading the files to computer from other servers.

SMTP (Simple Mail Transfer Protocol.): SMTP is a set of communication guidelines that allow software to transmit an electronic mail over the internet is called Simple Mail Transfer Protocol.

Point-to-Point Protocol (PPP) is protocol that is used to directly connect one computer system to another. Computers use PPP to communicate over the telephone network or the Internet.

Post Office Protocol version 3 (POP3) Protocol: (POP3) is a standard mail protocol used to receive emails from a remote server to a local email client. POP3 allows you to download email messages on your local computer and read them even when you are offline.

Telnet Telnet is a program that allows a user to log on to a remote computer. Telnet provides a connection to the remote computer in such a way that a local terminal appears to be at the remote side.

VoIP : VoIP stands for **Voice over Internet Protocol**. It is also referred to as IP telephony, internet telephony, or internet calling.

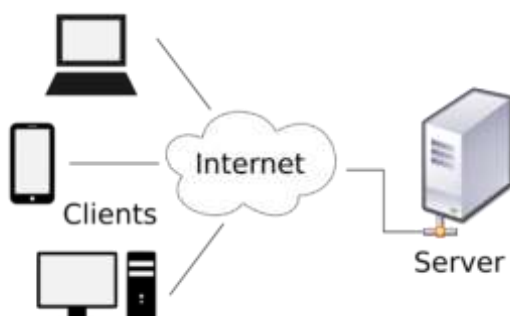
Web Services: Web Services means the services provided by World Wide Web. The World Wide Web provides services like chatting, emailing, video conferencing, e-learning, e-shopping, e-reservation, e-groups and social networking.

World Wide Web (WWW): The World Wide Web commonly referred to as WWW, W3, or the Web is an interconnected system of public webpages accessible through the Internet. It was invented by Tim Berners-Lee in 1989. Major components of WWW are:

1. Web Server – It is a computer that stores website resources (web pages, images, videos, etc.).
2. Web Browser (Client) - A software application used to access the web resources.
3. Webpage - Hypertext documents formatted in Hypertext Mark-up Language (HTML) and displayed in a web browser.
4. Website - A website is a collection of inter-linked web pages that is identified by a common domain name (website name) and stored on a web server.
5. HTTP Protocol - It governs data (web page) transfer between a server and a client.
6. HTML- A mark-up language used to specify the structure of a webpage.
7. URL- Address used to identify documents and other web resources on the internet.

Web Architecture

Web is working based on a client-server architecture.



Client: It is a computer capable of requesting, receiving & displaying information in the form of web pages or using a particular service from the service providers (Servers).

Servers: It is a remote computer which provides/transfers information to the client (in the form of web pages) or access to particular services.

Difference between Internet and WWW

Internet	World Wide Web(WWW)
Internet stands for Interconnected Networks	WWW stands for World wide Web
Internet is a means of connecting a computer to any other computer anywhere in the world.	World Wide Web which is a collection of information which is accessed via the Internet.
Internet is infrastructure.	WWW is service on top of that infrastructure.
Internet is primarily hardware-based	WWW is more software-oriented as compared to the Internet.
Internet uses TCP/IP protocol.	WWW uses HTTP Protocol.

HTML (Hypertext Mark-up Language): It is a mark-up language that tells web browsers how to structure the web pages you visit. It has a variety of tags and attributes for defining the layout and structure of the web document. A HTML document has the extension .htm or .html. Hypertext is a text which is linked to another html document via clickable links known as hyperlinks.

XML (eXtensible Mark-up Language): XML is a mark-up language like HTML but it is designed to transport or store data. It does not have predefined tags but allows the programmer to use customized tags. An XML document has the extension .xml.

HTML v/s XML

HTML	XML
HTML stands for Hyper Text Mark-up Language	XML stands for eXtensible Mark-up Language
HTML is a case <u>insensitive</u> .	XML is case sensitive.
Predefined tags (commands).	User defined tags (commands).
It is used for presentation of the Data.	It is used for transportation of the Data.
Small errors can be ignored.	Errors not allowed.
Closing tags are optional.	Compulsory to use closing tags.

HTTP - Hyper Text Transfer Protocol: HTTP is used to transfer data across the web. HTTP specifies how to transfer hypertext (linked web documents) between two computers. It allows users of the World Wide Web to exchange information found on web pages.

Hypertext Transfer Protocol Secure (HTTPS) is an extension of the HTTP which is used for secure communication over a computer network.

Domain Names: Every device connected to the Internet has a numeric IP address which is very difficult to remember. Each computer server hosting a website or web resource is given a name known as Domain Name corresponding to unique IP addresses. For example, IP addresses and domain names of some websites are as follows:

Domain Name	IP Address
ncert.nic.in	164.100.60.233
cbse.nic.in	164.100.107.32

The process of converting a hostname (such as www.google.com) into the corresponding IP address (such as 172.217.14.196) is called domain name resolution. Specialized DNS servers are used for domain name resolution (DNS resolution).

URL-Uniform Resource Locator: Every web page that is displayed on the Internet has a specific address associated with it, this address is known as the URL. The structure of a URL can be represented as follows:



The URL consists of four basic parts, namely, protocol, hostname, folder name and the filename. Each one of these has a specific function.

- 1) The “protocol” indicates the type of Protocol (http/https/ftp etc.) being used. The protocol is always followed by “://” and the host name.
- 2) The host name/domain name is the Internet address of a remote computer on which the files reside.
- 3) The folder name indicates the name of the directory in which the files are located.
- 4) The filename specifies the name of the specific document to be displayed in the browser. The filename itself consists of two pieces of information, the name of the file to be displayed and the file extension, which specifies the file type (.htm for HTML file, .txt for a text file, .bmp for a bitmap image, etc.)

The structure of a URL can be represented as follows:

Websites: A website is a collection of linked web pages (plus their associated resources) that share a unique domain name.

Web page: Web page is an electronic document designed using HTML linked with hyperlinks.

Web Browser: Web browser is software program to navigate the web pages on the internet. E.g., Google Chrome, Mozilla Firefox, Internet Explorer, Safari, Opera etc.

Cookie: A cookie is a small text file that stores information stored on your computer. Cookies often store your settings for a website, such as your preferred language or location, pages visited.

Web Server: A *web server* is a computer or a group of computers hosting one or more *websites*. E.g., Apache, IIS etc.

Web Hosting: Web hosting is the process of uploading/saving the web content on a web server to make it available on WWW.

Model Questions

I. Multiple Choice Questions

1. What are the three common types of computer networks?
 - a. ROM, MAN, LAN
 - b. RAM, WAN, LAN
 - c. MAN, LAN, WAN
 - d. None of the above
2. What is the acronym for LAN?
 - a. Local Area Network
 - b. Local Access Network
 - c. Line And Networking
 - d. Line-less Networking
3. Define what a LAN is?
 - a. Connected devices share the resources of a single processor or server within a small geographic area
 - b. Normally find within a business and school
 - c. These are computers that share resources over a large area
 - d. None of the above
4. Mr. John is a small businessman who runs Hardware. He has been experiencing problems with his small accounting department, which he depends on to provide sales reports. Mr. John wants to share information between his 7 computer stations and have one central printing area. What type of network would you recommend to Mr. John?
 - a. MAN
 - b. LAN
 - c. WAN
 - d. SAN
5. WAN covers a larger geographical area than MAN?
 - a. True
 - b. False
6. A network that consists of both LANs and MANs is called a Wide area network?
 - a. True
 - b. False
7. Arrange the Following Types of Networks according to their size, from largest to smallest?
 - a. LAN, WAN, MAN
 - b. WAN, LAN, MAN
 - c. MAN, LAN, WAN
 - d. WAN, MAN, LAN
8. You are a member of a club that deals with computer networks. The club has to take a project to build a MAN. Where would this project likely take place?
 - a. A small building/organization
 - b. University or college
 - c. Home
 - d. None of the above
9. What is the acronym MAN stand for?
 - a. Magnetic Access Network
 - b. Metropolitan Area Network
 - c. Multi-Area Network
 - d. Multi-Access net
10. In your school there is a library, and you can use the internet to do research, this library will most likely be a WAN network?
 - a. True
 - b. False
11. Types of Networks are Categories by their Geographical Area cover?
 - a. True
 - b. False
12. Metropolitan Area Network Normally Require an Internet connection?
 - a. True
 - b. False
13. What's a web browser?
 - a) A kind of spider
 - b) A computer that store www files
 - c) A person who likes to look at websites

- d) A software program that allows you to access sites on the World Wide Web
14. A _____ is a document commonly written and is accessible through the internet or other network using a browser?
- a) Accounts b) Data
c) Web page d) Search engine
- 15 Which of the following is used to read HTML code and to render Webpage?
- a) Web Server b) Web Browser
c) Web Matrix d) Weboni
16. Which of these tech company owns Firefox web browser?
- a) Lenovo b) IBM
c) Apple d) Mozilla
17. Which of the following browsers were/are available for the Macintosh?
- a) Opera b) Safari
c) Netscape d) All of these
18. What is the name of the browser developed and released by Google?
- a) Chrome b) Googly
c) Heetson d) Titanium
19. Which of the following is a Web Browser?
- a) MS-office b) Notepad c) Firefox d) Word 2007
20. Which of the following is not a web browser?
- a) Chrome b) Microsoft Edge c) Safari d) Ubuntu
21. URL stands for
- (a) Uniform Research Limited (b) Uniform Resource Locator
(c) Uniform Resource Labs (d) Uniform Research Locator
22. LinkedIn is an example for _____ website.
- (a) E-learning (b) E-commerce
(c) Video conferencing (d) Social networking
23. Which of the following is not a web service?
- (a) Distance Learning (b) E-mailing
(c) Video conferencing (d) Social networking
24. Web browsers are also called as _____
- (a) Web Servers (b) Web Clients (c) Web Hosting (d) Web Designing
25. Working of WWW based on _____ architecture.
- (a) Peer-To-Peer architecture (b) Client-Client architecture
(c) Client-Server architecture (d) Server-Server architecture
26. _____ is a computer software capable of requesting, receiving & displaying information in the form of webpages.
- (a) Web Servers (b) Web Browsers
(c) Web Designers (d) Web Camera
27. A _____ is a program or automated script which browses the World Wide Web in a methodical, automated manner.
- (a) Web Servers (b) Web Browsers
(c) Web Designers (d) Web Crawler
28. _____ is a mark-up language that helps in developing web pages.
- (a) HTTP (b) HTML (c) XML (d) C++

29. _____ is a language used to transport data over internet.
 (a) HTTP (b) HTML (c) XML (d) C++
30. _____ is a set of rules for communication between two computers over a network.
 (a) Modem (b) Protocol
 (c) Switch (d) IP address
31. In web services, the communication takes place between
 (a) Two electronic devices (b) Two human beings
 (c) Two spiders (d) None of the above
32. Web services means services provided by _____
 (a) Microsoft (b) Google
 (c) BSNL (d) World Wide Web

II. Very Short Answer Type Questions(1-mark)

1. Name The transmission media best suitable for connecting to hilly areas.
2. How many pair of wires are there in twisted pair cable (Ethernet)?
3. Name a device that forwards data packets along networks.
4. What is the full form of WWW?
5. What is the full form of Internet?
6. Who invented the WWW in 1989?
7. Special software's that is used to view webpages are _____
8. _____ are used to store webpages, so whenever a request, it will serve the request.
9. _____ are programs /computers used to store information's in the form of webpages.
10. Web pages that are linked to each other via _____
11. _____ protocol is used to transfer web pages over internet.
12. Full form of HTTP?
13. _____ is a massive collection of digital pages to access information over the Internet
14. Write any 2 differences between HTML & XML?
15. _____ is a real-time communication between two or more users via computer.
16. _____ helps us to learn anywhere using Internet.
17. _____ allows customers to conduct financial transactions on a secure Website.
18. Internet can be used to get reservation of trains and air planes through _____ service.
19. _____ helps to create and maintain social relationship over web.
20. Expand the following abbreviations:
 - a. HTTP
 - b. XML
 - c. HTTPS
 - d. HTML
 - e. VoIP
21. Name any two common web browsers.
22. Full form of Email is _____
23. What out of the following, you will use to have an audio visual chat with an expert sitting in a faraway place to fix-up technical issues?
 (i) E-mail (ii) VoIP (iii) FTP
24. Match the following

Web Services	Description
--------------	-------------

A	Video conferencing	P	Without ever having to go booking office
B	E-Shopping	Q	Self-paced learning modules allow students to work at their own speed
C	E-mail	R	Each of the end user has a camera as well as microphone to capture video and audio in real time and it will be transmitted over internet
D	E-reservation	S	Purchasing products through computers/mobile devices
E	E-learning	T	Messages normally reaches a recipients account within seconds

25. Match the following

Web Services		Applications	
A	Video conferencing	P	IRCTC
B	E-Shopping	Q	Diksha App
C	E-mail	R	GEM
D	E-reservation	S	Gmail
E	E-learning	T	Instagram
F	Social Networking	U	VConSol

III.Short Answer Type (Theory with Answers)

1. What are Protocols? Name the protocol used to transfer a file from one device to the other.

Protocols are set of rules that are followed while transmitting data through a computer network. Protocols determines how to data can be moved securely from a source device to a destination device. The protocol used for transferring a file from one device to another is the File Transfer Protocol (FTP)

2. What is meant by an IP Address? Give an example for IP Address.

An IP Address is a numerical address that uniquely identifies every device connected to a network or internet. The user's physical location can be tracked by using an IP Address. IP V4 (IP Version 4) is a popular version of IP Address. IP Address (in IP V4) consists of four set of numbers separated by a dot. These numbers can range from 0 to 255.

An example IP Address format is given below:

192.158.12.38

3. Explain how an IP Address become helpful in investigating cyber-crimes.

IP address can be used to trace the physical location of a user connected to a network. By this many cyber crime can be investigated and traced out efficiently tracking the exact location from where the cybercrime is carried out.

4. Why Protocols are needed in the case of Data Communication?

The communicating devices may be in different geographical areas. The speed of these devices may be different. Also, the data transfer rates of different networks may be different. These complexities make it necessary to have a common set of rules i.e., Protocols to ensure the secure communication of data

5. What is the difference between World Wide Web & Internet?

Internet means interconnected networks that spread all over the world (i.e. the physical infrastructure), while WWW means the information's (available in the form of webpages) that can be accessed through internet.

6. What is a protocol, give some examples?

Protocols are set of rules that are followed while transmitting data through a computer network. Protocols determines how to data can be moved securely from a source device to a destination device. The protocol used for transferring a file from one device to another is the File Transfer Protocol (FTP)

7. What is the difference between E-mail and chat?

In order to chat, you need to have an account on the same service as the person you are chatting with. e.g. on the other hand, in case of E-mail, it is not necessary, i.e. you can have an account from any provider and you can establish your own.

8. What are cookies?

Cookies are files stored temporarily on www browser's computer, which allow the www server to store persistent information associated with browsing user on user's system.

9. What is the difference between domain name and IP address?

IP addresses look like this: 192.168.12.134.

Domain names look like this: "www.google.com"

Domain names are easier for us to remember and use, while computers are quite handy with numbers. Thus, we use DNS (Domain Naming System) to translate domain names into the IP addresses.

IP address is a unique identifier for a computer or device on internet. A domain name (website name) is a name that identifies one or more IP addresses (when hosted at different servers for load balancing).

10. Give one suitable example of each URL and domain name?

URL: <https://kvsangathan.nic.in/hq-gyan-kosh>

Domain name: kvsangathan.nic.in

11. Differentiate between XML and HTML.

XML was designed to describe data and to focus on what data is.

HTML was designed to display data and to focus on how data looks.

HTML is about displaying information while XML is about describing information.

12. Distinguish between website and web browser.

Website:- It is a collection of inter-linked web pages stored in a server.

Web Browser:- It is a software application for retrieving, presenting and traversing through information resources in the form of web pages available on the World Wide Web.

13. Differentiate between the terms Domain Name and URL in context of web services. Also write one example of each to illustrate the difference.

Domain Name	URL
A domain name or website name is a human-friendly text form of the IP address.	URL is a string that represents the complete web address of any web page. It's used to locate a webpage.
It is the part of the URL that is more human friendly.	It is the string that represents a complete web address that contains the domain name.
Example: kvsangathan.nic.in	Example: https://kvsangathan.nic.in/contact-us

22. Differentiate between communication using Optical Fiber and Ethernet Cable in context of wired medium of communication technologies.

Optical Fibre - Very Fast - Expensive - Immune to electromagnetic interference

Ethernet Cable - - Slower as compared to Optical Fiber - Less Expensive as compared to Optical Fiber - prone to electromagnetic interference

IV. Previous CBSE Board Questions

- Ravi was trying to log-in to his internet-banking account. He noticed that the URL of the net banking starts with 'https'. The 's' in 'https' stands for _____
(i) Simple (ii) Smart (iii) Secure (iv) Strength
- What is meant by the homepage of a website?
- What is the significance of the URL?
- Which of the following is not a network protocol?
(i) HTML (ii) HTTP (iii) SMTP (iv) FTP
- Which of the following internet protocols provides secure data transmission between server and browser with the help of encryption.
a) HTTP b) HTTPS c) TELNET d) ARPANET
- Devanand, a student of Class XII, is not able to understand the difference between web client and web-server. Help him in understanding the same by explaining their role and giving suitable example of each.
- Write the full form of Cc and Bcc (used in email communication). Explain the difference between them.
- Define Internet and write its two uses in our daily life. How is it different from the World Wide Web (WWW).
- Web _____ is a software used to view web pages.

- 10) In a network, _____ is a computer that provides data and resources to other computers.
- 11) How is a website and a webpage related?
- 12) Microsoft Edge, Apple Safari are examples for _____
- 13) What is the use of a server in a computer network?
- 14) Among the following service available on the World Wide Web are?
 i) Email ii) HTML iii) XML iv) Video conferencing
 (a) (i) and (ii) (b) (i) and (iv)
 (c) (ii) and (iii) (d) None of the above
- 15) HTML and XML are _____
 (a) Programming Languages (b) Scripting Languages
 (c) Mark-up Languages (d) None of the above
- 16) XML uses _____
 (a) User defined tags (b) Predefined Tags
 (c) Both user defined and predefined tags (d) None of the above
- 17) XML was not designed to _____
 (a) store the data (b) present the data
 (c) carry the data (d) both a & c
- 18) Which of the following will you suggest to establish the online face to face communication between the people in the Regional Office Ernakulum and Delhi Headquarter?
 (a) Cable TV (b) Email
 (c) Text chat (d) Video Conferencing
- 19) What kind of data gets stored in cookies and how is it useful?
- 20) What do the following top level domains signify?
 (a) .com
 (b) .org
- 21) “With XML you invent your own tags”, Explain this statement with the help of example.
- 22) Define Domain Name Resolution?
- 23) _____ tags are case sensitive and _____ tags are not case sensitive.
 (a) HTML, XML (b) HTTP, XML
 (c) XML, HTTP (d) XML, HTML
- 24) Which of the following is not a web browser ?
 (a) Google Chrome (b) Internet Explorer (c) Mozilla Firefox (d) Photoshop
- 25) Which protocol helps us to browse through web pages using internet browsers?

26) Name any one internet browser.

27) XML stands for

- (A) Xtra Markup Language
- (B) Extensible Markup Language
- (C) Extensible Marking Language
- (D) Extensive Marked Language

28) We can upload a file to a web server using a protocol called _____.

- (A) FPT
- (B) IP
- (C) TCP
- (D) FTP

29) _____ delivers the requested web page to web browser.

30) MyPace University is setting up its academic blocks at Naya Raipur and is planning to set up a network. The University has 3 academic blocks and one Human Resource Center as shown in the diagram below: Study the following structure and answer questions (a) to (e)

Center to Center distances between various blocks/center is as follows:

Law Block to business Block	40m
Law block to Technology Block	80m
Law Block to HR center	105m
Business Block to technology Block	30m
Business Block to HR Center	35m
Technology block to HR center	15m

Number of computers in each of the blocks/Center is as follows:

Law Block	15
Technology Block	40
HR center	115
Business Block	25

- a) Suggest the most suitable place (i.e., Block/Center) to install the server of this University with a suitable reason.
- b) Suggest an ideal layout for connecting these blocks/centers for a wired connectivity.
- c) Which device will you suggest to be placed/installed in each of these blocks/centers to efficiently connect all the computers within these blocks/centers?
- d) Suggest the placement of a Repeater in the network with justification.
- e) The university is planning to connect its admission office in Delhi, which is more than 1250km from university. Which type of network out of LAN, MAN, or WAN will be formed? Justify your answer.

Test Your Self : PART I

- 1 Write any 1 advantage and 1 disadvantage of Bus topology.
2. What happens to the Network with Star topology if the following happens:
 - (i) One of the computers on the network fails?
 - (ii) The central hub or switch to which all computers are connected, fails?
3. Two doctors have connected their mobile phones to transfer a picture file of a person suffering from a skin disease. What type of network is formed?
4. SunRise Pvt. Ltd. is setting up the network in the Ahmadabad. There are four departments named as MrktDept, FunDept, LegalDept, SalesDept.

Distance between various buildings is given as follows:

MrktDept to FunDept	80 m
MrktDept to LegalDept	180 m
MrktDept to SalesDept	100 m
LegalDept to SalesDept	150 m
LegalDept to FunDept	100 m
FunDept to SalesDept	50 m

Number of Computers in the buildings

MrktDept	20
LegalDept	10
FunDept	8
SalesDept	42

- i) Suggest a cable layout of connections between the Departments and specify topology.
 - ii) Suggest the most suitable building to place the server with a suitable reason.
 - iii) Suggest the placement of i) modem ii) Hub /Switch in the network.
 - iv) The organization is planning to link its sale counter situated in various part of the same city/ which type of network out of LAN, WAN, MAN will be formed? Justify.
5. Name the protocol Used to transfer voice using packet switched network.
 6. What is HTTP?
 7. Write the purpose of the following devices:
 - (i). Network Interface Card
 - (ii). Repeater

Test Your Self : PART II

1. The 'Grand Plaza' Mall has a computer network. The network is in one building. Name this type of network (out of LAN/MAN/WAN).

2. Identify the type of topology on the basis of the following:

a. Since every node is directly connected to the server, a large amount of cable is needed which increases the installation cost of the network.

b. It has a single common data path connecting all the nodes

3. The following is a 32 bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) separated by decimal points.

192.158.1.38

What is it? What is its importance?

4. Dinsey has to share the data among various computers of his two offices branches situated in the same city. Name the network (out of LAN, WAN, PAN and MAN) which is being formed in this process.

5. Global Pvt. Ltd. is setting up the network in the Bangalore. There are four departments. Distances between various buildings are as follows:

Accounts to Research Lab	55 m
Accounts to Store	150 m
Store to Packaging Unit	160 m
Packaging Unit to Research Lab	60 m
Accounts to Packaging Unit	125 m
Store to Research Lab	180 m

Number of Computers

Accounts	25
Research Lab	100
Store	15
Packaging Unit	60

i) Suggest a cable layout of connections between the buildings.

ii) Suggest the most suitable place (i.e. buildings) to house the server of this organization.

iii) Suggest the placement of the following device with justification:

a) Repeater b) Hub/Switch

6. Write one example each of URL and IP address.

ANSWER KEY

I. Multiple Choice Questions(MCQ)

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

II. Very Short Answer Type Questions(1-mark)

1. Microwave / Radio wave
2. Two insulated copper wires
3. Router
4. World Wide Web
5. Interconnected Networks
6. Tim Berners-Lee
7. Web browsers
8. Web servers
9. Web servers
10. hyperlinks
11. HTTP- HyperText Transfer Protocol
12. HyperText Transfer Protocol
13. World Wide Web(WWW) or Web
14. Refer comparison table
15. Chat
16. E-learning
17. Internet banking
18. E-reservation
19. Social networking websites
20.
 - a. HTTP- HyperText Transfer Protocol
 - b. XML – eXtensible Mark-up Language
 - c. HTTPS - HyperText Transfer Protocol Secure
 - d. HTML - HyperText Mark-up Language

e. VoIP-Voice over Internet Protocol

21. Google Chrome, Mozilla Firefox
22. Electronic mail
23. Ii.VoIP
- 24.

A	Video conferencing	P	Each of the end user has a camera as well as microphone to capture video and audio in real time and it will be transmitted over internet
B	E-Shopping	Q	Purchasing products through computers/mobile devices
C	E-mail	R	Messages normally reaches a recipients account within seconds
D	E-reservation	S	Without ever having to go booking office
E	E-learning	T	Self-paced learning modules allow students to work at their own speed

25.

Web Services		Applications	
A	Video conferencing	P	VConSol
B	E-Shopping	Q	GEM
C	E-mail	R	Gmail
D	E-reservation	S	IRCTC
E	E-learning	T	Diksha App
F	Social Networking	U	Instagram

IV.Previous CBSE Board Questions - Answers

1. (iii) Secure
2. The default (first) page of a website is called a Homepage.
3. URL specifies unique address of each document on the internet.
4. (i) HTML

Internet Protocols for communication over the Internet, the communicating devices must follow certain rules. These rules are called Internet protocols.

For email communication, we use SMTP and POP.

For communication between browser and server HTTP and HTTPS protocols are used.

We can use TELNET to access services available on a remote computer.

5. b) HTTPS

6. Web-Client: An application that requests for services from a webserver. Example: Web Browsers, Chatting Applications

Web-Server: Web-server is a software (or any dedicated computer running this software) that serves the request made by web-clients. Example: Apache Server.

7. Cc : Carbon Copy: every recipient can check who else has received the mail.

Bcc : Blind Carbon Copy: no recipient can check who else has received the mail.

8. The Internet is a worldwide network that links many smaller computer-networks. Uses of the Internet 1. E-learning 2. E-commerce

The difference between the internet and www:

Internet means interconnected networks that spread all over the world (i.e. the physical infrastructure), while WWW means the information's (available in the form of webpages) that can be accessed through internet.

9. Web Browser
10. Server
11. A website is a collection of interlinked webpages.
12. Web Browsers
13. Role of server is to serve various clients (sharing data or resources among multiple clients)
14. (b) (i) and (iv)
15. (c) Mark-up Languages
16. (a) User defined tags
17. (b) present the data
18. (d) Video Conferencing
19. Cookies can store a wide range of information, including personally identifiable information (such as your name, home address, email address, or telephone number).
Cookies often store your settings for a website, such as your preferred language or location. When you return to the site, browser sends back the cookies that belong to the site. This allows the site to present you with information customized to fit your needs.
20. (a) .com - commercial
(b) .org - organization
21. XML tags are created by the user as there are no standard tags.
Ex : <name>Nayana</name>
22. The process of converting domain names (website names) into corresponding IP address with the help of DNS servers is called domain name resolution.
23. (d) XML,HTML
24. (d) Photoshop
25. HTTP - Hyper Text Transfer Protocol
26. Google Chrome or any other valid browser name
27. (B) Extensible Markup Language
28. (D) FTP
29. Web Server
- 30 a. Most suitable place to install the server is HR center, as this center has maximum number of computers.
c. Switch
d. Repeater may be placed when the distance between 2 buildings is more than 70 meter.
e. WAN, as the given distance is more than the range of LAN and MAN.

Test Yourself: PART I

1. **Advantage:** Since there is a single common data path connecting all the nodes, the bus topology uses a very short cable length which considerably reduces the installation cost.
Disadvantage: Fault detection and isolation is difficult. This is because control of the network is not centralized in any particular node. If a node is faulty on the bus, detection of fault may have to be performed at many points on the network. The faulty node has then to be rectified at that connection point.
2. (i). failure in one cable will not affect the entire network
(ii). If the central hub or switch goes down, then all the connected nodes will not be able to communicate with each other.
3. PAN
4. i. Star Topology should be used.

ii) As per 80 – 20 rule, SalesDept because it has maximum no. of computers.
iii) Each building should have hub/switch and Modem in case Internet connection is required.
iv) MAN (Metropolitan Area Network)
5. VoIP
6. HTTP is a protocol that is used for transferring hypertext(i.e. text, graphic, image, sound, video, etc,) between 2 computers and is particularly used on the World Wide Web (WWW)
7. (i) Network Interface Card (NIC) is a network adapter used to set up a wired network. It acts as an interface between computer and the network.
(ii) A repeater is a device that amplifies a signal being transmitted on the network.

Test Yourself: PART II

1. LAN

2.

a. Star Topology

b. Bus Topology

3. It is an IP Address. It is used to identify the computers on a network

4. MAN

5. (i)

(ii) The most suitable place/ building to house the server of this organization would be building Research Lab, as this building contains the maximum number of computers

(iii). a) Repeater : distance between Store to Research Lab is quite large, so a repeater would ideally be placed.

b) Hub/Switch : Each would be needed in all the buildings to interconnect the group of cables from the different computers in each building.

6. IP address 192.168.1.1

URL : <https://www.apple.com/>

DBMS-DATABASE MANAGEMENT SYSTEM

DBMS: A database management system (DBMS) is a software that is responsible for storing, maintaining and utilizing databases.

Examples- MySQL, Oracle, PostgreSQL, SQL Server, Microsoft Access, MongoDB.

Relational model:

The relational model uses a collection of tables to represent both data and the relationships among those data. Each table has multiple columns, and each column has a unique name.

The columns of the table correspond to the attributes of the record type and a row in a table represents a relationship among a set of values.

SNO	NAME	CLASS	CITY
1	SUMIT	12	DELHI
2	ANU	11	NOIDA
3	MEENU	12	AGRA

Diagram labels: ATTRIBUTES (points to columns), TUPLE (points to rows), COLUMN (points to a column), RELATION (points to the entire table).

Relation: A Relation is logically related data organized in the form of tables.

Attribute/ Field: Column of a table is called Attribute or Field.

Tuple/ Entity/ Record: Rows of a table is called Tuple or Record.

Domain: It is collection of values from which the value is derived for a column.

Degree - Number of columns (attributes) in a table.

Cardinality - Number of rows (Records) in a table.

StudID	Roll No	First Name	LastName	Email
1	11	Tom	Price	abc@gmail.com
2	12	Nick	Wright	xyz@gmail.com
3	13	Dana	Natan	mno@yahoo.com

Diagram labels: Candidate Key (points to Roll No, First Name, LastName, Email), primary Key (points to StudID), Alternate Key (points to First Name, LastName, Email).

Primary Key – A primary is an attribute or set of attributes in a relation that uniquely identifies tuples (rows) in that relation.

Candidate Key –It is an attribute or a set of attributes or keys participating for Primary Key, to uniquely identify each tuples in that relation.

Alternate Key – A candidate key that is not the primary key is called alternate key or secondary key.

Foreign Key – Foreign keys are the attributes of a relation that points to the primary key of another relation

Model Questions

I. Multiple choice Questions(MCQ):

1. DBMS stands for_____
 - a) Data Base Management Software
 - b) Data Base Maintenance System
 - c) Data Basic Management System
 - d) Data Base management system
2. In RDBMS, R stands for_____
 - a) Relational
 - b) Rotational
 - c) Rational
 - d) None of the above
3. A Database contains one or more_____
 - a) Data
 - b) Tables
 - c) Files
 - d) Links
4. What is not true in respect of DBMS?
 - a) Database enforces standards
 - b) Database increases redundancy
 - c) Database facilitates sharing of data
 - d) Database helps to maintain integrity
5. Cardinality is total _____
 - a) number of rows in a table
 - b) number of columns in a table
 - c) number of data items in a table
 - d) none of the above

6. Degree refers to total_____
- a) number of rows in a table
 - b) number of columns in a table
 - c) number of data items in a table
 - d) none of the above
7. Data about data is _____
- a) Data redundancy
 - b) Meta Data
 - c) Database schema
 - d) None of the above
8. Repetition of data is called
- a) Data redundancy
 - b) Data Description
 - c) Data inconsistency
 - d) None of the above
9. Mismatched redundant copies of data is known as data
- a) Dependence
 - b) Inconsistency
 - c) Isolation
 - d) Redundancy
10. A is an organized collection of structured data.
- a) Database
 - b) File
 - c) DBMS
 - d) Information
11. A data is a set of rules that define valid data.
- a) Query
 - b) Constraint
 - c) Dictionary
 - d) All of the above
12. A relational database consists of a collection of
- a) Fields
 - b) Records
 - c) Keys
 - d) Tables

13. A row in a database.

- a) Field
- b) Record
- c) Key
- d) Table

14. The term _____ is used to refer to a field in a table.

- a) Attribute
- b) Row
- c) Tuple
- d) Instance

15. Which of the following statements is not true about relational database?

- a) Relational data model is the most widely used data model.
- b) The data is arranged as a collection of tables in relational database.
- c) Relational database increases data redundancy and inconsistency.
- d) None of the above.

16. Which of the following is a disadvantage of file processing system?

- a) Data redundancy
- b) Data isolation
- c) Data inconsistency
- d) All of the above

17. Table: Employee

EMPID	ENAME	SALARY	DEPTNO	Email
1001	George	30000	10	George23@yahoo.co.in
1002	Mary	32000	12	Mary_123@yahoo.co.in
1003	Alwin	25000	12	Al_win@gmail.com
1004	Sumit	20000	11	Sumit_222@yahoo.co.in

Answer the questions based on the table Employee.

- a) The cardinality of the table Employee is
 - i) 5
 - ii) 4
 - iii) 3
 - iv) 6
- b) The degree of the table Employee is
 - i) 3
 - ii) 4
 - iii) 5
 - iv) 6

- c) Which column can be made as the primary key in the table Employee?
- EMPID
 - EMAIL
 - Both i and ii
 - None of the above
- d) If two columns are added to the table Employee, then the cardinality and degree of the table is and respectively.
- 4 , 7
 - 7, 4
 - 6,5
 - 5,6
18. An attribute in a relation is a foreign key if it is the _____ key in any other relation.
- Candidate
 - Primary
 - Super
 - Sub
19. A(n) _____ in a table represents a logical relationship among a set of values.
- Column
 - Key
 - Row
 - Attribute

II. Very Short Answer Questins:

- 1) What is meant by a database?
- 2) Define primary key? Give an example.
- 3) What do you mean by candidate key?
- 4) What is meant by degree and cardinality of a table?
- 5) What is meant by DBMS?
- 6) What is meant by database schema?
- 7) What is meant by data constraint?
- 8) What is meant by relation?

ANSWERS:

I. Multiple Choice Questions (MCQ)

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

II. Very Short Answer Answers:

1	A database is an organized collection of structured information, or inter-related data, typically stored in a computer system.												
2	<p>A primary key is a column or set of columns that contain values that uniquely identify each row in a table.</p> <p>For example Rno can be primary key of the table student.</p> <p>Table:Student</p> <table border="1"><thead><tr><th>RNO</th><th>NAME</th><th>MARK</th></tr></thead><tbody><tr><td>100</td><td>Tanay</td><td>30</td></tr><tr><td>101</td><td>Kiran</td><td>50</td></tr><tr><td>102</td><td>Manu</td><td>30</td></tr></tbody></table>	RNO	NAME	MARK	100	Tanay	30	101	Kiran	50	102	Manu	30
RNO	NAME	MARK											
100	Tanay	30											
101	Kiran	50											
102	Manu	30											
3	It is an attribute or a set of attributes capable of being the Primary Key, to uniquely identify each record in that table.												
4	Degree refers to the number of attributes/columns in a relation. Cardinality refers to the number of tuples/rows in a relation.												
5	RDBMS (Relational Database Management System) is the software used to store, manage, query, and retrieve data stored in a relational database.												
6	Database schema is also called the visual or logical architecture as it tells us how the data are organized in a database.												
7	Restrictions or limitations on the type of data that can be inserted in one or more columns of a table to ensure accuracy and reliability of data in the database.												
8	A relation is a named, two dimensional table storing logically related data.												

STRUCTURED QUERY LANGUAGE(SQL)

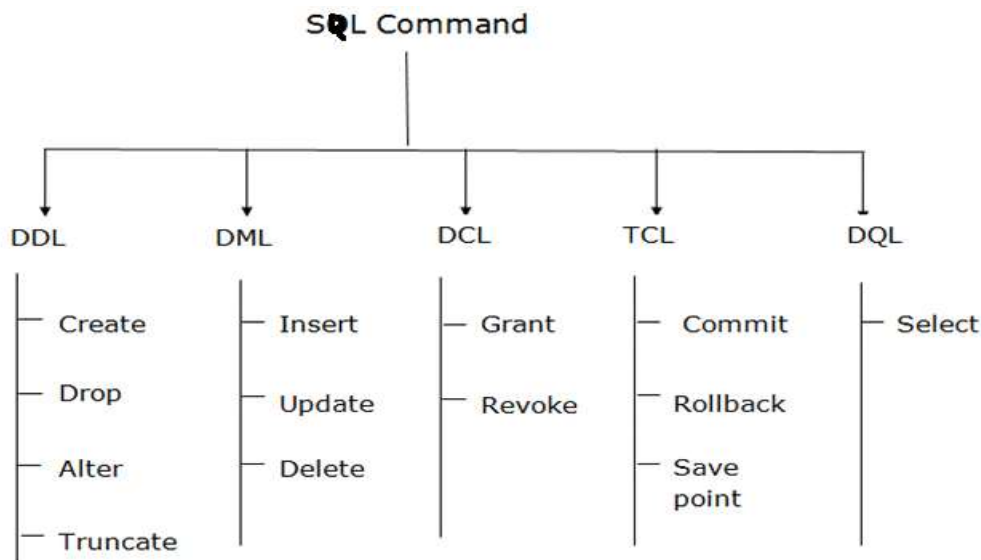
SQL(Structured Query Language) is a language that is used to manage data that is held in a relational database management system.

1.4 SQL Commands

SQL commands are used to communicate with the database to perform specific tasks, functions, and queries of data.

1.5 Types of SQL Commands

There are five types of SQL commands: DDL, DML, DCL, TCL, and DQL.



1.5.1 DDL or Data Definition Language : DDL is a set of SQL commands used to create, modify, and delete database structures/tables but not data. List of DDL commands:

CREATE: This command is used to create the database or its objects (like table, index, function, views, store procedure, and triggers).

DROP: This command is used to delete objects from the database.

ALTER: This is used to alter the structure of the database.

1.5.2 DML (Data Manipulation Language): DML commands deal with the manipulation of data present in the tables. List of DML commands:

INSERT : It is used to insert data into a table.

UPDATE: It is used to update existing data within a table.

DELETE : It is used to delete records from a database table.

1.6 DATATYPES

➤ Text Data types

Char(size) – fixed length of *size* bytes

Varchar(size)-variable length of *size* bytes

➤ **Number Data types**

Integer(size)or Int- It represents a number without decimal point

Float(Size)-It represents a floating point number

➤ **Date data type**

Date

1.7 CONSTRAINT: A Constraint is a condition or check applicable on a field or set of fields.

Types of Constraints:

- **Unique Constraint** :-This ensures that no rows have the same value in the specified column(s). There can be many unique constraints defined on a table.

Syntax: Create table EMP (**ecode integer unique**, ename char(20),sex char(1));

- **Primary key Constraint:** This declares a column as the primary **key** of the table This is similar to **unique** constraint except that a table can have only one primary key and also that, a primary key does not allow NULL values but Unique key allows NULL values.

The following SQL creates a PRIMARY KEY on the "ID" column when the "Persons" table is created:

```
CREATE TABLE Persons ( ID int NOT NULL, LastName  
varchar(255) NOT NULL, FirstName varchar(255), Age int, PRIMARY KEY (ID));
```

- **Not null:** This constraint ensures column should not contain **NULL**

Syntax: Create table EMP(**ecode integer Not null unique**, ename char(20),sex char(1));

1.8 DATABASE COMMANDS IN MYSQL

- **CREATE DATABASE:** used for creating a database in MySQL.

Syntax: mysql>CREATE DATABASE movies;

- **SHOW DATABASES:** Display list of existing databases

Syntax: mysql>SHOW DATABASES;

- **USE :** Select a particular database.

Syntax: mysql>USE database_name;

- **DROP DATABASE:** Used to drop an existing SQL database.

Syntax :mysql>DROP DATABASE database_name;

- **CREATE TABLE:** Used to create a new table in a database.

Syntax: CREATE TABLE *table_name* (*column1 datatype*, *column2 datatype*, *column3 datatype*,);

Example: The following example creates a table called "Persons" that contains five columns: PersonID, LastName, FirstName, Address, and City:


```
CREATE TABLE Persons (
    PersonID int,
    LastName varchar(255),
    FirstName varchar(255),
    Address varchar(255),
    City varchar(255)
);
```

- **SHOW TABLES:** Display all the names of tables present in the database

Syntax: mysql> SHOW TABLES;

- **DESCRIBE TABLE :** Shows the structure of the table, such as column names, constraints on column names, etc. The **DESC** command is a short form of the DESCRIBE command. Both DESCRIBE and DESC commands are equivalent.

Syntax mysql> DESCRIBE | **DESC** table_name;

- **ALTER TABLE Statement:** Used to add, delete, or modify columns/constraints in an existing table.

ALTER TABLE - ADD Column/Attribute

syntax: ALTER TABLE *table_name* ADD *column_name datatype*;

Example ALTER TABLE Customers ADD Email varchar(255);

ALTER TABLE - DROP COLUMN

Syntax: ALTER TABLE *table_name* DROP COLUMN *column_name*;

Example ALTER TABLE Customers DROP COLUMN Email;

ALTER TABLE – ADD PRIMARY KEY

Syntax: ALTER TABLE *table_name* ADD PRIMARY KEY (*Column_name*);

Example ALTER TABLE Persons ADD PRIMARY KEY (ID);

ALTER TABLE – DROP PRIMARY KEY

Syntax: ALTER TABLE *table_name* DROP PRIMARY KEY;

Example : ALTER TABLE Persons DROP PRIMARY KEY;

- **DROP TABLE Statement:** Used to drop an existing table in a database.

Syntax: DROP TABLE *table_name*;

Example: DROP TABLE Shippers;

- **INSERT INTO Statement:** Used to insert new records in a table.

Syntax 1. Specify both the column names and the values to be inserted:

INSERT INTO *table_name* (*column1*, *column2*, ...) VALUES (*value1*, *value2*, ...);

Syntax 2: Add all column data without specifying column names

INSERT INTO *table_name* VALUES (*value1*, *value2*, *value3*, ...);

- **DELETE Statement:** Used to delete existing records/rows in a table.

Syntax: DELETE FROM *table_name* WHERE *condition*;

Example: DELETE FROM Customers; # Delete all rows from table Customers

- **SELECT Statement:** Used to select data from a database.

Syntax1: SELECT *column1*, *column2*, ... FROM *table_name*;

Syntax2: SELECT * FROM *table_name*; #selects all columns from table

- **SELECT DISTINCT Statement :** Used to return only distinct (different) values.

Syntax: SELECT DISTINCT *column1*, *column2*, ...FROM *table_name*;

Example: SELECT DISTINCT Country FROM Customers;

SQL Aliases: SQL aliases are used to give a table, or a column in a table, a temporary name. Aliases are often used to make column names more readable. An alias only exists for the duration of that query. An alias is created with the AS keyword.

Alias Column Syntax: SELECT *column_name* AS *alias_name* FROM *table_name*;

Alias Table Syntax: SELECT *column_name(s)* FROM *table_name* AS *alias_name*;

WHERE Clause: The WHERE clause is used to filter records and extract only those records that fulfill the specified condition. It is used in select, update and delete SQL statements

WHERE Syntax: SELECT *column1*, *column2*, ...FROM *table_name* WHERE *condition*;

Operators in The WHERE Clause

The following operators can be used in the WHERE clause:

Operator	Description
=	Equal
>	Greater than
<	Less than
>=	Greater than or equal
<=	Less than or equal
<>	Not equal. Note: In some versions of SQL this operator may be written as !=
BETWEEN	Between a certain range
LIKE	Search for a pattern
IN	To specify multiple possible values for a column

The SQL AND, OR and NOT Operators

The WHERE clause can be combined with AND, OR, and NOT operators.

- The AND operator displays a record if all the conditions separated by AND are TRUE.
- The OR operator displays a record if atleast one of the conditions separated by OR is TRUE.
- The NOT operator displays a record if the condition(s) is NOT TRUE.

AND Syntax : *SELECT column1, column2, ... FROM table_name*

WHERE condition1 AND condition2 AND condition3 ...;

OR Syntax: *SELECT column1, column2, ... FROM table_name*

WHERE condition1 OR condition2 OR condition3 ...;

NOT Syntax: *SELECT column1, column2, ... FROM table_name*

WHERE NOT condition;

The SQL IN Operator

The IN operator allows you to specify multiple values in a WHERE clause.

The IN operator is a shorthand for multiple OR conditions.

IN Syntax: `SELECT column_name(s) FROM table_name`

`WHERE column_name IN (value1, value2, ...);`

The SQL BETWEEN Operator

The BETWEEN operator selects values within a given range. The values can be numbers, text, or dates. The BETWEEN operator is inclusive: begin and end values are included.

BETWEEN Syntax: `SELECT column_name(s) FROM table_name`

`WHERE column_name BETWEEN value1 AND value2;`

The SQL LIKE Operator

The LIKE operator is used in a WHERE clause to search for a specified pattern in a column.

There are two wildcards often used in conjunction with the LIKE operator:

- The percent sign (%) represents zero, one, or multiple characters
- The underscore sign (_) represents one, single character

The percent sign and the underscore can also be used in combinations!

LIKE Syntax: `SELECT column1, column2, ... FROM table_name`

`WHERE columnN LIKE pattern;`

LIKE Operator	Description
<code>WHERE CustomerName LIKE 'a%'</code>	Finds any values that start with "a"
<code>WHERE CustomerName LIKE '%a'</code>	Finds any values that end with "a"
<code>WHERE CustomerName LIKE '%or%'</code>	Finds any values that have "or" in any position
<code>WHERE CustomerName LIKE '_r%'</code>	Finds any values that have "r" in the second position
<code>WHERE CustomerName LIKE 'a_%'</code>	Finds any values that start with "a" and are at least 2 characters in length
<code>WHERE CustomerName LIKE 'a__%'</code>	Finds any values that start with "a" and are at least 3 characters in length
<code>WHERE ContactName LIKE 'a%o'</code>	Finds any values that start with "a" and ends with "o"

What is a NULL Value?

A field with a NULL value is a field with no value.

How to Test for NULL Values?

It is not possible to test for NULL values with comparison operators, such as =, <, or <>.

We will have to use the IS NULL and IS NOT NULL operators instead.

IS NULL Syntax: SELECT *column_names* FROM *table_name*

 WHERE *column_name* IS NULL;

Example: SELECT CustomerName, ContactName, Address FROM Customers

 WHERE Address IS NULL;

IS NOT NULL Syntax: SELECT *column_names* FROM *table_name*

 WHERE *column_name* IS NOT NULL;

Example: SELECT CustomerName, ContactName, Address FROM Customers

 WHERE Address IS NOT NULL;

The SQL ORDER BY Keyword

The ORDER BY keyword is used to sort the result-set in ascending(ASC -default) or descending order (DESC).

ORDER BY Syntax: SELECT *column1, column2, ...* FROM *table_name*

 ORDER BY *column1, column2, ...* ASC|DESC;

Example

SELECT * FROM Customers ORDER BY Country DESC;

SELECT * FROM Customers ORDER BY Country DESC, CustomerName;

➤ **UPDATE Statement:** Used to modify the existing records in a table.

Syntax: UPDATE *table_name* SET *column1 = value1, column2 = value2, ...*

 WHERE *condition*;

Example: UPDATE Customers

 SET ContactName = 'Alfred Schmidt', City= 'Frankfurt'

 WHERE CustomerID = 1;

Aggregate (Group) function

- Aggregate functions are the functions that operate on a set of rows to give one result per group.
- These sets of rows on which group function is applied may be the whole table or the table split into groups by the use of GROUP BY clause.

Types of Group Functions

Function	Description
sum()	Find the sum of numeric values
avg()	Find the average of numeric values
count()	Counts the number of rows in a table
max()	Find the maximum among all the values in a column
min()	Find the minimum among all the values in a column

Remember the following points about group functions:

- All group functions, except count(*) ignore NULL values
- Functions -sum(), avg() are used with NUMERIC data.
- Functions -min() and max() can be used with any data type

Example: Consider the following table employee

```
mysql> select * from employee;
+----+-----+-----+-----+-----+-----+-----+
| No  | Name   | Salary | Zone   | Age  | Grade | Dept |
+----+-----+-----+-----+-----+-----+-----+
| 1   | Mukul  | 30000  | West  | 28   | A     | 10   |
| 2   | Kritika| 35000  | Centre| 30   | A     | 10   |
| 3   | Naveen | 32000  | West  | 40   | NULL  | 20   |
| 4   | Uday   | 38000  | North | 38   | C     | 30   |
| 5   | Nupur  | 32000  | East  | 26   | NULL  | 20   |
| 6   | Moksh  | 37000  | South | 28   | B     | 10   |
| 7   | Shelly | 36000  | North | 26   | A     | 30   |
+----+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)
```

Q: Find the sum, average, minimum, maximum value of salaries of employees in the employee table

```
mysql> select sum(salary),min(salary),avg(salary),max(salary) from employee;
+-----+-----+-----+-----+
| sum(salary) | min(salary) | avg(salary) | max(salary) |
+-----+-----+-----+-----+
| 240000 | 30000 | 34285.7143 | 38000 |
+-----+-----+-----+-----+
1 row in set (0.00 sec)
```

Count() function

Count () has got three formats:

Count(*) : This function returns the number of rows in the table that satisfy the criteria of select statement. It includes duplicate rows and rows with NULL values in any of the column

Example: Count the number of employees in the employee table.

```
mysql> select count(*) from employee;
+-----+
| count(*) |
+-----+
|         7 |
+-----+
1 row in set (0.00 sec)
```

Count(<col name>): This function returns the number of not null values in the specified column, but includes duplicate values in counting

Example: count the number of grades of employees in the employee table.

```
mysql> select count(grade) from employee;
+-----+
| count(grade) |
+-----+
|             5 |
+-----+
1 row in set (0.00 sec)
```

Count(DISTINCT <col name>): This function returns the number of unique, not null values in the specified column.

Example: Count the number of different grades of the employee

```
mysql> select count(distinct grade) from employee;
+-----+
| count(distinct grade) |
+-----+
|                       3 |
+-----+
1 row in set (0.00 sec)
```

Grouping Records (Group by clause)

- To divide the rows in a table into smaller groups of information, group by clause is used.
- It combines all identical rows in a group of fields.
- A column name is used for grouping

Syntax:-

```
SELECT [DISTINCT] <COL LIST> FROM <TABLE NAME>  
[WHERE <CONDITION>]  
[GROUP BY < COLUMN NAMES>]  
[HAVING <CONDITION>]  
[ORDER BY <COL NAME>/<EXPR> ASC/DESC];
```

NOTE -

- Group by expression specifies the columns whose values determine the basis for grouping rows

Example

Q. Display the no of employees in each zone.

```
mysql> select zone,count(zone) from employee group by zone;
+-----+-----+
| zone | count(zone) |
+-----+-----+
| Centre | 1 |
| East | 1 |
| North | 2 |
| South | 1 |
| West | 2 |
+-----+-----+
5 rows in set (0.01 sec)
```

Q. Display the no of employees in each zone whose salary is greater than 32000

```
mysql> select zone,count(zone) from employee where salary>32000 group by zone;
+-----+-----+
| zone | count(zone) |
+-----+-----+
| Centre | 1 |
| North | 2 |
| South | 1 |
+-----+-----+
3 rows in set (0.00 sec)
```

Having clause

- This clause is used to restrict rows resulting after grouping.
- Steps followed in execution of select with group by and having clause-
 1. Rows are grouped according to the columns in the group by clause.
 2. Then the group function is applied.
 3. Groups matching with Having clauses are displayed.

Example

Q. Display only those departments with sum of salaries whose total salary is greater than 70000

```
mysql> select dept,sum(salary) from employee group by dept having sum(salary)>70000;
+-----+-----+
| dept | sum(salary) |
+-----+-----+
| 10 | 102000 |
| 30 | 74000 |
+-----+-----+
2 rows in set (0.00 sec)
```


Cartesian Product (Cross Join or unrestricted join)

Returns a result in which Each row of the first table is paired with all the rows in the second table which is rarely useful.

Example- Consider the following tables

```
mysql> SELECT * FROM EMPLOYEE;
+----+-----+-----+-----+-----+-----+-----+
| No | Name   | Salary | Zone   | Age | Grade | Dept |
+----+-----+-----+-----+-----+-----+-----+
|  1 | Mukul  | 30000  | West   | 28  | A     | 10   |
|  2 | Kritika| 35000  | Centre | 30  | A     | 10   |
|  3 | Naveen | 32000  | West   | 40  | NULL  | 20   |
|  4 | Uday   | 38000  | North  | 38  | C     | 30   |
|  5 | Nupur  | 32000  | East   | 26  | NULL  | 20   |
|  6 | Moksh  | 37000  | South  | 28  | B     | 10   |
|  7 | Shelly | 36000  | North  | 26  | A     | 30   |
|  8 | Mukul  | 40000  | West   | 50  | C     | 10   |
+----+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)

mysql> SELECT * FROM DEPARTMENT;
+----+-----+
| Dept | Dname   |
+----+-----+
| 10   | Mechanical |
| 20   | Electrical |
| 30   | Computer Sci |
+----+-----+
3 rows in set (0.00 sec)
```

Q: To display the cartesian product of the employee names and their department name

```
mysql> select Name,Dname from employee,department;
+----+-----+-----+
| Name   | Dname   |
+----+-----+-----+
| Mukul  | Mechanical |
| Mukul  | Electrical |
| Mukul  | Computer Sci |
| Kritika| Mechanical |
| Kritika| Electrical |
| Kritika| Computer Sci |
| Naveen | Mechanical |
| Naveen | Electrical |
| Naveen | Computer Sci |
| Uday   | Mechanical |
| Uday   | Electrical |
| Uday   | Computer Sci |
| Nupur  | Mechanical |
| Nupur  | Electrical |
| Nupur  | Computer Sci |
| Moksh  | Mechanical |
| Moksh  | Electrical |
| Moksh  | Computer Sci |
| Shelly | Mechanical |
| Shelly | Electrical |
| Shelly | Computer Sci |
| Mukul  | Mechanical |
| Mukul  | Electrical |
| Mukul  | Computer Sci |
+----+-----+-----+
24 rows in set (0.00 sec)
```

Joins in MySQL: A join is used when data from two or more tables is required based on the common values existing in corresponding columns of two tables. There are many types of joins such as:

Equi join

- Specified columns from the joining tables are checked for equality.
- Values from joining tables are retrieved only if the condition in where clause is satisfied.

SYNTAX:-

```
SELECT <column_name (s)>  
FROM <table_name1>, <table_name2>, ..., <table_nameN>  
WHERE <table_name1>.<column_name> = <table_name2>.<column_name>;
```

Q: to display the name of the employee and their department

```
mysql> select name,dname from employee e,department d where e.dept = d.dept;
```

name	dname
Mukul	Mechanical
Kritika	Mechanical
Naveen	Electrical
Uday	Computer Sci
Nupur	Electrical
Moksh	Mechanical
Shelly	Computer Sci
Mukul	Mechanical

8 rows in set (0.00 sec)

You should always qualify the common columns when joining tables by using the “.” (dot) operator.

Natural Join

This clause is based on all the columns in the two tables that have the same name. It selects the rows from two tables that have equal values in the matched columns. The Resulting table displays the common columns only once in the result.

SYNTAX:-

```
SELECT [column_names | *]  
FROM table_name1  
NATURAL JOIN table_name2;
```

Example- consider the same tables employee and department.

Q : To display the name of employee and department of all employee

```
mysql> select Name, dept, Dname from employee natural join department;
```

Name	dept	Dname
Mukul	10	Mechanical
Kritika	10	Mechanical
Naveen	20	Electrical
Uday	30	Computer Sci
Nupur	20	Electrical
Moksh	10	Mechanical
Shelly	30	Computer Sci
Mukul	10	Mechanical

8 rows in set (0.00 sec)

Appears only once

ASSERTION AND REASONING QUESTIONS

1. Assertion(A): The resultset refers to a logical set of records that are fetched from the database executing an SQL Query.
Reason (R): Resultset stored in a cursor object can be extracted by using fetch(...) functions.
 - (a) Both A and R are true and R is the correct explanation of A
 - (b) Both A and R are true and R is not the correct explanation of A
 - (c) A is true but R is false
 - (d) A is false but R is true
2. Assertion(A): In SQL, aggregate function avg() calculates the average value on a set of values and produce a single result.
Reason (R): The aggregate functions are used to perform some fundamental arithmetic tasks such as min(), max(), sum() etc.
 - (a) Both A and R are true and R is the correct explanation of A
 - (b) Both A and R are true and R is not the correct explanation of A
 - (c) A is true but R is false
 - (d) A is false but R is true
3. Assertion(A): Primary key is a set of one or more attributes that identify tuples in a relation.
Reason (R): The primary key constraint is a combination of the NOT NULL and UNIQUE constraints.
 - (a) Both A and R are true and R is the correct explanation of A
 - (b) Both A and R are true and R is not the correct explanation of A
 - (c) A is true but R is false
 - (d) A is false but R is true
4. Assertion(A): Foreign key is a non-key attribute whose value is derived from primary key of another table.
Reason (R): Each foreign key refers a candidate key in a relation.
 - (a) Both A and R are true and R is the correct explanation of A
 - (b) Both A and R are true and R is not the correct explanation of A
 - (c) A is true but R is false
 - (d) A is false but R is true

5. Assertion(A): The SELECT statement in SQL is used to retrieve data from one or more tables.
Reason(R): The SELECT statement can be used to retrieve all columns or a subset of columns from a table.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true
6. Assertion(A): The WHERE clause in SQL is used to filter data based on a specified condition.
Reason(R): The WHERE clause is always required when using the SELECT statement in SQL
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true
7. Assertion (A): The ORDER BY clause in SQL is used to sort the result set in ascending or descending order.
Reason(R): The ORDER BY clause can only be used with the SELECT statement in SQL.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true
8. Assertion (A): The IN operator in SQL is used to match a value with a list of values.
Reason(R): The IN operator can only be used with the where clause in SQL.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true
9. Assertion (A): The between operator in SQL is used to match a value with in a range of values.
Reason(R): The between operator can only be used with numerical values in SQL.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true
10. Assertion (A): The LIKE operator in SQL is used to match a value with a pattern.
Reason(R): The % and _ wildcard characters can be used with the LIKE operator in SQL.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

ANSWERS

1. (b)
2. (b)
3. (a)
4. (b)
5. (a)
6. (b)
7. (a)
8. (b)
9. (b)
10. (a)

I	<p>Interface Python with SQL database</p> <p><u>Database connectivity</u></p> <p>Database connectivity refers to connection and communication between an application and a database system.</p> <p>The term “front-end” refers to the user interface, while “back-end” means the server, application and database that work behind the scenes to deliver information to the user.</p> <ul style="list-style-type: none">● Mysql.connector <p>Library or package to connect from python to MySQL.</p> <p>Before we connect the program with mysql , we need to install connectivity package named mysql-connector- python</p> <ul style="list-style-type: none">● Command to install connectivity package <pre>pip install mysql-connector-python</pre> <ul style="list-style-type: none">● Command to import connector <pre>import mysql.connector</pre>
2	<p><u>Steps for creating database connectivity applications</u></p> <p>i) Start Python</p> <p>start python editor to create our own python script.</p> <p>ii) Import mysql.connector package</p> <p>Import statement as shown below:</p> <pre>import mysql.connector</pre>

or

```
import mysql.connector as con
```

iii) Establishing a connection to MySQL DATABASE.

We need to establish a connection to a mysql database using connect () function of mysql.connector package.

The connect statement creates a connection to the mysql server and returns a MySQL connection object.

A database connection object controls the connection to the database. It represents a unique session with a database connected from within a program.

Syntax:

```
<Connection object> = mysql.connector.connect (host=<hostname>,user=<username>,  
passwd=<password>, database=<database>)
```

Where,

Hostname-The hostname of database server or IP address

User -Username on MYSQL

Password-Password of the database user

Database-Name of the database

Example:

```
import mysql.connector
```

```
con=mysql.connector.connect(host="localhost",user="root", passwd="manager " ,  
database="student12")
```

iv) Creating a cursor Object

It is a useful control structure of database connectivity. It will let us execute all the queries we need. Cursor stores all the data as a temporary container of returned data and allows traversal so that we can fetch data one row at a time from cursor. Cursors are created by the <connectionobject>.cursor()method.

A Database cursor is a special control structure that facilitates the row by row processing of records in the result set.

Syntax:

```
<cursor object>=<connectionobject>.cursor()
```

```
cursor=con.cursor()
```

v) Execute SQL query:

We can execute SQL query using <cursorobject>. execute() function .

Syntax:

```
<cursor object>.execute(<sql query string>)
```

```
cursor.execute("select * from student")
```

The above code will execute the SQL query and store the retrieved records (resultset) in the cursor object(cursor).

Result set refers to a logical set of records that are fetched from the database by executing an SQL query and made available in the program.

vi) Extract data from Result set:

The records retrieved from the database using SQL select query has to be extracted as record from the result set. We can extract data from the result set using the following fetch () function.

➤ Multiple ways to retrieve data:

fetchall()

fetchone()

fetchmany()

❖ fetchall()

Fetches all the rows from the result set in the form of a tuple containing the records.

❖ fetchone()

Fetches only one row from the result set in the form of a tuple containing a record

Syntax:

```
<data>=<cursor>.fetchall()
```

```
<data>=<cursor>.fetchone()
```

```
data=cursor.fetchall()
```

for row in data:

```
    print(row)
```

vii) Closing cursor and connection

we must close the connection established.

Syntax:

```
<connectionobject>.close()  
con.close()
```

3 Python connectivity program to display entire content from a table.

```
import mysql.connector  
mycon=mysql.connector.connect(host="localhost",user="root",passwd="manager",  
database="class12")  
if mycon.is_connected():  
    print("successfully connected")  
    cursor=mycon.cursor()  
    st="select * from employee"  
    cursor.execute(st)  
    data=cursor.fetchall()  
    count=cursor.rowcount  
    print("Number of records in the employee table",count)  
    print("Details of the records of the employee")  
    for row in data:  
        print(row)  
    mycon.close()  
else:  
    print("connection problem")
```


4	<p>Python connectivity program to display the record from a table by using a parameterised query.</p> <pre> import mysql.connector mycon=mysql.connector.connect(host="localhost",user="root",passwd="manager", database="class12") if mycon.is_connected(): print("successfully connected") cursor=mycon.cursor() eid=input("enter the employee id") st="select * from employee where empid='{}'.format(eid) cursor.execute(st) data=cursor.fetchall() print("Details of the records of the employee") for row in data: print(row) mycon.close() else: print("connection problem") </pre>
5	<p>Python connectivity program to insert a new record to a table by using a parameterised query.</p> <pre> import mysql.connector con=mysql.connector.connect(host="localhost",user="root",password="manager", database="class12") if con.is_connected(): print("successfully connected") cur=con.cursor() empid=int(input("enter empid:")) ename=input("enter name:") desg=input("enter designation:") </pre>

```

sex=input("enter sex:")

salary=float(input("enter salary:"))

cur=con.cursor()

str=("insert into employee(empid,ename,desg,sex,sal)values({},'{}','{}','{}','{}').format
(empid,ename, desg,sex,salary))

cur.execute(str)

con.commit()

print("successfully inserted")

con.close()

else:

    print("connection problem")

```

6 Python connectivity program to update a record of a table by using parameterised query.(Update salary of employees using employee id)

```

import mysql.connector

con=mysql.connector.connect(host="localhost",user="root",password="manager",
database="class12")

if con.is_connected():

    print("successfully connected")

    cur=con.cursor()

    eid=int(input("enter empid:"))

    salary=float(input("enter salary:"))

    cur=con.cursor()

    str=("update employee set sal={} where empid={}").format(salary,eid)

    cur.execute(str)

    con.commit()

    print("successfully updated record")

    con.close()

else:

    print("connection problem")

```

7	<p>Python connectivity program to delete a record from table by using parameterised query.(Delete employee details by using employee id)</p> <pre> import mysql.connector con=mysql.connector.connect(host="localhost",user="root",password="manager",database="class12") if con.is_connected(): print("successfully connected") cur=con.cursor() eid=int(input("enter empid:")) cur=con.cursor() str=("delete from employee where empid={}").format(eid) cur.execute(str) con.commit() print("successfully deleted record:") con.close() else: print("connection problem") </pre>
Questions	
1	<p>Write a python connectivity program to display only first three records from a table?</p> <pre> import mysql.connector mycon=mysql.connector.connect(host="localhost",user="root",passwd="manager", database="class12") if mycon.is_connected(): cursor=mycon.cursor() st="select * from employee" cursor.execute(st) data=cursor.fetchmany(3) print("Details of the records of the employee") for row in data: print(row) </pre>

	<pre> mycon.close() else: print("connection problem") </pre>
2	<p>Write a python connectivity program to display first record from a table?</p> <pre> import mysql.connector mycon=mysql.connector.connect(host="localhost",user="root",passwd="manager", database="class12") if mycon.is_connected(): cursor=mycon.cursor() st="select * from employee" cursor.execute(st) data=cursor.fetchone() print("Details of the records of the employee") print(data) mycon.close() else: print("connection problem") </pre>
3	<p>Write a python connectivity program to display the records of all female managers from a table named employee and also find out the number of female managers. If the details are not existing, then print “Record Not Found” message?</p> <pre> import mysql.connector mycon=mysql.connector.connect(host="localhost",user="root",passwd="manager", database="class12") if mycon.is_connected(): cursor=mycon.cursor() st="select * from employee where desg='Manager' and sex='F'" cursor.execute(st) data=cursor.fetchall() count=cursor.rowcount if count>0: </pre>

	<pre> print("Number of Female Managers:",count) print("Details of the records of the employee") for row in data: print(row) mycon.close() else: print("Record not found") else: print("connection problem") </pre>
4	<p>Write a python connectivity program to display the records of all managers from a table named employee using parameterised query and also findout the number of managers. If the details are not existing, then print “Record Not Found” message?</p> <pre> import mysql.connector mycon=mysql.connector.connect(host="localhost",user="root",passwd="manager", database="class12") if mycon.is_connected(): cursor=mycon.cursor() designation=input("enter the designation") st="select * from employee where desg='{}'.format(designation) cursor.execute(st) data=cursor.fetchall() count=cursor.rowcount if count>0: print("Number of Managers",count) print("Details of managers from employee table") for row in data: print(row) mycon.close() else: print("Record not found") else: print("connection problem") </pre>

5	<p>Write a python connectivity program to update salary from a table named employee .Use parameterised query and count the number of updated record. If the details are not existing,then print “Record Not Found” message?</p> <pre> import mysql.connector con=mysql.connector.connect(host="localhost",user="root",password="manager", database="class12") if con.is_connected(): print("successfully connected") cur=con.cursor() eid=int(input("enter empid:")) salary=float(input("enter salary:")) cur=con.cursor() str=("update employee set sal={} where empid={}".format(salary,eid)) cur.execute(str) con.commit() count=cur.rowcount if count>0: print("successfully updated record:",count) con.close() else: print("Record not found") else: print("connection problem") </pre>
6	<p>Write a python connectivity program to delete the record from a table named employee using parameterised query and also count the number of deleted record. If the details are not existing,then print “Record Not Found” message?</p> <pre> import mysql.connector con=mysql.connector.connect(host="localhost",user="root",password="manager",database="class12") if con.is_connected(): </pre>

```

cur=con.cursor()

eid=int(input("enter empid:"))

cur=con.cursor()

str=("delete from employee where empid={}").format(eid)

cur.execute(str)

con.commit()

count=cur.rowcount

if count>0:

    print("successfully deleted record:",count)

    con.close()

else:

    print("Record not found")

else:

    print("connection problem")

```

CBSE TYPE QUESTIONS AND ANSWERS

7 **Shyam has created a table named Student in MYSQL database, SCHOOL:**

- **rno(Roll number)- integer**
- **name(Name) - string**
- **Per(Percentage) – float**

Note the following to establish connectivity between Python and MySQL:

- **Username - root**
- **Password - manager**
- **Host – localhost**

Shyam, now wants to display the records of students whose percentage is more than 90. Help Shyam to write the program in Python

```

import mysql.connector

mycon=mysql.connector.connect(host="localhost",user="root",passwd="manager",
database="school")

cursor=mycon.cursor()

per=90

st="select * from student where per>{}".format(per)

cursor.execute(st)

data=cursor.fetchall()

```

	<pre>print("Details of the records of the employee") for row in data: print(row) mycon.close()</pre>
8	<p>Shyam has created a table named ‘Student’ in MYSQL database, ‘SCHOOL’:</p> <ul style="list-style-type: none"> • rno(Roll number)- integer • name(Name) - string • Per(Percentage) – float <p>Note the following to establish connectivity between Python and MySQL:</p> <ul style="list-style-type: none"> • Username - root • Password - manager • Host – localhost <p>Shyam, now wants to insert records of students . Help Shyam to write the program in Python.</p> <pre>import mysql.connector con=mysql.connector.connect(host="localhost",user="root",password="manager", database="school") cur=con.cursor() rno=int(input("Enter the Roll number:")) name=input("Enter the name") per=float(input("enter the percentage:")) cur=con.cursor() str=("insert into student(rno,name,per)values({},'{}', {})".format(rno,name,per)) cur.execute(str) con.commit() print("successfully inserted record:") con.close()</pre>
9	<p>Shyam has created a table named ‘Student’ in MYSQL database, ‘SCHOOL’:</p> <ul style="list-style-type: none"> • rno(Roll number)- integer • name(Name) - string • Per(Percentage) – float <p>Note the following to establish connectivity between Python and MySQL:</p> <ul style="list-style-type: none"> • Username - root • Password - manager • Host – localhost

Shyam, now wants to increase the percentage of students by 2% ,who got less than 40 percentage. Help Shyam to write the program in Python.

```
import mysql.connector
con=mysql.connector.connect(host="localhost",user="root",password="manager",
database="school")
cur=con.cursor()
per=40
cur=con.cursor()
str=("update student set per=per+2 where per<{}").format(per)
cur.execute(str)
con.commit()
print("successfully updated record:") con.close()
```

10 **Shyam has created a table named ‘Student’ in MYSQL database, ‘SCHOOL’:**

- **rno(Roll number)- integer**
- **name(Name) - string**
- **Per(Percentage) – float**

Note the following to establish connectivity between Python and MySQL:

- **Username - root**
- **Password - manager**
- **Host – localhost**

Shyam, now wants to delete the records of students who got less than 33 percentage. Help Shyam to write the program in Python.

```
import mysql.connector
con=mysql.connector.connect(host="localhost",user="root",password="manager",
database="school")
cur=con.cursor()
cur=con.cursor()
per=33
str=("delete from student where per<{}").format(per)
cur.execute(str)
con.commit()
print("successfully deleted record:")
con.close()
```

Sample Paper - 1
Computer Science (083)

Class : XII

Maximum Marks: 70

Time Allowed: 3 hours

General Instructions:

- Please check this question paper contains 35 questions.
- The paper is divided into 4 Sections- A, B, C, D and E.
- Section A, consists of 18 questions (1 to 18). Each question carries 1 Mark.
- Section B, consists of 7 questions (19 to 25). Each question carries 2 Marks.
- Section C, consists of 5 questions (26 to 30). Each question carries 3 Marks.
- Section D, consists of 2 questions (31 to 32). Each question carries 4 Marks.
- Section E, consists of 3 questions (33 to 35). Each question carries 5 Marks.
- All programming questions are to be answered using Python Language only.

SECTION A		
1.	State True or False Python supports dynamic typing.	1
2.	Identify the odd one from this list: a) Tuple b) Dictionary c) List d) String	1
3.	Choose the correct option. d = { "Naturals":100 , "Amul" : 200, "BR": 300 , "Amul" : 500 } print(sorted(d)) a) { "Naturals":100 , "Amul" : 200, "BR": 300 , "Amul" : 500 } b) ["Amul", "Amul", "BR", "Naturals"] c) ["Amul", "BR", "Naturals"] d) {"Amul":500, "BR":300, "Naturals":100}	1
4.	Evaluate the following expression:20+10* 2**2**3 a) 2580 b) 660 c) 7680 d) 540	1
5.	If S='computer science model examination ', what will the following command return? print(S.capitalize()) a) Computer science model examination b) Computer Science Model Examination c) computer science model examination d) COMPUTER SCIENCE MODEL EXAMINATION	
6	Identify the function which is not a MySQL function. a) Sum() b) Count() c) Max() d) Average()	

7.	<p>Choose the correct option from the following: The tell() function</p> <p>a) Places the file handle at the position that we specify b) Sets the file handle at the beginning of the file c) Returns the byte number of the position of the file handle. d) Brings the file handle to the end of the file</p>	1
8.	<p>The command used to insert a new column to an already existing table is:</p> <p>a) Update b) Alter c) Insert d) modify</p>	1
9.	<p>Assuming the table emp to exist, what will the following command do?Delete from emp;</p> <p>a) Will delete the table emp b) Will delete all the attributes in it c) Will delete all the tuples in it. d) Wrong syntax</p>	1
10.	<p>Find the erroneous statement from the following:</p> <pre> Str= 'Hard Work Is The Key To Success' print(Str) # Statement 1 for I in len(str): # Statement 2 if Str[I]== ' ': # Statement 3 Str[I]= ' - ' # Statement 4 Str= 'Good Luck' # Statement 5 </pre> <p>(a) Statement 2 (b) Statement 4 (c) Statement 5 (d) Statement 2 and 4</p>	1
11.	<p>An Alternate key is a -----key, but not a Primary Key.</p> <p>a) Candidate b) Unique c) Foreign d) None of these</p>	1

12.	<p>Identify the correct option(s) to open the text file in read mode.</p> <p>i) sf =open('student.txt','w')</p> <p>ii) sf = open('student.txt','r')</p> <p>iii) sf = open('student.txt')</p> <p>iv) sf = open('student.txt','rb')</p> <p>a) Option i</p> <p>b) both iii & iv</p> <p>c) both ii and iii</p> <p>d) both ii and iv</p>	1
13.	<p>The wild card character ‘_’ indicates:</p> <p>a) one character</p> <p>b) Any number of characters</p> <p>c) Specific number of characters mentioned</p> <p>d) One column</p>	1
14.	<p>Fill in the blank: _____Protocol is used to browse the internet.</p> <p>(a) VoIP (b) SMTP (c) PPP (d)HTTP</p>	1
15.	<p>What will be the output of the following: A=”Model Exam” B=A print(id(A)==id(B))</p> <p>a) True</p> <p>b) False</p> <p>c) 0</p> <p>d) 1</p>	1
16.	<p>Which of the following is an optional argument of the connect()function inpython mysql.connector module?</p> <p>a) Host</p> <p>b) User</p> <p>c) Password</p> <p>d) database</p>	1

Q17 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 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		
(d) A is false but R is True		
17.	Assertion (A):- The default delimiter in CSV files is comma(.). Reasoning (R):- The default delimiter of the CSV file can be overridden with the help of the 'delimiter' attribute.	1
18.	Assertion (A):- If the arguments in a function call statement match the number and order of arguments as defined in the function definition, such arguments are called positional arguments. Reasoning (R):- During a function call, the argument list first contains default argument(s) followed by positional argument(s).	1
SECTION B		
19.	(i) Expand the following terms: POP3 , URL (ii) Give one difference between Web Server and Web Site. OR (i) Write down any one advantage of computer networks (ii) Define Gateway	1+1
20.	Roshan tried to define a function to input an integer and print its factors. But he encountered certain syntax and logical errors in his code. Rewrite the corrected code and underline the corrections made. def factors(): n=input("Enter the number") for i in range(0,n) If n% i = 0 : print(i)	2
21.	Write a function countNow(STUDENT) in Python, that takes the dictionary, STUDENT as an argument and displays the names (in uppercase) having 4 characters. For example, Consider the following dictionary STUDENT={ 1:"ARUN",2:"AVINASH",3:"PRIYA",4:"NIHA",5:"JEWEL" } The output should be: ARUN NIHA OR Write a function, JUMBLE(String), that takes a string as an argument and returns another string where uppercase letter is converted to lowercase and vice versa. For example, if the string is "HeLlO", then the output will be :hEILo	1
22.	Predict the output of the Python code given below: D = ["P",20,"R",10,"S",30] T = 0	2

	<pre>A = "" B = 0 for C in range(1,6,2): T= T + C A= A + D[C-1]+"\$" B = B + D[C]</pre>	
23	<p>Write the Python statement for each of the following tasks using BUILT-IN functions/methods only:</p> <p>(i) To delete last element in the list L1. (ii) To find the length of a string named message</p> <p style="text-align: center;">OR</p> <p>A list named MARK stores marks obtained by a student in 5 subjects. Write the Python command to import the required module and (using built-in function) to display the average mark of the student.</p>	1+1
24.	<p>Ms. Shalu has just created a table named “Staff” containing Columns Sname, Department and Salary. After creating the table, she realized that she has forgotten to add a primary key in the table. Help her in writing an SQL command to add a primary key - StaffId of integer type to the table Staff. Thereafter, write the command to insert the following record in the table:</p> <p>StaffId - 111 Sname- Shalu Department: Marketing Salary: 45000</p> <p style="text-align: center;">OR</p> <p>Kiran is working in a database named SCHOOL, in which he has created a table named “STUDENT” containing columns UID, SName, Gender and Category. After creating the table, he realized that the attribute, Category has to be deleted from the table and a new attribute Stream of data type string has to be added. This attribute Stream cannot be left blank. Help him to write the commands to complete both the tasks.</p>	2
25.	<p>Predict the output :</p> <pre>def Find (P, Q = 20) : P = P + Q Q = P - Q print (P,"@",Q) return P</pre> <pre>R =380 S= 120 R=Find(R, S) print(R,"*",S) S=Find(S) print(R,"*",S) print (T,B,sep='#') print(A)</pre>	2

SECTION C

26. Predict the Output :

```

Text1="ChandraYAAN-3"
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])
    elif Text1[I]>="a" and Text1[I] <="z":
        Text2=Text2 + Text1[I].upper()
    else:
        Text2=Text2 + "*"
    I=I+1
print (Text2)

```

3

27 Consider the given table Employee and answer the following questions

EmpID	EmpName	Designation	Salary	DoJ
E101	Sam	Systems Engineer	30000	2020-09-12
E102	Krish	Technical Lead	35000	2020-03-07
E103	Mia	Lead Consultant	43000	2019-02-16
E104	Isabel	Manager	50000	2018-02-20
E105	Nasrin	Lead Consultant	50000	2018-10-04
E106	Ayan	Systems Engineer	32000	2021-01-15
E107	Sen	Manager	55000	2017-11-25

Write the output of the queries based on Employee table

(i) select EmpName, Designation from Employee where EmpName like '___';

(ii) select distinct Designation from Employee;

(iii)select EmpID,EmpName, Designation from Employee where Designation in ('Technical Lead', 'Lead Consultant');

28. Write a Python function ReversWords() to read the text file "Python.txt" and display the words starting with 'P' or 'p' in reverse order and all other words as such.
Eg:If the file contains the following text:
Python is a popular programming language.
Then it is to be displayed as->
nohtyP is a ralupop gnimmargorp language.

3

	OR						
	Write a function AMCount() to display the no.of occurrences of 'A' and 'M' ('a' and 'm' also)separately of a text file STORY.TXT.						
29.	Consider the table EMPLOYEEES shown below and write SQL commands for (i) to (iii)						3
	EM PID	NAME	DESIGN ATION	SALA RY	BEN EFI TS	ADDRESS	CITY
	200	Akash	Manager	15000	2000	Christ Nagar	Jaipur
	201	Ajit	Manager	12000	1500	Delhi Road	Agra
	202	Ramesh	Salesman	8000	800	Bandra	Mumbai
	203	Deepak	Clerk	5000	500	Holy Palace	Mumbai
	204	Aman	Officer	10000	1000	Badarwa	Haryana
	(i) To display Name , Designation and Address of all employees whose name starts with character 'A' (ii) To display the NAME,DESIGNATION,ADDRESS and TOTAL SALARY of all employees where TOTAL SALARY is calculated as SALARY + BENEFITS (iii) To display the number of employees designation wise						
30.	Write Addnew(Book) and Remove(Book) functions in python to add a new book and remove a book from a List of books, considering them to act as PUSH and POP operations of the data structure Stack.						3
SECTION D							
31	Consider the following tables DOCTOR and SALARY. Write SQL commands for the following statements. TABLE : DOCTOR						4
	ID	NAME	DEPT	SE X	EXPERIENC E		
	101	JOHN	ENT	M	12		
	104	SMITH	ORTHOPEDI C	M	6		
	107	F GEORGE	CARDIOLOG Y	M	11		
	114	LARA DUTT	SKIN	F	10		
	109	K GEORGY	MEDICINE	F	4		
	105	JOHNSON	ORTHOPEDI C	M	7		
	117	LUCY	ENT	F	8		
	111	BILL G	MEDICINE	F	15		

130	MORPHY	ORTHOPEDI C	M	16	
TABLE : SALARY					
ID	BASI C	ALLOWANC E	CONSULTATIO N		
101	12000	1000	300		
104	24000	2300	500		
107	32000	3200	500		
114	12000	1000	600		
109	41000	1700	100		
105	27100	1100	200		
117	11000	1200	300		
111	18900	1600	200		
130	42000	2600	300		
(i) Display NAME of all doctors who are in “ORTHOPEDIC” having more than 10 years’ experience from the table DOCTOR. (ii) Display the average salary of all doctors working in “ENT” department using the DOCTOR and SALARY. (Salary= Basic + Allowance) (iii) Display the minimum ALLOWANCE of female doctors. (iv) Display the highest consultation fee amount for all male doctors.					
32	Write a Program in Python that defines and calls the following user defined functions: a) add() – To accept and add data of an employee to a CSV file ‘furdata.csv’. Each record consists of a list with field elements as fid, fname and fprice to store furniture id, furniture name and furniture price respectively. b) search() - To display the records of the furniture whose price is more than 10000.				4
33	SAP Methodologies is planning to expand their network in India starting with three cities in India to build infrastructure for research and development of their chemical products. The company has planned to setup their main office in Chennai at three different locations and have named their offices as Production Unit, Finance Unit and Media Unit. The company has one more research office namely Corporate Unit in Mumbai. A rough layout of the same is as follows:				

Approximate distance between these units is as follows:

PRODUCTION UNIT	FINANCE UNIT	70M
PRODUCTION UNIT	MEDIA UNIT	15km
PRODUCTION UNIT	CORPORATE UNIT	2112 Km
FINANCE UNIT	MEDIA UNIT	15Km

WIN G	NO.COMPUTERS
PRODUCTION UNIT	15
FINANCE UNIT	35
MEDIA UNIT	10
CORPORATE UNIT	30

Suggest the kind of network required (out of LAN, MAN, WAN) for each of the following units:

- (a) Production Unit and Media Unit
- (b) Production Unit and Finance Unit
- (ii) Name the device you suggest for connecting all computers within each unit?
- (iii) Which of the following communication media, will you suggest to be procured by the company for connecting their local office units in Chennai for very effective (high speed) communication?
 - (a) Telephone cable
 - (b) Optical fiber
 - (c) Ethernet cable
- (iv) Among the different units in Chennai, which unit can be made the Server. Justify your reason.
- (v) Suggest a cable/wiring layout for connecting the company's local office units located in Chennai.

- | | | |
|----|---|-----|
| 34 | <p>i) Differentiate between binary file and csv file:</p> <p>ii) Raghav is a Python programmer, created a binary file record.dat with employee id, ename and salary. The file contains 10 records. He now has to update a record based on the employee id entered by the user and update the salary. The updated record is then to be written in the file temp.dat. The records which are not to be updated also have to be written to the file temp.dat. If the employee id is not found, an appropriate message should to be displayed.</p> <p style="text-align: center;">OR</p> <p>i) Differentiate between seek() and tell() functions</p> <p>ii) Anushka wants to increase the price by 10% for those items which are less than 250. The details of the items (itemno, iname and price) are stored in a file named 'items.dat'. She wants to store the modified data in another file named</p> | 2+3 |
|----|---|-----|

	<p>items_copy.dat. Anushka has written a function named Price_Change() . Help Anushka to accomplish the task</p>	
35	<p>Define the term Domain with respect to RDBMS. Give one example to support your answer.</p> <p>Sunil wants to write a program in Python to read a record from the table named student and displays only those records who have marks between 80 and 95:</p> <p>RollNo – integer Name – string Clas – integer Marks – integer</p> <p>Note the following to establish connectivity between Python and MYSQL:</p> <ul style="list-style-type: none"> · Username is root · Password is tiger <p>The table exists in a MYSQL database named vidyalaya.</p> <p style="text-align: center;">OR</p> <p>i) Define Candidate Key</p> <p>ii) Write a program to insert the following record in the table Student:</p> <p style="padding-left: 40px;">RollNo – integer Name – string Class – integer Marks – integer</p> <p>Note the following to establish connectivity between Python and MYSQL:</p> <p>Username is root Password is abcd</p> <p>The table exists in a MYSQL database named XIICS. The details (RollNo, Name, Class and Marks) are to be accepted from the user.</p>	

Sample Paper 1 – Marking Scheme
Computer Science (083)

Class : XII

SECTION A		
1.	State True or False Python supports dynamic typing Ans: True	1
2.	Identify the odd one from this list: a) Tuple b) Dictionary c) List d) String	1
3.	Choose the correct option. d = { "Naturals":100, "Amul" : 200, "BR": 300 , "Amul" : 500 } print(sorted(d)) a) { "Naturals":100 , "Amul" : 200, "BR": 300 , "Amul" : 500 } b) ["Amul", "Amul", "BR", "Naturals"] c) ["Amul", "BR", "Naturals"] d) {"Amul":500, "BR":300, "Naturals":100}	1
4.	Evaluate the following expression: $20+10*2**2**3$ a) 2580 b) 660 c) 7680 d) 540	1
5.	If S='computer science model examination ', what will the following command return? print(S.capitalize()) a) Computer science model examination b) Computer Science Model Examination c) computer science model examination d) COMPUTER SCIENCE MODEL EXAMINATION	1
6.	Identify the function which is not a MySQL function. a) Sum() b) Count() c) Max() d) Average()	1
7.	Choose the correct option from the following: The tell() function a) Places the file handle at the position that we specify. b) Sets the file handle at the beginning of the file. c) Returns the byte number of the position of the file handle. d) Brings the file handle to the end of the file.	1
8.	The command used to insert a new column to an already existing table is: a) Update b) Alter c) Insert d) modify	1

9.	<p>Assuming the table 'emp' to exist, what will the following command do? Delete from emp;</p> <p>a) Will delete the table emp b) Will delete all the attributes in it c) Will delete all the tuples in it. d) Wrong syntax</p>	1
10.	<p>Find the erroneous statement from the following:</p> <pre>Str='Hard Work Is The Key To Success' print(Str) # Statement 1 for I in len(str): # Statement 2 if Str[I]=' ': # Statement 3 Str[I]=' - ' # Statement 4 Str='Good Luck' # Statement 5</pre> <p>(a) Statement 2 (b) Statement 4 (c) Statement 3 and 5 (d) Statement 2 and 4</p>	1
11.	<p>An Alternate key is a _____ key, but not a Primary Key.</p> <p>a) Candidate b) Unique c) Foreign None of these</p>	1
12.	<p>Identify the correct option(s) to open the text file in read mode. (Assume the file already exists)</p> <p>i) sf =open('student.txt','w') ii) sf = open('student.txt','r') iii) sf = open('student.txt') iv) sf = open('student.txt','rb')</p> <p>a) Option i b) both iii & iv c) both ii and iii d) both ii and iv</p>	1
13.	<p>The wild card character '_' indicates:</p> <p>a) one character b) Any number of characters c) Specific number of characters mentioned d) One column</p>	1
14.	<p>Fill in the blank: _____ protocol is used to browse the internet.</p> <p>(a) VoIP (b) SMTP (c) PPP (d)HTTP</p>	1

15.	<p>What will be the output of the following: A="Model Exam" B=A print(id(A)==id(B))</p> <p>a) True b) False c) 0 d) 1</p>	1
16.	<p>Which of the following is an optional argument of the connect() function in python mysql.connector module?</p> <p>a) Host b) User c) Password d) database</p>	1
<p>Q17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as</p> <p>(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 (d) A is false but R is True</p>		
17.	<p>Assertion (A):- The default delimiter in CSV files is comma(,). Reasoning (R):- The default delimiter of the CSV file can be overridden with the help of the 'sep' attribute.</p> <p>Ans (a) Both A and R are true and R is the correct explanation for A</p>	1
18.	<p>Assertion (A):- If the arguments in a function call statement match the number and order of arguments as defined in the function definition, such arguments are called positional arguments. Reasoning (R):- During a function call, the argument list first contains default argument(s) followed by positional argument(s).</p> <p>Ans (c) A is True but R is False</p>	1
SECTION B		
19.	<p>(i) Expand the following terms: HTTP , URL HTTP – Hyper Text Transfer Protocol URL – Uniform Resource Locator</p> <p>(ii) A web server is a computer system that stores and delivers web pages to users when they request them. A website is a collection of web pages, images, videos, and other digital assets that are hosted on a web server.</p> <p>Or</p> <p>i) Write down any one advantage of computer networks File Sharing / Resource Sharing</p> <p>ii) Define Gateway A gateway is a device which connects dissimilar networks</p>	1+1

20	<p>Roshan tried to define a function to input an integer and print its factors. But he encountered certain syntax and logical errors in his code. Rewrite the corrected code and underline the corrections made.</p> <pre>def factors(): n=input("Enter the number")for i in range(0,n) If n% i = 0 :print(i)</pre> <p>Ans: def factors(): n=int(input("Enter the number"))for i in range(<u>1,n+1</u>): <u>if n% i == 0</u> :print(i)</p>	2
21	<pre>def countNow(STUDENT) : for name in STUDENT.values(): if len(name)= =4: print(name) STUDENT={1:"ARUN",2:"AVINASH",3:"PRIYA",4:"NIHA",5:"JEW EL" } countNow(STUDENT) or def Jumble(str): n=len(str) str2="" for i in range(0,n): if str[i].isupper(): str2=str2+str[i].lower() elif str[i].islower(): str2=str2+str[i].upper() else: str2=str2+str[i] return str2</pre>	
22	<p>9#60 P\$R\$\$ (1 mark for each correct line with the appropriate symbol)</p>	2
23	<p>(i) To delete last element in the list L1. S=L1.pop() (ii) To find the length of a string named message n=len(message) or import statistics print(statistics.mean(MARK))</p>	2

24	<p>ALTER TABLE Staff ADD StaffId INT PRIMARY KEY; INSERT INTO Staff VALUES("Shalu","Marketing",45000,111);</p> <p>Or To delete the attribute, category: ALTER TABLE STUDENT DROP category; To add the attribute, Stream ALTER TABLE Sports ADD stream varchar(10) NOT NULL ;</p>	2																				
25	<p>500 @ 380 500 * 120 140 @ 120 500 * 140</p>	2																				
26	hHANDRAAAN-*4	3																				
27	<p>(i) select EmpName, Designation from Employee where EmpName like '_--';</p> <table border="0"> <thead> <tr> <th>EmpName</th> <th>Designation</th> </tr> </thead> <tbody> <tr> <td>Sam</td> <td>Systems Engineer</td> </tr> <tr> <td>Mia</td> <td>Lead Consultant</td> </tr> <tr> <td>Sen</td> <td>Manager</td> </tr> </tbody> </table> <p>(i) select distinct Designation from Employee;</p> <p>distinct Designation Systems Engineer Technical Lead Lead Consultant Manager</p> <p>(iii)select EmpID,EmpName, Designation from Employee where Designation in ('Technical Lead', 'Lead Consultant');</p> <table border="0"> <thead> <tr> <th>EmpID</th> <th>EmpName</th> <th>Designation</th> </tr> </thead> <tbody> <tr> <td>E102</td> <td>Krish</td> <td>Technical Lead</td> </tr> <tr> <td>E103</td> <td>Mia</td> <td>Lead Consultant</td> </tr> <tr> <td>E105</td> <td>Nasrin</td> <td>Lead Consultant</td> </tr> </tbody> </table>	EmpName	Designation	Sam	Systems Engineer	Mia	Lead Consultant	Sen	Manager	EmpID	EmpName	Designation	E102	Krish	Technical Lead	E103	Mia	Lead Consultant	E105	Nasrin	Lead Consultant	3
EmpName	Designation																					
Sam	Systems Engineer																					
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EmpID	EmpName	Designation																				
E102	Krish	Technical Lead																				
E103	Mia	Lead Consultant																				
E105	Nasrin	Lead Consultant																				
28	<pre>def ReversWords(): with open("Python.txt") as f:ch=f.read() l=ch.split()for i in l: if i[0] in "Pp": print(i[::-1],end=' ') else:</pre>	3																				

	<pre> print(i,end=' ') f.close() or def CountAM(): with open("Story.txt") as f: A=M=0 s=f.read() for ch in s: if ch in "Aa": A+=1 elif ch in "Mm": M+=1 f.close() print("No.of A and M is", A ," & ", M) </pre>	
29	<p>(i) To display Name , Designation and Address of all employees whose name starts with character 'A' select name,designation,address from employees where name like 'A%';</p> <p>(ii) To display the NAME,DESIGNATION,ADDRESS and TOTAL SALARY of all employees where TOTAL SALARY is calculated as SALARY + BENEFITS select name,designation,address,salary+benefits as 'total salary' from employees;</p> <p>(iii) To display the number of employees designation wise select designation,count(*) from employees group by designation</p>	3
30	<p>Ans. Book=[]</p> <pre> def Addnew(s): name=input("Enter book name:") Book.append(name) def Remove(Book): if(Book==[]): print("Stack Empty. Underflow") else: print("Deleted book is :", Book.pop()) </pre>	3
31	<p>(i) SELECT NAME FROM DOCTOR WHERE DEPT="ORTHOPEDIC" AND EXPERIENCE>10;</p> <p>(ii) SELECT AVG(BASIC + ALLOWANCE) FROM DOCTOR, SALARY WHERE DOCTOR.ID=SALARY.ID AND DEPT="ENT";</p> <p>(iii) SELECT MIN(ALLOWANCE) FROM DOCTOR, SALARY WHERE DOCTOR.ID=SALARY.ID AND SEX="F";</p> <p>(iv) SELECT MAX(CONSULTATION) FROM DOCTOR, SALARY WHERE DOCTOR.ID=SALARY.ID AND SEX="M";</p>	4

32	<pre> import csv def add(): fout=open("furdata.csv","a",newline='\n') wr=csv.writer(fout) fid=int(input("Enter Furniture Id :: ")) fname=input("Enter Furniture name :: ") fprice=int(input("Enter price :: ")) FD=[fid,fname,fprice] wr.writerow(FD) fout.close() def search(): fin=open("furdata.csv","r",newline='\n') data=csv.reader(fin) found=False print("The Details are") for i in data: if int(i[2])>10000: found=True print(i[0],i[1],i[2]) if found==False: print("Record not found") fin.close() add() print("Now displaying") search() </pre>	
33	<p> i) a) MAN b) LAN ii) Switch/hub iii) Optical Fibre iv) Production Unit- It contains the maximum no.of computers Star Topology </p>	
34	<p> a)Ans : Binary file: <ul style="list-style-type: none"> • Extension is .dat • Not human readable • Stores data in the form of 0s and 1s CSV file <ul style="list-style-type: none"> · Extension is .csv · Human readable · Stores data like a text file Program b)def update_data(): <pre> rec={} fin=open("record.dat","rb") fout=open("temp.dat","wb") found=False eid=int(input("Enter employee id to update their salary :: ")) while True: try: </pre> </p>	2+3

```

rec= pickle.load(fin)
if rec["Employee id"]==eid:
    found=True
    rec["Salary"]=int(input("Enter new salary :: "))
    pickle. dump(rec,fout)

    else:
        pickle.dump(rec,fout)
except:
    break
if found==True:
    print("The salary of employee id ",eid," has been updated.")
else:
    print("No employee with such id is not found")
fin.close()
fout.close()

```

or

i) Differentiate between seek() and tell() functions

Ans : The tell function is used to determine the current position of the file pointer, and the seek function is used to move the file pointer to the specified position of the file

ii) Anushka wants to increase the price by 10% for those items which are less than 250. The details of the items (itemno, iname and price) are stored in a file named 'items.dat'. She wants to store the modified data in another file named items_copy.dat. Anushka has written a function named Price_Change() . Help Anushka to accomplish the task

```

import pickle
def Price_Change():
    f1=open("items.dat",'rb')
    f2=open("items_copy.dat","wb")
    l=pickle.load(f1)
    for i in l:
        if i[2]<250:
            i[2]=i[2]+i[2]*10/100
    pickle.dump(l,f2)
    f2.close()
    f2=open("items_copy.dat","rb")
    l=pickle.load(f2)
    print(l)
    f1.
    close()
    f2.close()

```

35	<p>i) In relational database terminology, a domain defines the permitted range of values for an attribute of an entity</p> <p>ii) <code>import mysql.connector as mysql</code> <code>def sql_data():</code> <code> con=mysql.connect(host="localhost",user="root",password="tiger",</code> <code> database="vidyalaya")</code> <code> mycursor= con.cursor()</code> <code> print("Students with marks between 80 and 95 are : ")</code> <code> mycursor.execute("select * from vidyalaya where Marks between 80 and</code> <code>95")</code> <code> data= mycursor.fetchall()</code> <code> for i in data:</code> <code> print(i)</code></p> <p>or</p> <code>con1=mysql.connect(host="localhost",user="root", passwd="abcd",</code> <code>database="XIICS")</code> <code>mycursor= con1.cursor()</code> <code>rno=int(input("Enter Roll Number :: "))</code> <code>name=input("Enter name :: ")</code> <code>class=int(input("Enter class :: "))</code> <code>marks=int(input("Enter Marks :: "))</code> <code>s="insert into student values ({},'{'},{},{})".format(rno,name,class,marks)</code> <code>mycursor.execute(s)</code> <code>con1.commit()</code> <code>print("Data Added successfully")</code>	
----	---	--

KENDRIYA VIDYALAYA SANGATHAN: ERNAKULAM REGION
SAMPLE QUESTION PAPER - 2
COMPUTER SCIENCE (083)

Maximum Marks: 70

Time Allowed: 3 hours

General Instructions:

1. *This question paper contains five sections, Section A to E.*
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 02 Long Answer type questions carrying 04 marks each.*
7. *Section E has 03 questions carrying 05 marks each.*
8. *All programming questions are to be answered using Python Language only.*

SECTION A																										
1.	State True or False A variable in python is defined only when some value is assigned to it.	1																								
2.command is used to remove primary key from the table in SQL. a) delete b)remove c) alter d)drop																									
3.	What will the following expression be evaluated to in Python? print(25 // 4 + 3**1**2 * 2) a) 24 b) 18 c) 6 d) 12	1																								
4.	What will be the output of the following Python code? string = "my name is x" for i in string.split(): print (i, end=",") a)m, y, , n, a, m, e, , i, s, , x, b)m, y , n, a, m, e , i, s , x, c)my, name, is, x, d)error	1																								
5.	Suppose a dictionary D is declared as D={1:"John",2:"Dev",3:"Bob"} which of the following is incorrect? State the reason. (a) print(D[3]) (b) D[[1,2,3]] = "Python" (c) D['Bob']=3 (d) print(D[3][1])	1																								
6.	Observe the following table: <div style="text-align: center;"> <table border="1" style="margin: auto; border-collapse: collapse;"> <caption>Table: Store</caption> <thead> <tr> <th>Item Code</th> <th>Item</th> <th>Qty</th> <th>Rate</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>Gel Pen Classic</td> <td>1150</td> <td>25</td> </tr> <tr> <td>11</td> <td>Sharpener</td> <td>1500</td> <td>10</td> </tr> <tr> <td>12</td> <td>Ball Pen 0.5</td> <td>1600</td> <td>12</td> </tr> <tr> <td>13</td> <td>Eraser</td> <td>1600</td> <td>5</td> </tr> <tr> <td>15</td> <td>Ball Pen 0.25</td> <td>800</td> <td>20</td> </tr> </tbody> </table> </div> What is the degree and cardinality of the above table? a)4 and 5 b)5 and 4 c)4 and 6 d) 6 and 4	Item Code	Item	Qty	Rate	10	Gel Pen Classic	1150	25	11	Sharpener	1500	10	12	Ball Pen 0.5	1600	12	13	Eraser	1600	5	15	Ball Pen 0.25	800	20	1
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15	Ball Pen 0.25	800	20																							
7.	Fill in the blank: protocol is used to transmit an electronic mail over the internet. a)FTP b)SMTP c)VOIP d)HTTP	1																								
8.	Consider the statements given below and then choose the correct output from the given options: example="snow world" print(example[-2:1:-3]) a)lo b)lwn c)lwo d)lwn	1																								

	<p>i) Insert value 55 between 45 and 65 ii) Remove all the elements from list OR i) To add all the elements in L ii) physically remove the list L</p>																																					
24	<p>Differentiate between COUNT(*) and SUM() functions in SQL with appropriate example. (OR) What do you understand by Candidate keys in a table? Give a suitable example of candidate keys from a table containing some meaningful data.</p>	2																																				
25	<p>Predict the output of the following Python code: def Bigger(N1,N2): if N1>N2: return N1 else: return N2 L=[32,10,21,54,43] for c in range (4,0,-1): a=L[c] b=L[c-1] print(Bigger(a,b),'@', end=' ')</p>	2																																				
SECTION C																																						
26	<p>Predict the output of the Python code given below: st = "python programming" count = 4 while True: if st[0]=="p": st = st[2:] elif st[-2]=="n": st = st[:4] else: count+=1 break print(st) print(count)</p>	3																																				
27	<p>Consider the table EMPLOYEE given below and write the output of the SQL queries that follow</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>EmpId</th> <th>Name</th> <th>DoJ</th> <th>Gender</th> <th>City</th> <th>Salary</th> </tr> </thead> <tbody> <tr> <td>101</td> <td>Leonard</td> <td>1995-06-06</td> <td>M</td> <td>London</td> <td>9500</td> </tr> <tr> <td>102</td> <td>Priya</td> <td>1993-05-07</td> <td>F</td> <td>Delhi</td> <td>4500</td> </tr> <tr> <td>103</td> <td>Howard</td> <td>1994-05-06</td> <td>M</td> <td>Paris</td> <td>8500</td> </tr> <tr> <td>104</td> <td>Penny</td> <td>1995-08-08</td> <td>F</td> <td>London</td> <td>11000</td> </tr> <tr> <td>105</td> <td>Raj</td> <td>1995-10-08</td> <td>M</td> <td>London</td> <td>10000</td> </tr> </tbody> </table>	EmpId	Name	DoJ	Gender	City	Salary	101	Leonard	1995-06-06	M	London	9500	102	Priya	1993-05-07	F	Delhi	4500	103	Howard	1994-05-06	M	Paris	8500	104	Penny	1995-08-08	F	London	11000	105	Raj	1995-10-08	M	London	10000	3
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		106	Amy	1994-12-12	F	Paris	8500																											
		107	Bernadette	1995-12-08	F	Lyon	8000																											
		108	Sheldon	1995-06-12	M	Seattle	15000																											
		i)SELECT COUNT(*), City FROM EMPLOYEE GROUP BY City HAVING COUNT(*) > 1; ii)SELECT MIN(DoJ) FROM EMPLOYEE WHERE GENDER = 'M'; iii)SELECT AVG(Salary) from EMPLOYEE WHERE Name LIKE "%o%";																																
28	.	<p>Write a function countline() in python to count the number lines in a text file 'Country.txt', which is starting with an alphabet 'W' or 'H'. If the file contents are as follows:</p> <p><i>Whose woods these are I think I know. His house is in the village though; He will not see me stopping here To watch his woods fill up with snow.</i></p> <p>The output of the function should be: W or w : 1 H or h : 2</p> <p style="text-align: center;">(OR)</p> <p>Write a user defined function countwords() to display the total number of words present in the text file "Quotes.Txt". If the text file has the following data written in it:</p> <p><i>Living a life you can be proud of doing your best Spending your time with people and activities that are important to you Standing up for things that are right even when it's hard Becoming the best version of you</i></p> <p>The countwords() function should display the output as: Total number of words : 40</p>							3																									
29	.	<p>Consider the table MobileMaster</p> <p style="text-align: center;">Table: MobileMaster</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>M Id</th> <th>M Company</th> <th>M Name</th> <th>M Price</th> <th>M Mf Date</th> </tr> </thead> <tbody> <tr> <td>MB001</td> <td>Samsung</td> <td>Galaxy</td> <td>13000</td> <td>2014-02-12</td> </tr> <tr> <td>MB002</td> <td>Nokia</td> <td>N1100</td> <td>7500</td> <td>2011-04-15</td> </tr> <tr> <td>MB003</td> <td>Realme</td> <td>C35</td> <td>12000</td> <td>2021-11-20</td> </tr> <tr> <td>MB004</td> <td>Oppo</td> <td>SelfieEx</td> <td>12500</td> <td>2015-08-21</td> </tr> </tbody> </table> <p>Based on the given table, write SQL queries for the following: i) Reduce the Mobile Price of all mobiles by 10% ii) Delete the mobiles with Price less than 12000 iii)Display Mobile company name and Model name separated by comma. in a new column name 'company&brand' and price ,in the ascending order of the Price</p>							M Id	M Company	M Name	M Price	M Mf Date	MB001	Samsung	Galaxy	13000	2014-02-12	MB002	Nokia	N1100	7500	2011-04-15	MB003	Realme	C35	12000	2021-11-20	MB004	Oppo	SelfieEx	12500	2015-08-21	3
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MB004	Oppo	SelfieEx	12500	2015-08-21																														
30	.	<p>Vedika has created a dictionary containing names and marks as key-value pairs of 5 students. Write a program, with separate user-defined functions to perform the following operations: i)Push the keys (name of the student) of the dictionary into a stack, where the corresponding value (marks) is greater than 70. ii)Pop and display the content of the stack.</p>							3																									

The dictionary should be as follows:
d={"Ramesh":58, "Umesh":78, "Vishal":90, "Khushi":60, "Ishika":95}
Then the output will be: Umesh Vishal Ishika

SECTION D

31 a) Consider the table VEHICLE and TRAVEL given below: 4

Table: TRAVEL

CNO	CNAME	TRAVELDATE	KM	VCODE	NOP
101	Arun	2015-12-13	200	V01	32
102	Balaji	2016-06-21	120	V03	45
103	Vignesh	2016-04-23	450	V02	42
104	Selva	2016-01-13	80	V02	40
105	Anupam	2015-02-10	65	V04	2
106	Tarun	2016-04-06	90	V05	4

Table: VEHICLE

VCODE	VEHICLETYPE	PERKM
V01	VOLVO BUS	150
V02	AC DELUXE BUS	125
V03	ORDINARY BUS	80
V04	CAR	18
V05	SUV	30

- PERKM is *Freight Charges per kilometre*.
- Km is *kilometres Travelled*.
- NOP is *number of passengers travelling in vehicle*.

- i) Write the command to view the structure of the table TRAVEL.
- ii) Display candidate name and Vehicle Type for each candidate.
- iii) Display Customer Name and kilometres Travelled in descending order of kilometres Travelled.
- iv) Display the number of customers in each vehicle Type (ie VCODE)

32 Genesis Infotech plans to develop a computerized system for payroll processing of all its employees for storing salary details, which stores data in “**employee.csv**”. 4

The structure of the file is

[EMPNO,EMPNAME,SALARY] Where

EMPNO is employee No (integer), EMPNAME employee Name(string), SALARY as salary(integer)


Genesis want develop the following user defined functions:

AddEmp() -To accept a record from user and add to the file

ShowEmp() -Display the details of employees with column headings also display the number of employees who are drawing a salary of more than Rs 5000 per month.

SECTION E

33 Oasis Public School, Coimbatore is setting up the network between its different wings of school campus. There are 4 wings namely SENIOR(S), JUNIOR (J), ADMIN (A) and 5

	<p>HOSTEL (H).</p>  <p>Distances between various wings are given below:</p> <table border="0"> <tr><td>Wing A to Wing S</td><td>100m</td></tr> <tr><td>Wing A to Wing J</td><td>200m</td></tr> <tr><td>Wing A to Wing H</td><td>400m</td></tr> <tr><td>Wing S to Wing J</td><td>300m</td></tr> <tr><td>Wing S to Wing H</td><td>100m</td></tr> <tr><td>Wing J to Wing H</td><td>450m</td></tr> </table> <p>Number of Computers installed at various wings are as follows:</p> <table border="0"> <thead> <tr><th>Wings</th><th>Number of Computers</th></tr> </thead> <tbody> <tr><td>Wing A</td><td>20</td></tr> <tr><td>Wing S</td><td>150</td></tr> <tr><td>Wing J</td><td>50</td></tr> <tr><td>Wing H</td><td>25</td></tr> </tbody> </table>	Wing A to Wing S	100m	Wing A to Wing J	200m	Wing A to Wing H	400m	Wing S to Wing J	300m	Wing S to Wing H	100m	Wing J to Wing H	450m	Wings	Number of Computers	Wing A	20	Wing S	150	Wing J	50	Wing H	25	
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Wings	Number of Computers																							
Wing A	20																							
Wing S	150																							
Wing J	50																							
Wing H	25																							
	i)Suggest the best-wired medium and mention the topology or layout to connect various wings of Oasis Public School, Coimbatore.	1																						
	ii)Name the most suitable wing to house the server. Justify your answer.	1																						
	iii)Suggest placement of HUB/SWITCH in the network of the School.	1																						
	iv)Suggest a device that can provide wireless Internet access to all smartphone /laptop users in the campus of Oasis Public School, Coimbatore.	1																						
	v)Suggest a protocol that shall be needed to provide file transfer within the School	1																						
34	<p>i)What is the difference between “w” and “a” modes in python?</p> <p>ii) Consider a file, University.dat, containing records of the following structure: [Universityname ,collegename, noofstaff]</p> <p>Write a function CopyCollege(), that reads contents from the file University.dat and copies the records with University name as Calicut to the file name Calicut.DAT. The function should return the total number of records copied to the file Calicut.DAT.</p> <p>OR</p> <p>i)What is the difference between readline() and readlines() functions?</p> <p>ii)Write a menu driven program InsertRec() and Searchroll() for adding and searching for a particular roll number using dictionary on student binary file “student.DAT”. Structure of dictionary is {Rollno:rollno,”Name”:name,”Marks”:marks}</p>	2+3 (5)																						
35	<p>i) Define the term Domain with respect to RDBMS. Give one example to support your answer</p> <p>ii) Swaraj wants to write a program in Python to insert the following record in the table named ‘Employee’ in MYSQL database, COMPANY:</p> <ul style="list-style-type: none"> ● EID(Employee ID)- integer ● name(Name) - string ● DOB (Date of birth) – Date 	5																						

- Salary – float

Note the following to establish connectivity between Python and MySQL:

- Username - root
- Password - tiger
- Host - localhost

The values of fields EID, name, DOB and Salary has to be accepted from the user. Help Swaraj to write the program in Python.

OR

i) what is the difference between primary key and foreign key?

ii) Nayana has created a table named 'Employee' in MYSQL database, COMPANY:

- EID(Employee ID)- integer
- name(Name) - string
- DOB (Date of birth) – Date
- Salary – float

Note the following to establish connectivity between Python and MySQL:

- Username - root
- Password - tiger
- Host - localhost

Nayana , now wants to display the records of employees whose salary is more than 25000. Help Nayana to write the program in python