

Computer Science

[Question Bank for Easy Revision – Part 2]

[QB/XII/083/Easy Revision - 2021]

Descriptive Questions:

1. What is a function in Python?

A function is a named group of statements which get executed when the function is invoked.

2. Differentiate between actual parameters and formal parameters. Also give a suitable example for the same.

Actual Parameters	Formal Parameter
Parameter used in function call.	Parameter used in function definition.
Can be an identifier, a literal, or any other valid expression.	Has to be an identifier only.
Example: <pre>def func(a,b): print(a,b) r=1 func(3,r*2)</pre> In the above code, 3 and r*2 in the function call are actual parameters, whereas a and b in the function definition are formal parameters.	

3. Differentiate between value and reference parameters. Also give a suitable example for the same.

Value Parameter	Reference Parameter
It is a copy of the corresponding actual parameter.	It is an alias of the corresponding reference parameter.
Any change in a value parameter does not affect the corresponding actual parameter.	Any change in a reference parameter is reflected on the corresponding actual parameter too.
All immutable data objects are accepted as value parameters in a function.	All mutable data objects are accepted as reference parameters in a function.
Example: <pre>def func(a,b): a[b]+=1 b+=1 arr=[1,2,3,4] n=2 func(arr,n) print(arr,n)</pre> In the above code arr is passed to a as a reference parameter, and n is passed to b as a value parameter. After the function call, the value of arr is changed, whereas value of n remains the same. The output of the above code is: [1, 2, 4, 4] 2	

4. What is meant by the scope of a variable?

Scope of a variable refers to the part of the code (program) in which it can be used.

5. Differentiate between local and global variables. Write an example script to explain the same.

Local variable	Global variable
Defined inside a function without using the keyword 'global'.	Defined outside any function, or inside a function using the keyword 'global'.
Can be used only in the function in which it is used.	Can be used anywhere, after its declaration, in a program.
Example: <pre>def func(): global p,q a=p; q=a; p=a+q print(a,p,q) p=3 func() print(p,q)</pre> In the above code p and q are global variables, whereas a is a local variable. The output produced by the above code is: <pre>3 6 3 6 3</pre>	

6. What is the use of keyword global?

Keyword 'global' is used in a function to

- i. Specify the global variable(s) which need to be updated in the function
- ii. Declare global variable(s) inside a function.

7. Can a function have a local variable with the same name as that of a global variable in the script? If yes, then is it possible to access global variable with the same name in that function? If yes, how?

Yes, a function can have a local variable with the same name as that of a global variable in the script. Yes, it is possible to access global variable with the same name in that function using the in-built function `globals()`.

8. What is the use of return statement in a function? In which three cases does a function return None?

return statement is used to return a value from a function. A function returns None in the following three cases:

- (i) The function has no return statement
- (ii) The function has blank return statement
- (iii) The function explicitly returns None by return statement.

9. What is the difference between mutable and immutable data objects being passed as arguments to a function?

A mutable data object is always passed as a reference parameter to a function. It means that whatever change is made to the corresponding formal parameter, **it will be reflected** on the passed data object too.

An immutable data object is always passed as a value parameter to a function. It means that any change made to the corresponding formal parameter **has no effect on** the passed data object.

10. What is a function header? Give an example.

A function header is the first statement of a function definition. It starts with key word `def`, followed by function name and an optional list of parameters within parentheses, and is terminated by a colon (`:`). Example:

```
def func(a,b): #function header
    print(a,b)
```

11. With reference to function `func()` in the code given below, identify

(i) function header, (ii) function call(s), (iii) arguments (actual parameters), (iv) parameters (formal parameters), (v) function body

```
def func(x):
    global b
    y=b+2
    b*=y
    y+=x+b
    print(x,y,b)
x,b=5,10
func(x)
print(func(x))
```

```
def func(x): ->Function header, formal parameter - b
    global b
    y=b+2
    b*=y
    y+=x+b
    print(x,y,b)
x,b=5,10
func(x) -> Function Call, Actual parameter - x
print(func(x)) -> Function Call, Actual parameter - x
```

function body

12. What is a python module? Give an example of an inbuilt python module.

A module is a python script (a .py file) containing one or more of the following components: declarations (classes, objects, variables etc.), function definitions, function calls, independent statements (executable code outside a function).

13. What is a python package? Give an example of a python package.
A package is a folder containing one or more modules and a file `__init__.py`. The presence of the file `__init__.py`, even if empty, lets python treat a folder as a package to be imported in other modules, if required. Without `__init__.py`, a folder is just a normal folder and cannot be treated as a package.

14. Write Python statement(s) to import:

- (i) A function **alpha()** from a module named **myModule**.
- (ii) Functions **comp1()** and **comp2()** from a module named **Computer**
- (iii) A package **pkg** from a library **lib**.
- (iv) Module **Salary** from a package **HR**
- (v) Package named **Trigonometry**.

- (i) `from mymodule import alpha`
- (ii) `from computer import comp1(), comp2()`
- (iii) `from lib import pkg`
- (iv) `from hr import salary`
- (v) `import trigonometry`

15. What is a file?

A file is a named collection of data stored on a secondary storage device.

16. Why do we need files?

Files are needed for permanent storage of data.

17. What are two main categories of file types?

Text file and Binary file.

18. What is the difference between a text file and a binary file?

Text File	Binary File
A text file can be created using any text editor or a computer program.	A binary file can be created using only a computer program.
A text file can be opened meaningfully using any text editor or a computer program.	A binary file can be read meaningfully only by a computer program.

19. What are the two basic operations which are performed on a file?

Writing data in the file, Reading data from the file.

20. What is a file buffer?

It is a small memory space allocated to a file object. All the transfer of data between the program and the file (on secondary storage device) happens through buffer only. Each file object is allocated its own separate buffer.

21. How can a file be opened in a Python program?

A file can be opened using the `open()` function.

22. What are different file opening modes for a text file in Python? Write, in brief, what does each mode do?

23. File opening mode	If the file already exists	If the file does not exist
'r'	File is opened in read mode.	<u>FileNotFoundError is raised.</u>

'r+'	File is opened in read-write mode with file pointer at 0.	<u>FileNotFoundError is raised.</u>
'w'	File contents are deleted and file is opened in write mode.	File is created and opened in write mode.

'w+'	File contents are deleted and file is opened in read-write mode.	File is created and opened in read-write mode.
'a'	File is opened in append mode.	File is created and opened in append mode.
'a+'	File is opened in read-append mode.	File is created and opened in read-append mode.
'x'	<u>FileExistsError is raised.</u>	File is created and opened in write mode.
'x+'	<u>FileExistsError is raised.</u>	File is created and opened in read-append mode.

24. Differentiate between 'write' mode and 'append' modes of files in Python.

Write mode	Append mode
Data can be written anywhere in the file.	Data can be written only at the end of the existing data in the file.
File pointer can be adjusted using seek()	File pointer cannot be adjusted.
Already existing data, if any, is deleted from the file.	Already existing data, if any, is not deleted from the file.

25. What different functions are available to write data in a text file? Describe each in brief.

Write() – writes a string in the file.

Writelines() – writes a list of strings in the file.

26. What different functions are available to write read data from a text file? Describe each in brief.

Read() – reads the data from the file as a string.

Readline() – reads one line of data from the file, as a string.

Readlines() – reads the entire file content as a list of strings.

27. Why is it important to close a file?

It is important to close a file to:

(i) Free the file handle allocated to the file, so that it can be used for some other file.

(ii) To flush the buffer into the file if the file was opened in write or append mode.

28. In which mode should a file be opened:

29.

(i) To write data into an existing file.

(ii) To read data from a file

(iii) To create a new file and write data into it.

(iv) To write data into an existing file. If the file does not exist, then file should be created to write data into it.

(i) append (ii) read (iii) write (iv) append

30. Differentiate between seek() and tell().

seek()	tell()
Sets the file pointer.	Returns the value of file pointer.
Takes one integer parameter.	Does not take any parameter.

31. What is the difference between a binary file and a text file?

Text file	Binary file
Contains lines of text, where each line is terminated by an EOL character.	Contains data in the form of sequence of bytes. There is no concept of lines or EOL character.
Can be created and meaningfully read using any text editor or a program.	Can be created through a program, and meaningfully read only through some specific programs or application(s).

32. Which functions are used to (i) rename a file, (ii) delete a file? In which module are these functions available?
- rename() function is used to rename a file.
remove() function is used to delete a file.
- These function are available in the os module.
33. What are the three standard input-output streams in Python?
- stdin, stdout, stderr
34. Define the terms 'pickling' and 'unpickling'.
- Pickling* is the process whereby a Python object hierarchy is converted into a byte stream, and *unpickling* is the inverse operation, whereby a byte stream (from a binary file or bytes-like object) is converted back into an object hierarchy.
35. What is a stack?
- A stack is a linear data structure which is used for LIFO type of data processing.
36. Define the terms TOP, PUSH, POP in context of stacks.
- TOP – It is the open end of a stack from where all insertions in the stack and deletions from the stack are performed.
PUSH – The insertion operation in a stack is known as PUSH. POP – The deletion operation from a stack is called POP.
37. How can a stack be implemented in Python?
- A stack can be implemented in Python using a list.
38. Define the terms Overflow and Underflow in context of stacks.
- Overflow – It is the condition when we try PUSH an element in an empty stack.
Underflow – It is the condition when we try to POP an element from an empty stack
39. What is a csv file? How is it different from a plain text file?
- A csv file is a text file in which each line represents a record, and fields within a record are separated by commas. The commas are not a part of data.
- In a text file, there is no concept of records and fields. Each character in a text file is part of data. All csv files are text files, but all text files are not csv files.
40. Define connection and cursor w.r.t. Python interface with an SQL database.
- A connection is an object which connects a Python program to a database. A cursor is an object which is used to execute SQL queries over a connection.
41. What is the role of fetchone() method?
- fetchone() retrieves the next row of a query result set and returns it as a tuple. It returns None if there are no more rows to be fetched.
42. What is the function of fetchall() method?
- fetchall() fetches all (or all remaining) rows of a query result set and returns a list of tuples. If no more rows are available, it returns an empty list.
43. What is the function of fetchmany() method?
- fetchmany() fetches a specified number of rows of a query result set and returns a list of tuples. If no more rows are available, it returns an empty list.
44. Find the correct identifiers out of the following, which can be used for naming variable or functions in a Python program:
- While, for, Float, new, 2ndName, A%B, Amount2, _Counter
While, Float, new, Amount2, _Counter
45. Find the correct identifiers out of the following, which can be used for naming Variable or Functions in a Python program:
- For, while, INT, NeW, delete, 1stName, Add+Subtract, name1
For, INT, NeW, delete, name1
46. Out of the following, find those identifiers, which cannot be used for naming variables functions in a C++ program:
- _Cost, Pr*Qty, float, Switch, Address One, Delete, Number12, in
Pr*Qty, float, Address One, in
47. Out of the following, find those identifiers, which cannot be used for naming variables or functions in a C++ program:
- Total Tax, float, While, S.I. NeW, switch, Column31, _Amount

Finding the Errors:

1. Find error(s), if any, in each of the following code snippets in Python:

```
(i) def f1[a,b]
    a+=b
    b*=a
    print(a,b)
x,b=5
f1(x)

(ii) def f1(a,b):
    a+=b
    b*=a
    print(a,b)
    x,b=5,10 #or any other numeric value for b
    f1(x,b) #or any other numeric expression as second argument

(iii) define f2(x):
    Global b
    x+=b
    b==x+2
    print(x,y,b)
x,b=5,10
f2(b)

(ii) def f2(x):
    global b
    x+=b
    b*=y
    print(x,b,sep='*')
    x,b=5,10
    f2(b)

(iii) def f3(a=1,b):
    global x, global y
    x=a+b
    a,a*x=a+x,y
    print(a,b,x,y)
f3[5,10]
print(f3[5])

(iii) def f3(b,a=1):
    global x,y
    x=a+b
    a,y=a+x,a*x
    print(a,b,x,y)
f3(5,10)
print(f3(5))
```

2. Why will the following code raise an exception?

```
def f1()
    with open("abc.txt",'r') as f:
        for i in range(10):
            f.write(str(i))
    f.close()
f1()
```

The given code will raise an exception because the code is trying to write in a file open in read mode

Finding the Output:

1. Find output of each of the following code snippets in Python:

```
(i) def f1(a,b):
    a+=b
    b*=a
    print(a,b)
x,b=5,10
f1(x,b)
print(x,b)
(ii) 15 150
      5 10
(ii) def f2(x,y):
    global b
    x+=b
    b*=y
    y+=x+y
    print(x,y,b)
x,b=5,10
f2(x,b)
print(x,b)
(ii) 15 35 100
      5 100
(iii) def f3(a,b):
    global x,y
    x=a+b
    a,y=a+x,a*x
    print(a,b,x,y)
f3(5,10)
print(f3(b=x,a=y))
(iii) 20 10 15 75
       165 15 90 6750
       None
(iv) def f4(s):
    for ch in s:
        if ch in 'aeiou':
            print('*',end='')
        elif ch in ['AEIOU']:
            print('#',end='')
        elif ch.isdigit():
            print(s[0],end='')
        else: print(s[-1],end='')
f4('India91')
print()
f4('KUwait965')
print()
(iv) 111**II
      555**5KKK
(v) def f5(s):
    s1=''
    for i in range(len(s)):
        if s[i]==s[-1-i]:
            s1+=s[i]
        else: s1=s[i]+s1
    print(s1)
f5('abcba')
f5('abcaba')
```

```

(vi) def f6(x=5, y=10):
    global a
    x+=x+y
    y=y+a
    a+=a+x
    print(x,y,a)
a=4
f6(y=a)
f6(a,a+1)
(vi)
14 8 22
67 45 111
(vii) def f7(str1):
    str2=''
    diff=ord('a')-ord('A')
    for ch in str1:
        if ch>='A' and ch<='Z':
            ch=chr(ord(ch)+diff)
        elif ch>='a' and ch<='z':
            ch=chr(ord(ch)-diff)
        else:
            ch='#'
        str2+=ch
    print(str2)
f7('R@tI0n@L')
(vii)
r#TI#N#l

```

2. What will be the content of file abc.txt after execution of the following code?

```

def f1():
    for i in range(10):
        f=open("abc.txt", 'w')
        f.write(str(i))
    f.close()
f1()

```

Ans 9

Differentiate between:

1. Import random and from random import random
 Import random and from random import random

Import random	From random import random
Imports the complete random module	Imports only the function random() from the random module
Any function from the random module can be used in the code	Only the imported function can be used in the code.
Function call needs to be qualified by prefixing module name random with the function call.	No prefix is needed with the function call
Example: random.random()	Example: random()

2. import math and from math import sqrt

Import math	From math import sqrt
Imports the complete math module	Imports only the function sqrt() from the math module
Any function from the math module can be used in the code	Only the imported function can be used in the code.
Function call needs to be qualified by prefixing module name random with the function call.	No prefix is needed with the function call
Example: math.sqrt()	Example: sqrt()

3. random.randint() and randint()

random.randint()	randint()
Imports the complete math module	Imports only the function sqrt() from the math module
Any function from the math module can be used in the code	Only the imported function can be used in the code.
Function call needs to be qualified by prefixing module name random with the function call.	No prefix is needed with the function call
Example: math.sqrt()	Example: sqrt()

Writing code:

- 1 Write a function in Python which takes three numbers as parameters and returns the largest of these three numbers. The function should not use in-built `max()` function.

```
def high(a,b,c):
    if a>=b and a>=c:
        return a
    if b>=c and b>=a:
        return b
    if c>=a and c>=b:
        return c
```

- 2 Write a function in Python which takes a string as a parameter and returns the reversed string without using slicing.

```
def rev_str(s):
    s1=''
    for ch in s:
        s1=ch+s1
    return s1
```

- 3 Write a function in Python which takes a string of comma separated words as parameter and returns a comma separated string in which the words of given string are sorted. For example, if the given string is "Maths,English,Physics,Chemistry", then the returned string should be: "Chemistry,English,Maths,Physics".

```
def sort_words(s):
    s=s.split(',')
    s.sort()
    s=', '.join(s)
    return s
```

Text File Operations

1. Consider the following code:

```
ch = "A"
f=open("data.txt",'a')
f.write(ch)
print(f.tell())
f.close()
```

What is the output if the file content before the execution of the program is the string "ABC"?
(Note that "" are not the part of the string)

1. 4

2. Write a function to count and display the number of blanks present in a text file named "PARA.TXT".

```
def count_spaces():
    with open("para.txt") as f:
        data=f.read()
        c=data.count(' ')
    return(c)
```

3. Write a single statement to display the contents of a text file named "abc.txt"

```
print(open("abc.txt").read())
```

4. Assuming that a text file named TEXT1.TXT already contains some text written into it, write a function named **vowelwords()**, that reads the file TEXT1.TXT and creates a new file named TEXT2.TXT, which shall contain only those words from the file TEXT1.TXT which don't start with an uppercase vowel (i.e., with 'A', 'E', 'I', 'O', 'U'). For example, if the file TEXT1.TXT contains

Carry Umbrella and Overcoat When It rains

Then the text file TEXT2.TXT shall contain

Carry and When rains

```
def vowelwords():
    f1=open("text1.txt")
    f2=open("text2.txt",'w')
    for line in f1:
        line=line.split()
        for word in line:
            if word[0] not in "AEIOU":
                f2.write(word+" ")
        f2.write("\n")
    f1.close()
    f2.close()
```

5. Write a function in PYTHON to count the number of lines ending with a vowel from a text file "STORY.TXT".

```
def count_end(): c=0
    with open("story.txt") as f:
        for line in f:
            line=line.strip()
            if line != "" and line[-1] in "aeiouAEIOU":
                c+=1
    print(c)
```

6. Write a function in PYTHON to count and display the number of words starting with alphabet 'A' or 'a' present in a text file "LINES.TXT".

Example:

If the file "LINES.TXT" contains the following lines,

A boy is playing there. There is a playground.

An aeroplane is in the sky.

Are you getting it?

The function should display the output as 5.

```
def count_words_A(): c=0
    with open("Lines.txt") as f:
        for line in f:
            line=line.split()
            for word in line:
                if word[0] in "aA":
                    c+=1
    print(c)
```

7. Write a function in PYTHON to display the last 3 characters of a text file "STORY.TXT".

```
def last_three():
    f=open("story.txt")
    data=f.read()
    data=data.strip()
    print(data[-3:])
    f.close()
```

8. Write a function **copy()** that will copy all the words starting with an uppercase alphabet from an existing file "FAIPS.TXT" to a new file "DPS.TXT".

```
def copy():
    f1=open("FAIPS.txt")
    f2=open("DPS.txt",'w')
    data=f1.read()
    for word in data:
        if word[0].isupper():
            f2.write(word+" ")
    f1.close()
    f2.close()
```

9. Write a function **show(n)** that will display the nth character from the existing file "MIRA.TXT". If the total characters present are less than n, then it should display "invalid n".

```
def show(n):
    f=open("MIRA.TXT")
    data=f.read()
    f.close()
    if len(data)<n:
        print("Invalid n")
    else:
        print(data[n-1])
```

10. Write a function in PYTHON that counts the number of "Me" or "My" words present in a text file "DIARY.TXT". If the "DIARY.TXT" contents are as follows:

My first book was Me and My
Family. It gave me chance to be
Known to the world.

The output of the function should be:

Count of Me/My in file: 4

(CBSE 2011)

```
def Me_My():
    f=open("DIARY.TXT")
    data=f.read()
    f.close()
    data=data.upper()
    c=data.count("ME")+data.count("MY")
    print("Count of Me/My in file:",c)
```

11. Write a function in PYTHON to read the contents of a text file "Places.Txt" and display all those lines on screen which are either starting with 'P' or with 'S'. **(CBSE 2013)**

```
def places():
    with open("places.txt") as f:
        for line in f:
            if line[0] in "pPsS":
```

```
print(line)
```

12. Write a function **CountHisHer()** in PYTHON which reads the contents of a text file "Gender.txt" which counts the words His and Her (not case sensitive) present in the file.

For, example, if the file contains:

Pankaj has gone to his friend's house. His friend's name is Ravya. Her house is 12KM from here.

The function should display the output:

Count of His: 2

Count of Her: 1

(CBSE 2012)

```
def CountHisHer():
    f=open("gender.TXT")
    data=f.read()
    f.close()
    data=data.upper()
    data=data.split()
    his=data.count("HIS")
    her=data.count("HER")
    print("Count of His:",his)
    print("Count of Her:",her)
```

13. Write a function **EUCount()** in PYTHON, which should read each character of a text file IMP.TXT, should count and display the occurrences of alphabets E and U (including small cases e and u too).

Example:

If the file content is as follows:

Updated information

Is simplified by official websites.

The EUCount() function should display the output as:

E:4

U:1

(CBSE 2014)

14. Write function definition for SUCCESS() in PYTHON to read the content of a text file STORY.TXT, count the presence of word SUCCESS and display the number of occurrence of this word. **(CBSE- Delhi 2015)**

Note :

- The word SUCCESS should be an independent word
- Ignore type cases (i.e. lower/upper case)

Example :

If the content of the file STORY.TXT is as follows :

Success shows others that we can do it. It is possible to achieve success with hard work. Lot of money does not mean SUCCESS.

The function SUCCESS() should display the following :

3

```
def SUCCESS(): f=open("STORY.TXT")
    data=f.read()
    f.close()
    data=data.upper()
    data=data.split()
    c=data.count("SUCCESS")\
    +data.count("SUCCESS,")\
    +data.count("SUCCESS.")\
    +data.count("SUCCESS;")\
    +data.count("SUCCESS:")
    print(c)
```

15. Write function definition for TOWER() in PYTHON to read the content of a text file WRITEUP.TXT, count the presence of word TOWER and display the number of occurrences of this word. **(CBSE-Outside Delhi 2015)**

Note :

- The word TOWER should be an independent word
- Ignore type cases (i.e. lower/upper case)

Example:

If the content of the file WRITEUP.TXT is as follows:

Tower of hanoi is an interesting problem.
Mobile phone tower is away from here. Views
from EIFFEL TOWER are amazing.

The function TOWER () should display the following:

3

16. Write the function definition for WORD4CHAR() in PYTHON to read the content of a text file FUN.TXT, and display all those words, which have four characters in it. **(CBSE- Delhi 2016)**

Example:

If the content of the file Fun.TXT is as follows:

When I was a small child, I used to play in the garden with my grand mom. Those days were amazingly funful and I remember all the moments of that time

The function WORD4CHAR() should display the following:

When used play with days were that time

```
def WORD4CHAR():
    f=open("fun.TXT")
    data=f.read()
    f.close()
    data=data.split()
    for word in data:
        if word[-1] in ".,:;":
            word=word[:-1]
        if len(word)==4:
            print(word,end=' ')
```

17. Write function definition for DISP3CHAR() in PYTHON to read the content of a text file KIDINME.TXT, and display all those words, which have three characters in it. **(CBSE-Outside Delhi 2016)**

Example:

If the content of the file KIDINME.TXT is as follows:

**When I was a small child, I used to play in the garden
with my grand mom. Those days were amazingly funfilled and I
remember all the moments of that time**

The function DISP3CHAR() should display the following:

was the mom and all the

18. Write a function in Python to copy the contents of a text file into another text file. The names of the files should be input from the user.

```
def copyFile():
    sf=input("Enter source file name: ")
    tf=input("Enter target file name: ")
    f1=open(sf)
    f2=open(tf,'w')
    data=f1.read()
    f2.write(data)
    f1.close()
    f2.close()
```

19. Write a function in Python which accepts two text file names as parameters. The function should copy the contents of first file into the second file in such a way that all multiple consecutive spaces are replaced by a single space. For example, if the first file contains:

Self conquest is the
greatest victory .

then after the function execution, second file should contain:

Self conquest is the
greatest victory .

```
def f1(sfn, tfn):
    sf=open(sfn)
    tf=open(tfn,'w')
    data=sf.read()
    while ' ' in data:
        data=data.replace(' ',' ')
        tf.write(data)
    sf.close()
    tf.close()
```

20. Write a function in Python to input a multi-line string from the user and write this string into a file named 'Story.txt'. Assume that the file has to be created.

```
def write_file():
    import sys
    print("Enter a multi-line string,press ^D \ in the beginning of  
a line to terminate: ")
    a=sys.stdin.read()

    open('story1.txt','w').write(a)
```

21. Write a function to display the last line of a text file. The name of the text file is passed as an argument to the function.

```
def read_last_line(fn):
```

```

f=open(fn,'r')

data=f.readlines()

print(data[-1])

f.close()

```

22. Write a function which takes two file names as parameters. The function should read the first file (a text file), and stores the index of this file in the second file (a binary file). The index should tell the line numbers in which each of the words appear in the first file. If a word appears more than once, the index should contain all the line numbers containing the word.

```

def indexing(fn,indexFile):
    import pickle
    f=open(fn,'r')
    data=f.readlines()
    index={}
    i=0
    for line in data:
        i+=1
        for word in line.split():
            if word not in index:
                index[word]=[i]
            elif i not in index[word]:
                index[word]+=[i]

    f.close()

    f=open(indexFile,'wb')
    pickle.dump(index,f)
    f.close()

```

23. Write a Python function to read and display a text file 'BOOKS.TXT'. At the end display number of lowercase characters, uppercase characters, and digits present in the text file.

```

def readAndCount():
    f=open('BOOKS.TXT')
    l=u=d=0
    data=f.read()
    f.close()
    print(data)
    for ch in data:
        if ch.islower():
            l+=1
        elif ch.isupper():
            u+=1
        elif ch.isdigit():
            d+=1

    print('Lowercase characters:',l)
    print('Uppercase characters:',u)
    print('Digits:',d)

```

24. Write a Python function to display the size of a text file after removing all the white spaces (blanks, tabs, and EOL characters).

```

def fileSize():
    fn=input("Enter file name: ")
    f=open(fn)
    data=f.read()
    data=data.replace(' ','')
    data=data.replace('\n','')
    data=data.replace('\t','')

```

```
print(len(data))
```

Binary File Operations

1. Following is the structure of each record in a data file named "PRODUCT.DAT".

{"prod_code":value, "prod_desc":value, "stock":value}

The values for prod_code and prod_desc are strings, and the value for stock is an integer.

Write a function in PYTHON to update the file with a new value of stock. The stock and the product_code, whose stock is to be updated, are to be input during the execution of the function.

2. Given a binary file "STUDENT.DAT", containing records of the following type:

[S_Admno, S_Name, Percentage]

Where these three values are:

S_Admno – Admission Number of student (string)

S_Name – Name of student (string)

Percentage – Marks percentage of student (float)

Write a function in PYTHON that would read contents of the file "STUDENT.DAT" and display the details of those students whose percentage is above 75.

3. Assuming the tuple Vehicle as follows:

`(vehicletype, no_of_wheels)`

Where vehicletype is a string and no_of_wheels is an integer.

Write a function `showfile()` to read all the records present in an already existing binary file SPEED.DAT and display them on the screen, also count the number of records present in the file.

4. Write a function in PYTHON to search for a BookNo from a binary file "BOOK.DAT", assuming the binary file is containing the records of the following type:

`{"BookNo":value, "Book_name":value}`

Assume that BookNo is an integer.

5. Assuming that a binary file VINTAGE.DAT contains records of the following type, write a function in PYTHON to read the data VINTAGE.DAT and display those vintage vehicles, which are priced between 200000 and 250000. **(CBSE 2012)**

`[VNO, VDesc, price]`

6. Write a function in PYTHON to search for a laptop from a binary file "LAPTOP.DAT" containing the records of following type. The user should enter the model number and the function should display the details of the laptop. **(CBSE 2011)**

`[ModelNo, RAM, HDD, Details]`

where ModelNo, RAM, HDD are integers, and Details is a string.

7. Write a function in PYTHON to search for the details (Number and Calls) of those mobile phones which have more than 1000 calls from a binary file "mobile.dat". Assuming that this binary file contains records of the following type:

`(Number, calls)`

8. Write a function in PYTHON to read the records from binary file GAMES.DAT and display the details of those games, which are meant for children of AgeRange "8 to 13". Assume that the file GAMES.DAT contains records of the following type: **(CBSE 2013)**

`[GameCode, GameName, AgeRange];`

9. Write a function in PYTHON to read each record of a binary file ITEMS.DAT, find and display those items which costs less than 2500. Assume that the file ITEMS.DAT is created with the help of objects of the following type: **(CBSE-Delhi 2015)**

`{"ID":string, "GIFT":string, "Cost":integer};`

10. Write a definition for function BUMPER() in PYTHON to read each object of a binary file GIFTS.DAT, find and display details of those gifts, which have remarks as "ON DISCOUNT". Assume that the file GIFTS.DAT is created with the help of lists of following type:

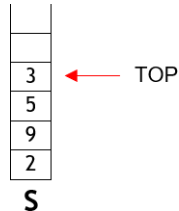
`(ID, Gift, Remarks, Price)`

(CBSE- Delhi 2016)

Stacks

1. Write functions `stackpush(nameStack)` to insert a new name and `stackpop(nameStack)` to delete a name from a stack implemented using a list. The list is passed as an argument to these functions.
2. Each element of a stack ITEM (a list) is a list containing two elements BNo (integer), and Description (String). Write functions to push an element in the stack and to pop an element from the stack. The popped element should be returned by the function. If the stack is empty, the pop function should return None.

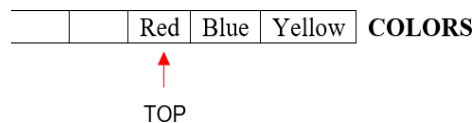
3. Each element of a stack TEXTBOOKS (a list) is a dictionary with keys 'ISBN', 'TITLE', and 'PRICE'. The values for 'ISBN', 'TITLE', and 'PRICE' are of type integer, string, and float respectively. Write functions:
- PUSH(TEXTBOOKS) to push an element in the stack. The details of the book to be pushed are to be input from the user.
 - POP(TEXTBOOKS) to pop an element from the stack. The popped element should be returned by the function. If the stack is empty, the pop function should return None.
4. Consider a stack S as follows:



Assuming standard definitions of functions PUSH() and POP(), redraw the stack after performing the following set of operations:

```
POP (S)
POP (S)
PUSH (S, 8)
PUSH (S, 3)
POP (S)
```

5. Consider the following stack named COLORS:
Redraw the stack after each of the following operations:



- (i) POP() (ii) PUSH('Black') (iii) PUSH('Pink') (iv) POP() (v) PUSH('Green')

2. RDBMS - Descriptive Questions

- Give a suitable example of a table with sample data and illustrate Primary and Candidate keys in it. **(CBSE 2012)**
- What is the difference between degree and cardinality of a table? What is the degree and cardinality of the following table: **(CBSE 2013)**

ENo	Name	Salary
101	John Fedrick	45000
103	Raya Mazumdar	50600

- Give a suitable example of a table with sample data and illustrate Primary and Alternate keys in it.
- Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key. **(CBSE-Delhi 2015)**

Id	Product	Qty	Price	Transaction Date
101	Plastic Folder 12"	100	3400	2014-12-14
104	Pen Stand Standard	200	4500	2015-01-31
105	Stapler Medium	250	1200	2015-02-28
109	Punching Machine Big	200	1400	2015-03-12
103	Stapler Mini	100	1500	2015-02-02

- Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key. **(CBSE-Outside Delhi 2015)**

Code	Item	Qty	Price	Transaction Date
------	------	-----	-------	------------------

1001	Plastic Folder 14"	100	3400	2014-12-14
1004	Pen Stand Standard	200	4500	2015-01-31
1005	Stapler Mini	250	1200	2015-02-28
1009	Punching Machine Small	200	1400	2015-03-12
1003	Stapler Big	100	1500	2015-02-02

- (vi) Observe the following STUDENTS and EVENTS tables carefully and write the name of the RDBMS operation which will be used to produce the output as shown in LIST. Also, find the Degree and Cardinality of the LIST.
(CBSE- Delhi 2016)

STUDENTS		EVENTS	
No	Name	EVENTCODE	EVENTNAME
1	Tara mani	1001	Programming
2	Jaya Sarkar	1002	IT Quiz
3	Tarini Trikha		

LIST			
NO	NAME	EVENTCODE	EVENTNAME
1	Tara mani	1001	Programming
1	Tara mani	1002	IT Quiz
2	Jaya Sarkar	1001	Programming
2	Jaya Sarkar	1002	IT Quiz
3	Tarini Trikha	1001	Programming
3	Tarini Trikha	1002	IT Quiz

- (vii) Observe the following PARTICIPANTS and EVENTS tables carefully and write the name of the RDBMS operation which will be used to produce the output as shown in RESULT. Also, find the Degree and Cardinality of the RESULT.
(CBSE- Outside Delhi 2016)

PARTICIPANTS		EVENTS	
PNo	Name	EVENTCODE	EVENTNAME
1	Aruanabha Tariban	1001	IT Quiz
2	John Fedricks	1002	Group Debate
3	Kanti Desai		

RESULT			
PNO	NAME	EVENTCODE	EVENTNAME
1	Aruanabha Tariban	1001	IT Quiz
1	Aruanabha Tariban	1002	Group Debate
2	John Fedricks	1001	IT Quiz
2	John Fedricks	1002	Group Debate
3	Kanti Desai	1001	IT Quiz
3	Kanti Desai	1002	Group Debate

3. SQL - Writing queries and finding outputs

- (i) Write SQL commands for the following queries based on the relation Teacher given below:

No	Name	Age	Department	Date_of_join	Salary	Sex
1	Jugal	34	Computer	10/01/97	12000	M
2	Sharmila	31	History	24/03/98	20000	F
3	Sandeep	32	Maths	12/12/96	30000	M
4	Sangeeta	35	History	01/07/99	40000	F
5	Rakesh	42	Maths	05/09/97	25000	M
6	Shyam	50	History	27/06/98	30000	M
7	Shiv Om	44	Computer	25/02/97	21000	M
8	Shalakra	33	Maths	31/07/97	20000	F

- To show all information about the teacher of History department.
- To list the names of female teachers who are in Maths department.
- To list the names of all teachers with their date of joining in ascending order.
- To display teacher's name, salary, age for male teachers only.
- To count the number of teachers with Age>23.

(ii) Given the following relation: STUDENT

No.	Name	Age	Department	Dateofadm	Fee	Sex
1	Pankaj	24	Computer	10/01/97	120	M
2	Shalini	21	History	24/03/98	200	F
3	Sanjay	22	Hindi	12/12/96	300	M
4	Sudha	25	History	01/07/99	400	F
5	Rakesh	22	Hindi	05/09/97	250	M
6	Shakeel	30	History	27/06/98	300	M
7	Surya	34	Computer	25/02/97	210	M
8	Shikha	23	Hindi	31/07/97	200	F

Write SQL commands for the following queries

- To show all information about the students of History department.
- To list the names of female students who are in Hindi department.
- To list the names of all students with their date of admission in ascending order.
- To display student's name, fee, age for male students only.
- To count the number of students with Age>23.

(iii) Write SQL commands for the following queries on the basis of **Club** relation given below:

Coach-ID	CoachName	Age	Sports	date_of_app	Pay	Sex
1	Kukreja	35	Karate	27/03/1996	1000	M
2	Ravina	34	Karate	20/01/1998	1200	F
3	Karan	34	Squash	19/02/1998	2000	M
4	Tarun	33	Basketball	01/01/1998	1500	M
5	Zubin	36	Swimming	12/01/1998	750	M
6	Ketaki	36	Swimming	24/02/1998	800	F
7	Ankita	39	Squash	20/02/1998	2200	F
8	Zareen	37	Karate	22/02/1998	1100	F
9	Kush	41	Swimming	13/01/1998	900	M
10	Shailya	37	Basketball	19/02/1998	1700	M

- To show all information about the swimming coaches in the club.
- To list the names of all coaches with their date of appointment (date_of_app) in descending order.
- To display a report showing coach name, pay, age, and bonus (15% of pay) for all coaches.
- To insert a new row in the Club table with ANY relevant data:
- Give the output of the following SQL statements:
 - Select COUNT(Distinct Sports) from Club;
 - Select Min(Age) from Club where SEX = "F";

(iv) Write SQL commands for (a) to (f) and write the outputs for (g) on the basis of tables FURNITURE and ARRIVALS:

FURNITURE

NO	ITEMNAME	TYPE	DATEOFSTOCK	PRICE	DISCOUNT
1	White lotus	Double Bed	23/02/02	30000	25
2	Pink feather	Baby cot	20/01/02	7000	20
3	Dolphin	Baby cot	19/02/02	9500	20
4	Decent	Office Table	01/01/02	25000	30
5	Comfort zone	Double Bed	12/01/02	25000	25
6	Donald	Baby cot	24/02/02	6500	15
7	Royal Finish	Office Table	20/02/02	18000	30
8	Royal tiger	Sofa	22/02/02	31000	30
9	Econo sitting	Sofa	13/12/01	9500	25
10	Eating Paradise	Dining Table	19/02/02	11500	25

ARRIVALS

NO	ITEMNAME	TYPE	DATEOFSTOCK	PRICE	DISCOUNT
1	Wood Comfort	Double Bed	23/03/03	25000	25
2	Old Fox	Sofa	20/02/03	17000	20
3	Micky	Baby cot	21/02/03	7500	15

- a) To show all information about the Baby cots from the FURNITURE table.
- b) To list the ITEMNAME which are priced at more than 15000 from the FURNITURE table.
- c) To list ITEMNAME and TYPE of those items, in which date of stock is before 22/01/02 from the FURNITURE table in descending of ITEMNAME.
- d) To display ITEMNAME and DATEOFSTOCK of those items, in which the discount percentage is more than 25 from FURNITURE table.
- e) To count the number of items, whose TYPE is "Sofa" from FURNITURE table.
- f) To insert a new row in the ARRIVALS table with the following data:
14, "Velvet touch", "Double bed", {25/03/03}, 25000, 30
- g) Give the output of following SQL stateme
Note: Outputs of the above mentioned queries should be based on original data given in both the tables i.e., without considering the insertion done in (f) part of this question.
- (i) Select COUNT(distinct TYPE) from FURNITURE;
- (ii) Select MAX(DISCOUNT) from FURNITURE,ARRIVALS;
- (iii) Select AVG(DISCOUNT) from FURNITURE where TYPE="Baby cot";
- (iv) Select SUM(Price) from FURNITURE where DATEOFSTOCK<{12/02/02};
- (v) Consider the following tables GAMES and PLAYER. Write SQL commands for the statements (a) to (d) and give outputs for SQL queries (E1) to (E4)

GAMES

GCode	GameName	Number	PrizeMoney	ScheduleDate
101	Carom Board	2	5000	23-Jan-2004
102	Badminton	2	12000	12-Dec-2003
103	Table Tennis	4	8000	14-Feb-2004
105	Chess	2	9000	01-Jan-2004
108	Lawn Tennis	4	25000	19-Mar-2004

PLAYER

PCode	Name	Gcode
1	Nabi Ahmad	101
2	Ravi Sahai	108
3	Jatin	101
4	Nazneen	103

(a) Write SQL commands for the following statements:

- 1) To display the names of all white colored vehicles
- 2) To display name of vehicle, make and capacity of vehicles in ascending order of their sitting capacity
- 3) To display the highest charges at which a vehicle can be hired from CABHUB.
- 4) To display the customer name and the corresponding name of the vehicle hired by them.

(b) Give the output of the following SQL queries:

- 1) SELECT COUNT(DISTINCT Make) FROM CABHUB;
- 2) SELECT MAX(Charges), MIN(Charges) FROM CABHUB;
- 3) SELECT COUNT(*), Make FROM CABHUB;
- 4) SELECT VehicleName FROM CABHUB WHERE Capacity = 4;

(viii) Write SQL queries for (a) to (f) and write the outputs for the SQL queries mentioned shown in (g1) to (g4) parts on the basis of tables ITEMS and TRADERS: **(CBSE 2013)**

ITEMS

CODE	INAME	QTY	PRICE	COMPANY	TCODE
1001	DIGITAL PAD 12i	120	11000	XENITA	T01
1006	LED SCREEN 40	70	38000	SANTORA	T02
1004	CAR GPS SYSTEM	50	21500	GEOKNOW	T01
1003	DIGITAL CAMERA 12X	160	8000	DIGICLICK	T02
1005	PEN DRIVE 32GB	600	1200	STOREHOME	T03

TRADERS

TCode	TName	CITY
T01	ELECTRONIC SALES	MUMBAI
T03	BUSY STORE CORP	DELHI
T02	DISP HOUSE INC	CHENNAI

- a) To display the details of all the items in the ascending order of item names (i.e. INAME).
- b) To display item name and price of all those items, whose price is in range of 10000 and 22000 (both values inclusive).
- c) To display the number of items, which are traded by each trader. The expected output of this query should be:

```
T01    2
T02    2
T03    1
```

- d) To display the price, item name and quantity (i.e. qty) of those items which have quantity more than 150.
- e) To display the names of those traders, who are either from DELHI or from MUMBAI.
- f) To display the names of the companies and the names of the items in descending order of company names.

- g1) SELECT MAX(PRICE), MIN(PRICE) FROM ITEMS;
- g2) SELECT PRICE*QTY AMOUNT FROM ITEMS WHERE CODE=1004;
- g3) SELECT DISTINCT TCODE FROM ITEMS;
- g4) SELECT INAME, TNAME FROM ITEMS I, TRADERS T WHERE I.TCODE=T.TCODE AND QTY<100;

(ix) Answer the (a) and (b) on the basis of the following tables **STORE** and **ITEM**: (CBSE 2014)

STORE

SNo	SName	AREA
S01	ABC Computronics	GK II
S02	All Infotech Media	CP
S03	Tech Shoppe	Nehru Place
S05	Hitech Tech Store	SP

ITEM

INo	IName	Price	SNo
T01	Mother Board	12000	S01
T02	Hard Disk	5000	S01
T03	Keyboard	500	S02
T04	Mouse	300	S01
T05	Mother Board	13000	S02
T06	Key Board	400	S03
T07	LCD	6000	S04
T08	LCD	5500	S05
T09	Mouse	350	S05
T10	Hard disk	4500	S03

(a) Write the SQL queries (1 to 4):

- 1) To display IName and Price of all the items in the ascending order of their Price.
- 2) To display the SNo and SName o all stores located in CP.
- 3) To display the minimum and maximum price of each IName from the table Item.
- 4) To display the IName, price of all items and their respective SName where they are available.

(b) Write the output of the following SQL commands (1 to 4):

- 1) SELECT DISTINCT INAME FROM ITEM WHERE PRICE >= 5000;
- 2) SELECT AREA, COUNT(*) FROM STORE GROUP BY AREA;
- 3) SELECT COUNT(DISTINCT AREA) FROM STORE;
- 4) SELECT INAME, PRICE*0.05 DISCOUNT FROM ITEM WHERE SNO IN ('S02', 'S03');

(x) Consider the following DEPT and WORKER tables. Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii): (CBSE-Delhi 2015)

Table: DEPT

DCODE	DEPARTMENT	CITY
D01	MEDIA	DELHI
D02	MARKETING	DELHI
D03	INFRASTRUCTURE	MUMBAI
D05	FINANCE	KOLKATA
D04	HUMAN RESOURCE	MUMBAI

Table: WORKER

WNO	NAME	DOJ	DOB	GENDER	DCODE
1001	George K	2013-09-02	1991-09-01	MALE	D01
1002	Ryma Sen	2012-12-11	1990-12-15	FEMALE	D03
1003	Mohitesh	2013-02-03	1987-09-04	MALE	D05
1007	Anil Jha	2014-01-17	1984-10-19	MALE	D04
1004	Manila Sahai	2012-12-09	1986-11-14	FEMALE	D01
1005	R SAHAY	2013-11-18	1987-03-31	MALE	D02
1006	Jaya Priya	2014-06-09	1985-06-23	FEMALE	D05

Note: DOJ refers to date of joining and DOB refers to date of Birth of workers.

- (i) To display Wno, Name, Gender from the table WORKER in descending order of Wno.
- (ii) To display the Name of all the FEMALE workers from the table WORKER.
- (iii) To display the Wno and Name of those workers from the table WORKER who are born between '1987-01-01' and '1991-12-01'.
- (iv) To count and display MALE workers who have joined after '1986-01-01'.
- (v) **SELECT COUNT(*) , DCODE FROM WORKER GROUP BY DCODE HAVING COUNT(*)>1;**
- (vi) **SELECT DISTINCT DEPARTMENT FROM DEPT;**
- (vii) **SELECT NAME, DEPARTMENT, CITY FROM WORKER W,DEPT D WHERE W.DCODE=D.DCODE AND WNO<1003;**
- (viii) **SELECT MAX(DOJ) , MIN(DOB) FROM WORKER;**

- (xi) Consider the following DEPT and EMPLOYEE tables. Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii). (CBSE-Outside Delhi 2015)

Table: DEPT

DCODE	DEPARTMENT	LOCATION
D01	INFRASTRUCTURE	DELHI
D02	MARKETING	DELHI
D03	MEDIA	MUMBAI
D05	FINANCE	KOLKATA
D04	HUMAN RESOURCE	MUMBAI

Table: EMPLOYEE

ENO	NAME	DOJ	DOB	GENDER	DCODE
1001	George K	20130902	19910901	MALE	D01
1002	Ryma Sen	20121211	19901215	FEMALE	D03
1003	Mohitesh	20130203	19870904	MALE	D05
1007	Anil Jha	20140117	19841019	MALE	D04
1004	Manila Sahai	20121209	19861114	FEMALE	D01
1005	R SAHAY	20131118	19870331	MALE	D02
1006	Jaya Priya	20140609	19850623	FEMALE	D05

Note: DOJ refers to date of joining and DOB refers to date of Birth of employees.

- (i) To display Eno, Name, Gender from the table EMPLOYEE in ascending order of Eno.
 - (ii) To display the Name of all the MALE employees from the table EMPLOYEE.
 - (iii) To display the Eno and Name of those employees from the table EMPLOYEE who are born between '1987-01-01' and '1991-12-01'.
 - (iv) To count and display FEMALE employees who have joined after '1986-01-01'.
 - (v) **SELECT COUNT(*) ,DCODE FROM EMPLOYEE GROUP BY DCODE HAVING COUNT(*)>1;**
 - (vi) **SELECT DISTINCT DEPARTMENT FROM DEPT;**
 - (vii) **SELECT NAME, DEPARTMENT FROM EMPLOYEE E, DEPT D WHERE E.DCODE=D.DCODE AND ENO<1003;**
 - (viii) **SELECT MAX(DOJ) , MIN(DOB) FROM EMPLOYEE;**
- (xii) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables. (CBSE- Delhi 2016)

Table: VEHICLE

Code	VTTYPE	PERKM
101	VOLVO BUS	160
102	AC DELUXE BUS	150
103	ORDINARY BUS	90
105	SUV	40
104	CAR	20

Note:

- PERKM is Freight Charges per kilometer
- VTTYPE is Vehicle Type

Table: TRAVEL

NO	NAME	TDATE	KM	CODE	NOP
101	Janish Kin	2015-11-13	200	101	32
103	Vedika sahai	2016-04-21	100	103	45
105	Tarun Ram	2016-03-23	350	102	42
102	John Fen	2016-02-13	90	102	40
107	Ahmed Khan	2015-01-10	75	104	2
104	Raveena	2015-05-28	80	105	4
106	Kripal Anya	2016-02-06	200	101	25

Note :

- NO is Traveller Number
 - KM is Kilometer travelled
 - NOP is number of travellers travelled in vehicle
 - TDATE is Travel Date
- (i) To display NO, NAME, TDATE from the table TRAVEL in descending order of NO.
- (ii) To display the NAME of all the travellers from the table TRAVEL who are travelling by vehicle with code 101 or 102.
- (iii) To display the NO and NAME of those travellers from the table TRAVEL who travelled between '2015-12-31' and '2015-04-01'.
- (iv) To display all the details from table TRAVEL for the travellers, who have travelled distance more than 100 KM in ascending order of NOP.
- (v) **SELECT COUNT (*) , CODE FROM TRAVEL GROUP BY CODE HAVING COUNT (*) > 1 ;**
- (vi) **SELECT DISTINCT CODE FROM TRAVEL ;**
- (vii) **SELECT A.CODE, NAME, VTYPE FROM TRAVEL A, VEHICLE B WHERE A.CODE=B.CODE AND KM < 90 ;**
- (viii) **SELECT NAME, KM*PERKM FROM TRAVEL A, VEHICLE B WHERE A.CODE=B.CODE AND A.CODE = '105' ;**
- (xiii) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables. **(CBSE- Outside Delhi 2016)**

Table: VEHICLE

VCODE	VEHICLETYPE	PERKM
V01	VOLVO BUS	150
V02	AC DELUXE BUS	125
V03	ORDINARY BUS	80
V05	SUV	30
V04	CAR	18

Note:

- PERKM is Freight Charges per kilometer

Table: TRAVEL

CNO	CNAME	TRAVELDATE	KM	VCODE	NOP
101	K.Niwal	2015-12-13	200	V01	32
103	Fredrick Sym	2016-03-21	120	V03	45
105	Hitesh Jain	2016-04-23	450	V02	42
102	Ravi anish	2016-01-13	80	V02	40
107	John Malina	2015-02-10	65	V04	2
104	Sahanubhuti	2016-01-28	90	V05	4
106	Ramesh jaya	2016-04-06	100	V01	25

Note :

- KM is Kilometer travelled
 - NOP is number of travellers travelled in vehicle
 - TDATE is Travel Date
- (i) To display CNO, CNAME, TRAVELDATE from the table TRAVEL in descending order of CNO.

- (ii) To display the CNAME of all the customers from the table TRAVEL who are travelling by vehicle with code V01 or V02.
- (iii) To display the CNO and CNAME of those customers from the table TRAVEL who travelled between '2015-12-31' and '2015-05-01'.
- (iv) To display all the details from table TRAVEL for the customers, who have travelled distance more than 120 KM in ascending order of NOP.
- (v) **SELECT COUNT (*), VCODE FROM TRAVEL GROUP BY V CODE
HAVING COUNT (*) >1 ;**
- (vi) **SELECT DISTINCT VCODE FROM TRAVEL ;**
- (vii) **SELECT A.VCODE,CNAME,VEHICLETYPE FROM TRAVEL A,VEHICLE B
WHERE A.VCODE=B.VCODE AND KM<90 ;**
- (viii) **SELECT CNAME,KM*PERKM FROM TRAVEL A, VEHICLE B WHERE
A.VCODE=B.VCODE AND A.VCODE= 'V05' ;**

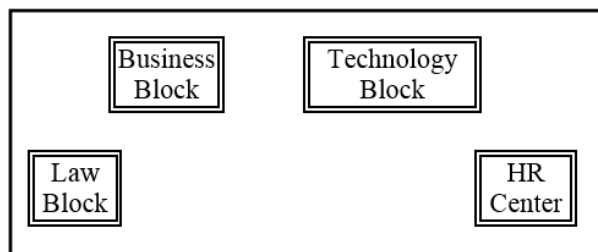
Computer Networks – Descriptive questions

1. What is a computer network?
2. Expand the terms: HTTP, HTTPS, SSH, SCP, POP, IMAP, SMTP, FTP, VoIP, URL, GPRS
3. What is **VoIP**? (CBSE 2011)
4. What, out of the following, will you use to have an audio-visual chat with an expert sitting in a faraway place to fix-up a technical issue? (CBSE 2012)
Email, VoIP, FTP
5. Give one suitable example of each – URL and Domain Name. (CBSE 2012)
6. What is the difference between domain name and IP address? (CBSE 2013)
7. Write two advantages of using an optical fiber cable over an Ethernet cable to connect two service stations, which are 190m away from each other. (CBSE 2013)
8. Write one characteristic each for 2G and 3G Mobile technologies. (CBSE 2014)
9. Which type of network (out of LAN, PAN, MAN) is formed when you connect two mobiles using Bluetooth to transfer a picture file? (CBSE 2014)
10. Write any two important characteristics of Cloud Computing. (CBSE 2014)
11. Differentiate between ftp and http. (CBSE 2015)
12. Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication? (CBSE-Delhi, Outside Delhi 2015)
Infrared, Coaxial Cable, Ethernet Cable, Microwave, Optical Fiber
13. Give two examples of PAN and LAN type of networks. (CBSE- Delhi 2016)
14. Which protocol helps us to browse through web pages using internet browsers? Name any one internet browser. (CBSE- Delhi 2016)
15. Write two advantages of 4G over 3G Mobile Telecommunication Technologies in terms of speed and services. (CBSE- Delhi 2016)
16. Differentiate between PAN and LAN types of networks. (CBSE-Outside Delhi 2016)
17. Which protocol helps us to transfer files to and from a remote computer? (CBSE-Outside Delhi 2016)
18. Write two advantages of 3G over 2G Mobile Telecommunication Technologies in terms of speed and services. (CBSE-Outside Delhi 2016)
19. What is attenuation?
20. Differentiate between IPv4 and IPv6 addresses with an example of each.
21. Differentiate between physical address and logical address of a node in a computer network.
22. Differentiate between Guided media and Unguided media with an example of each.
23. Explain the terms: (i) remote login (ii) remote desktop
24. What is Application layer in a computer network?
25. Explain the terms: (i) Wi-Fi (ii) Access Point?
26. Expand and explain the term DNS.
27. Differentiate between Bus topology and Star topology.
28. Mention any two advantages of using optical fibre over other guided media.
29. What is video conferencing?
30. Define the terms Worm and Trojan Horse as a malware.
31. What is a cookie?
32. Explain the terms Packet Switching and Circuit Switching.
33. Define the following terms:
(a) Digital property, (b) Intellectual property (c) Intellectual Property rights

34. Define the following terms:
(a) plagiarism (b) scam (c) identity theft (d) phishing (e) Illegal downloads (f) child pornography (g) spam mail
35. What is cyber forensics?
36. What is IT Act 2000?
37. Explain the following terms (licenses):
(a) Creative Commons (b) GPL (c) Apache
38. Categorise the following cyber-crimes:
(i) Using someone else's social media account to post something.
(ii) Unauthorised use of someone else's credit card
(iii) Sending unsolicited commercial bulk mails
(iv) Online access to a bank account for unauthorized transactions
(v) Modifying a company's data with unauthorized access
39. Out of the following, which all comes under cyber crime? (CBSE 2015)
(i) Stealing away a brand new computer from a showroom.
(ii) Getting in someone's social networking account without his consent and posting pictures on his behalf to harass him.
(iii) Secretly copying files from server of a call center and selling it to the other organization.
(iv) Viewing sites on an internet browser.
40. Which of the following crime(s) is/are covered under cybercrime? (CBSE 2013)
(i) Stealing brand new hard disk from a shop
(ii) Getting into unknown person's social networking account and start messaging on his behalf.
(iii) Copying some important data from a computer without taking permission from the owner of the data.

Computer Networks - Network Setup

- (i) Quick Learn University is setting up its academic blocks at Prayag nagar 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: (CBSE 2011)



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

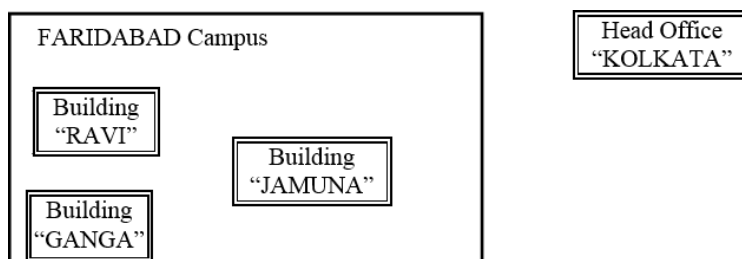
Number of computers in each of the blocks/Center is as follows:

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

- b) Suggest the most suitable place (i.e., Block/Center) to install the server of this University with a suitable reason.
- c) Suggest an ideal layout for connecting these blocks/centers for a wired connectivity.
- d) 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.

e) The university is planning to connect its admission office in the closest big city, which is more than 250km from university. Which type of network out of LAN, MAN, or WAN will be formed? Justify your answer.

- (ii) Granuda Consultants are setting up a secured network for their office campus at Faridabad for their day to day office and web based activities. They are planning to have connectivity between 3 buildings and the head office situated in Kolkata. Answer the questions (a) to (d) after going through the building positions in the campus and other details, which are given below: (CBSE 2012)



Distances between various buildings:

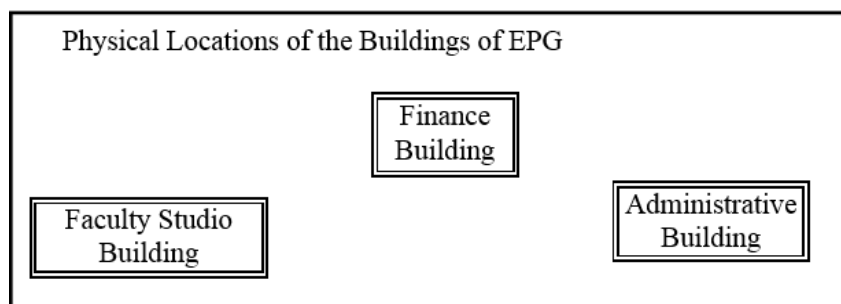
Building "RAVI" to Building "JAMUNA"	120m
Building "RAVI" to Building "GANGA"	50m
Building "GANGA" to Building "JAMUNA"	65m
Faridabad Campus to Head Office	1460km

Number of computers:

Building "RAVI"	25
Building "JAMUNA"	150
Building "GANGA"	51
Head Office	10

- Suggest the most suitable place (i.e. block) to house the server of this organization. Also give a reason to justify your suggested location.
- Suggest a cable layout of connections between the buildings inside the campus.
- Suggest the placement of the following devices with justification:
 - Switch
 - Repeater
- The organization is planning to provide a high speed link with its head office situated in KOLKATA using a wired connection. Which of the following cable will be most suitable for this job?
 - Optical Fiber
 - Co-axial cable
 - Ethernet cable

- (iii) Expertia Professional Global (EPG) is an online corporate training provider company for IT related courses. The company is setting up their new campus in Mumbai. You as a network expert have to study the physical locations of various buildings and the number of computers to be installed. In the planning phase, provide the best possible answers for the queries (a) to (d) raised by them. (CBSE 2013)



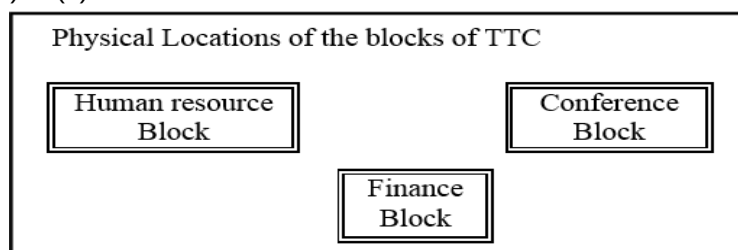
Building to Building distances (in Mtrs.)

FROM	To	Distance
Administrative Building	Finance Building	60
Administrative Building	Faculty Studio building	120
Finance Building	Faculty Studio building	70

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

Administrative Building	20
Finance Building	40
Faculty Studio building	120

- Suggest the most appropriate building, where EPG should plan to install the server.
 - Suggest the most appropriate building to building cable layout to connect all three buildings for efficient communication.
 - Which type of network out of the following is formed by connecting the computers of these three buildings?
LAN, MAN, WAN
 - Which wireless channel out of the following should be opted by EPG to connect to students of all over the world?
Infrared, Microwave, Satellite
- (iv) Trine Tech Corporation (TTC) is a professional consultancy company. The company is planning to set up their new offices in India with its hub at Hyderabad. As a network adviser, you have to understand their requirement and suggest them the best available solutions. Their queries are mentioned (a) to (d) below. (CBSE 2014)



Block to Block distances (in Mtrs.)

FROM	To	Distance
Human resource	Conference	110
Human resource	Finance	40
Conference	Finance	80

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

Human resource	25
Finance	120
Conference	90

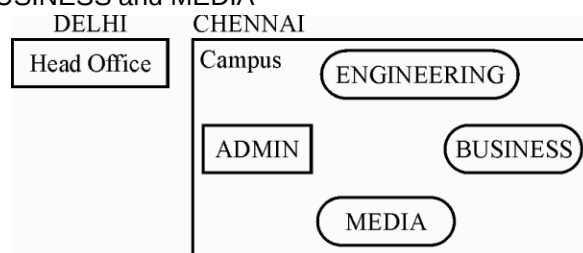
- What will be the most appropriate block, where TTC should plan to install the server?
- Draw a block to block cable layout to connect all the buildings in the most appropriate manner for efficient communication.
- What will be the best possible connectivity out of the following, you will suggest to connect the new setup of offices in Bangalore with its London based office?

Satellite Link, Infrared, Ethernet cable

- Which of the following devices will be suggested by you to connect each computer in each of the buildings.

Switch, modem, Gateway

- Perfect Edu Services Ltd. is an educational organization. It is planning to setup its India campus at Chennai with its head office at Delhi. The Chennai campus has 4 main buildings – ADMIN, ENGINEERING, BUSINESS and MEDIA
(CBSE 2015)



Shortest distances between various buildings:

ADMIN to ENGINEERING	55 m
ADMIN to BUSINESS	90 m
ADMIN to MEDIA	50 m
ENGINEERING to BUSINESS	55 m
ENGINEERING to MEDIA	50 m
BUSINESS to MEDIA	45 m
DELHI Head Office to CHENNAI Campus	2175 km

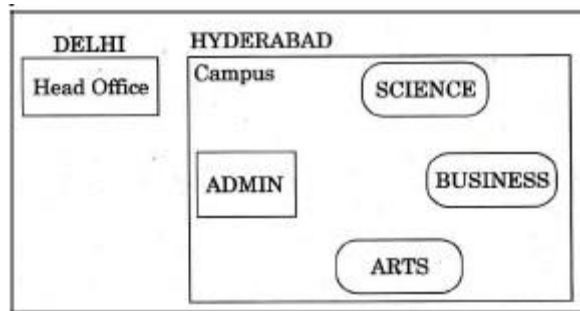
Number of Computers installed at various buildings are as follows:

ADMIN	110
ENGINEERING	75
BUSINESS	40
MEDIA	12
DELHI Head Office	20

- Suggest the most appropriate location of the server inside the CHENNAI campus (out of the 4 buildings), to get the best connectivity for maximum no. of computers. Justify your answer.
- Suggest and draw the cable layout to efficiently connect various buildings within the CHENNAI campus for connecting the computers.
- Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus?
- Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of CHENNAI campus and DELHI Head Office?
 - Cable TV
 - Email
 - Video Conferencing
 - Text Chat

- Xcelencia Edu Services Ltd. is an educational organization. It is planning to set up its India campus at Hyderabad with its head office at Delhi. The Hyderabad campus has 4 main buildings:
ADMIN, SCIENCE, BUSINESS and MEDIA. (CBSE-Outside Delhi 2015)

You as a network expert have to suggest the best network related solutions for their problems raised in (a) to (d), keeping in mind the distances between the buildings and other given parameters.



Shortest Distances between various buildings:

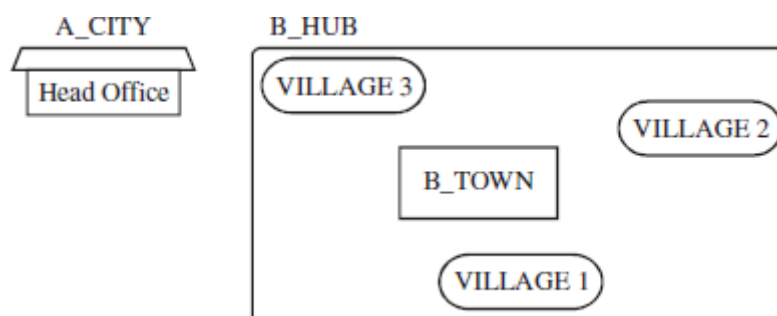
ADMIN to SCIENCE	65M
ADMIN to BUSINESS	100m
ADMIN to ARTS	60M
SCIENCE to BUSINESS	75M
SCIENCE to ARTS	60M
BUSINESS to ARTS	50M
DELHI Head Office to HYDERABAD Campus	1600KM

Number of Computers installed at various building are as follows:

ADMIN	100
SCIENCE	85
BUSINESS	40
ARTS	12
DELHI Head Office	20

- Suggest the most appropriate location of the server inside the HYDERABAD campus (out of the 4 buildings), to get the best connectivity for maximum no. of computers. Justify your answer.
 - Suggest and draw the cable layout to efficiently connect various buildings 'within the HYDERABAD campus for connecting the computers.
 - Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus?
 - Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of HYDERABAD campus and DELHI Head Office?
(a) E-mail (b) Text Chat (c) Video Conferencing (d) Cable TV
- (vii) Uplifting Skills Hub India is a knowledge and skill community which has an aim to uplift the standard of knowledge and skills in the society. It is planning to setup its training centers in multiple towns and villages pan India with its head offices in the nearest cities. They have created a model of their network with a city, a town and 3 villages as follows:

As a network consultant, you have to suggest the best network related solutions for their



issues/problems raised in (a) to (d) keeping in mind the distances between various locations and other given parameters.

Shortest distances between various locations:

VILLAGE 1 to B_TOWN	2 KM
VILLAGE 2 to B_TOWN	1.0 KM
VILLAGE 3 to B_TOWN	1.5 KM
VILLAGE 1 to VILLAGE 2	3.5 KM
VILLAGE 1 to VILLAGE 3	4.5 KM
VILLAGE 2 to VILLAGE 3	2.5 KM
A_CITY Head Office to B_HUB	25 KM

Number of Computers installed at various locations are as follows:

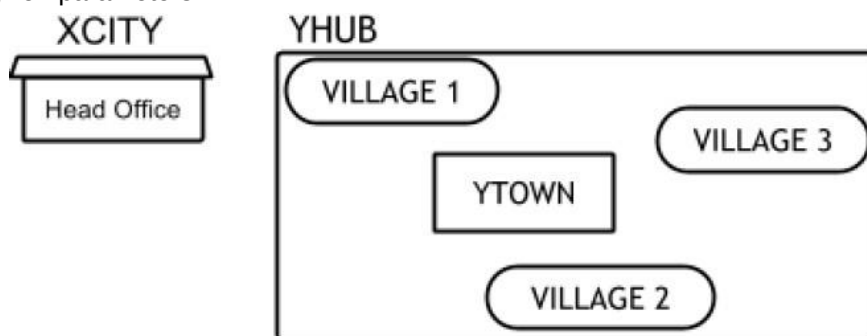
B_TOWN	120
VILLAGE 1	15
VILLAGE 2	10
VILLAGE 3	15
A_CITY OFFICE	6

Note :

- In Villages, there are community centers, in which one room has been given as training center to this organization to install computers.
 - The organization has got financial support from the government and top IT companies.
- a) Suggest the most appropriate location of the SERVER in the B_HUB (out of the 4 locations), to get the best and effective connectivity. Justify your answer.
 - b) Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the B_HUB.
 - c) Which hardware device will you suggest to connect all the computers within each location of B_HUB?
 - d) Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at all locations of B_HUB?

(viii) Intelligent Hub India is a knowledge community aimed to uplift the standard of skills and knowledge in the society. It is planning to setup its training centers in multiple towns and villages pan India with its head offices in the nearest cities. They have created a model of their network with a city, a town and 3 villages as follows.

As a network consultant, you have to suggest the best network related solutions for their issues/problems raised in (a) to (d), keeping in mind the distances between various locations and other given parameters.



Shortest distance between various locations:

VILLAGE 1 to YTOWN	2 KM
VILLAGE 2 to YTOWN	1.5 KM
VILLAGE 3 to YTOWN	3 KM
VILLAGE 1 to VILLAGE 2	3.5 KM
VILLAGE 1 to VILLAGE 3	4.5 KM
VILLAGE 2 to VILLAGE 3	3.5 KM
CITY Head Office to YHUB	30 Km

Number of computers installed at various locations are as follows:

YTOWN	100
VILLAGE 1	10
VILLAGE 2	15
VILLAGE 3	15
CITY OFFICE	5

Note:

- In Villages, there are community centers, in which one room has been given as training center to this organization to install computers.
 - The organization has got financial support from the government and top IT companies.
- a) Suggest the most appropriate location of the SERVER in the YHUB (out of the 4 locations), to get the best and effective connectivity. Justify your answer.
 - b) Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the YHUB.
 - c) Which hardware device will you suggest to connect all the computers within each location of YHUB?
 - d) Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at YHUB locations?

Society, Law, and Ethics

1. Define the following terms:
(a) Digital property, (b) Intellectual property (c) Intellectual Property rights
2. Define the following terms:
(a) plagiarism (b) scam (c) identity theft (d) phishing (e) Illegal downloads (f) child pornography (g) spam mail
3. What is cyber forensics?
4. What is IT Act 2000?
5. Explain the following terms (licenses):
(a) Creative Commons (b) GPL (c) Apache
6. What is meant by privacy of data? Why is data privacy important?
7. Categorise the following cyber-crimes:
 - (i) Using someone else's social media account to post something.
 - (ii) Unauthorised use of someone else's credit card
 - (iii) Sending unsolicited commercial bulk mails
 - (iv) Online access to a bank account for unauthorized transactions
 - (v) Modifying a company's data with unauthorized access
8. Out of the following, which all comes under cyber crime? (CBSE 2015)
 - (v) Stealing away a brand new computer from a showroom.
 - (vi) Getting in someone's social networking account without his consent and posting pictures on his behalf to harass him.
 - (vii) Secretly copying files from server of a call center and selling it to the other organization.
 - (viii) Viewing sites on an internet browser.
9. Which of the following crime(s) is/are covered under cybercrime? (CBSE 2013)
 - (iv) Stealing brand new hard disk from a shop
 - (v) Getting into unknown person's social networking account and start messaging on his behalf.
 - (vi) Copying some important data from a computer without taking permission from the owner of the data.

ANSWERS

Descriptive Questions:

1. A function is a named group of statements which get executed when the function is invoked.
- 2.

Actual Parameters	Formal Parameter
Parameter used in function call.	Parameter used in function definition.
Can be an identifier, a literal, or any other valid expression.	Has to be an identifier only.
Example: <pre>def func(a,b): print(a,b) r=1 func(3,r*2)</pre> In the above code, 3 and r*2 in the function call are actual parameters, whereas a and b in the function definition are formal parameters.	

3.

Value Parameter	Reference Parameter
It is a copy of the corresponding actual parameter.	It is an alias of the corresponding reference parameter.
Any change in a value parameter does not affect the corresponding actual parameter.	Any change in a reference parameter is reflected on the corresponding actual parameter too.
All immutable data objects are accepted as value parameters in a function.	All mutable data objects are accepted as reference parameters in a function.
Example: <pre>def func(a,b): a[b]+=1 b+=1 arr=[1,2,3,4] n=2 func(arr,n) print(arr,n)</pre> In the above code arr is passed to a as a reference parameter, and n is passed to b as a value parameter. After the function call, the value of arr is changed, whereas value of n remains the same. The output of the above code is: [1, 2, 4, 4] 2	

4. Scope of a variable refers to the part of the code (program) in which it can be used.

5.

Local variable	Global variable
Defined inside a function without using the keyword 'global'.	Defined outside any function, or inside a function using the keyword 'global'.
Can be used only in the function in which it is used.	Can be used anywhere, after its declaration, in a program.
Example: <pre>def func(): global p,q a=p; q=a; p=a+q print(a,p,q) p=3 func() print(p,q)</pre> In the above code p and q are global variables, whereas a is a local variable. The output produced by the above code is: 3 6 3 6 3	

7. Keyword 'global' is used in a function to
 - (i) Specify the global variable(s) which need to be updated in the function
 - (ii) Declare global variable(s) inside a function.

8. Yes, a function can have a local variable with the same name as that of a global variable in the script. Yes, it is possible to access global variable with the same name in that function using the in-built function `globals()`.
9. return statement is used to return a value from a function. A function returns None in the following three cases:
 - (i) The function has no return statement
 - (ii) The function has blank return statement
 - (ii) The function explicitly returns None by return statement.
10. A mutable data object is always passed as a reference parameter to a function. It means that whatever change is made to the corresponding formal parameter, it will be reflected on the passed data object too.
An immutable data object is always passed as a value parameter to a function. It means that any change made to the corresponding formal parameter has no effect on the passed data object.
11. A function header is the first statement of a function definition. It starts with key word `def`, followed by function name and an optional list of parameters within parentheses, and is terminated by a colon (`:`).
Example:


```
def func(a,b): #function header
    print(a,b)
```
12.


```
def func(x):  ->Function header, formal parameter - b
    global b
    y=b+2
    b*=y
    y+=x+b
    print(x,y,b)
x,b=5,10
func(x) -> Function Call, Actual parameter - x
print(func(x)) -> Function Call, Actual parameter - x
```

} function body
13. A module is a python script (a .py file) containing one or more of the following components: declarations (classes, objects, variables etc.), function definitions, function calls, independent statements (executable code outside a function).
14. A package is a folder containing one or more modules and a file `__init__.py`. The presence of the file `__init__.py`, even if empty, lets python treat a folder as a package to be imported in other modules, if required. Without `__init__.py`, a folder is just a normal folder and cannot be treated as a package.
15.
 - (i) From myModule import alpha
 - (ii) From Computer import comp1(), comp2()
 - (iii) From lib import pkg
 - (iv) From HR import Salary
 - (v) Import Trigonometry
16. A file is a named collection of data stored on a secondary storage device.
17. Files are needed for permanent storage of data.
18. Text file and Binary file.

Text File	Binary File
A text file can be created using any text editor or a computer program.	A binary file can be created using only a computer program.
A text file can be opened meaningfully using any text editor or a computer program.	A binary file can be read meaningfully only by a computer program.

19. Writing data in the file, Reading data from the file.
20. It is a small memory space allocated to a file object. All the transfer of data between the program and the file (on secondary storage device) happens through buffer only. Each file object is allocated its own separate buffer.
21. A file can be opened using the `open()` function.
- 22.

File opening mode	If the file already exists	If the file does not exist
'r'	File is opened in read mode.	<u>FileNotFoundError is raised.</u>
'r+'	File is opened in read-write mode with file pointer at 0.	<u>FileNotFoundError is raised.</u>
'w'	File contents are deleted and file is opened in write mode.	File is created and opened in write mode.

'w+'	File contents are deleted and file is opened in read-write mode.	File is created and opened in read-write mode.
'a'	File is opened in append mode.	File is created and opened in append mode.
'a+'	File is opened in read-append mode.	File is created and opened in read-append mode.
'x'	<u>FileExistsError is raised.</u>	File is created and opened in write mode.
'x+'	<u>FileExistsError is raised.</u>	File is created and opened in read-append mode.

23.

Write mode	Append mode
Data can be written anywhere in the file.	Data can be written only at the end of the existing data in the file.
File pointer can be adjusted using seek()	File pointer cannot be adjusted.
Already existing data, if any, is deleted from the file.	Already existing data, if any, is not deleted from the file.

24. Write() – writes a string in the file.

Writelines() – writes a list of strings in the file.

25. Read() – reads the data from the file as a string.

Readline() – reads one line of data from the file, as a string.

Readlines() – reads the entire file content as a list of strings.

26. It is important to close a file to:

- Free the file handle allocated to the file, so that it can be used for some other file.
- To flush the buffer into the file if the file was opened in write or append mode.

27.

(i) append (ii) read (iii) write (iv) append

28.

seek()	tell()
Sets the file pointer.	Returns the value of file pointer.
Takes one integer parameter.	Does not take any parameter.

29.

Text file	Binary file
Contains lines of text, where each line is terminated by an EOL character.	Contains data in the form of sequence of bytes. There is no concept of lines or EOL character.
Can be created and meaningfully read using any text editor or a program.	Can be created through a program, and meaningfully read only through some specific programs or application(s).

30. rename() function is used to rename a file. remove() function is used to delete a file. These function are available in the os module.

31. stdin, stdout, stderr

32. "Pickling" is the process whereby a Python object hierarchy is converted into a byte stream, and "unpickling" is the inverse operation, whereby a byte stream (from a binary file or bytes-like object) is converted back into an object hierarchy.

33. A stack is a linear data structure which is used for LIFO type of data processing.

34. TOP – It is the open end of a stack from where all insertions in the stack and deletions from the stack are performed.

PUSH – The insertion operation in a stack is known as PUSH.

POP – The deletion operation from a stack is called POP.

35. A stack can be implemented in Python using a list.

36. Overflow – It is the condition when we try PUSH an element in an empty stack.

Underflow – It is the condition when we try to POP an element from an empty stack.

37. A csv file is a text file in which each line represents a record, and fields within a record are separated by commas. The commas are not a part of data.

In a text file, there is no concept of records and fields. Each character in a text file is part of data. All csv files are text files, but all text files are not csv files.

38. A connection is an object which connects a Python program to a database. A cursor is an object which is used to execute SQL queries over a connection.

39. fetchone() retrieves the next row of a query result set and returns it as a tuple. It returns None if there are no more rows to be fetched.

40. fetchall() fetches all (or all remaining) rows of a query result set and returns a list of tuples. If no more rows are available, it returns an empty list.
41. fetchmany() fetches a specified number of rows of a query result set and returns a list of tuples. If no more rows are available, it returns an empty list.
42. While, Float, new, Amount2, _Counter
43. For, INT, NeW, delete, name1
44. Pr*Qty, float, Address One, in
45. Total Tax, S.I.

Finding the Errors:

1.

```
(v) def f1(a,b):
    a+=b
    b*=a
    print(a,b)
x,b=5,10 #or any other numeric value for b
f1(x,b) #or any other numeric expression as second argument.

(vi) def f2(x):
    global b
    x+=b
    b*=y
    print(x,b,sep='*')
x,b=5,10
f2(b)

(vii) def f3(b,a=1):
    global x,y
    x=a+b
    a,y=a+x,a*x
    print(a,b,x,y)
f3(5,10)
print(f3(5))
```

2. The given code will raise an exception because the code is trying to write in a file open in read mode.

Finding the Output:

1.

```
(i) 15 150
    5 10
(ii) 15 35 100
    5 100
(iii) 20 10 15 75
    165 15 90 6750
    None
(viii) 111**II
    555**5KKK
(ix) abcba
    acabba
(vi) 14 8 22
    67 45 111
(vii) r#TI#N#l
```

2. 9

Differentiate between:

4. Import random and from random import random

Import random	From random import random
Imports the complete random module	Imports only the function random() from the random module
Any function from the random module can be used in the code	Only the imported function can be used in the code.
Function call needs to be qualified by prefixing module name random with the function call.	No prefix is needed with the function call
Example: random.random()	Example: random()

5. Import math and from math import sqrt

Import math	From math import sqrt
Imports the complete math module	Imports only the function sqrt() from the math module
Any function from the math module can be used in the code	Only the imported function can be used in the code.
Function call needs to be qualified by prefixing module name random with the function call.	No prefix is needed with the function call
Example: math.sqrt()	Example: sqrt()

6. random.randint() and randint()

random.randint()	randint()
Imports the complete math module	Imports only the function sqrt() from the math module
Any function from the math module can be used in the code	Only the imported function can be used in the code.
Function call needs to be qualified by prefixing module name random with the function call.	No prefix is needed with the function call
Example: math.sqrt()	Example: sqrt()

Writing code:

```
1. def high(a,b,c):
    if a>=b and a>=c:
        return a
    if b>=c and b>=a:
        return b
    if c>=a and c>=b:
        return c
2. def rev_str(s):
    s1=''
    for ch in s:
        s1=ch+s1
    return s1
3. def sort_words(s):
    s=s.split(',')
    s.sort()
    s=', '.join(s)
    return s
```

Text File Operations

```
1. 4
2. def count_spaces():
    with open("para.txt") as f:
        data=f.read()
        c=data.count(' ')
    return(c)
```

```

3. print(open("abc.txt").read())

4. def vowelwords():
    f1=open("text1.txt")
    f2=open("text2.txt",'w')
    for line in f1:
        line=line.split()
        for word in line:
            if word[0] not in "AEIOU":
                f2.write(word+" ")
        f2.write("\n")
    f1.close()
    f2.close()

5. def count_end():
    c=0
    with open("story.txt") as f:
        for line in f:
            line=line.strip()
            if line != "" and line[-1] in "aeiouAEIOU":
                c+=1
    print(c)

6. def count_words_A():
    c=0
    with open("Lines.txt") as f:
        for line in f:
            line=line.split()
            for word in line:
                if word[0] in "aA":
                    c+=1
    print(c)

7. def last_three():
    f=open("story.txt")
    data=f.read()
    data=data.strip()
    print(data[-3:])
    f.close()

8. def copy():
    f1=open("FAIPS.txt")
    f2=open("DPS.txt",'w')
    data=f1.read()
    for word in data:
        if word[0].isupper():
            f2.write(word+" ")
    f1.close()
    f2.close()

9. def show(n):
    f=open("MIRA.TXT")
    data=f.read()
    f.close()
    if len(data)<n:
        print("Inavid n")
    else: print(data[n-1])

```

```

10. def Me_My():
    f=open("DIARY.TXT")
    data=f.read()
    f.close()
    data=data.upper()
    c=data.count("ME")+data.count("MY")
    print("Count of Me/My in file:",c)

11. def places():
    with open("places.txt") as f:
        for line in f:
            if line[0] in "pPsS":
                print(line)

12. def CountHisHer():
    f=open("gender.TXT")
    data=f.read()
    f.close()
    data=data.upper()
    data=data.split()
    his=data.count("HIS")
    her=data.count("HER")
    print("Count of His:",his)
    print("Count of Her:",her)

13. def EUcount():
    e=u=0
    with open("IMP.TXT") as f:
        ch=f.read(1)
        while (ch):
            if ch in "eE":
                e+=1
            elif ch in "uU":
                u+=1
            ch=f.read(1)
    print("E:",e)
    print("U:",u)

14. def SUCCESS():
    f=open("STORY.TXT")
    data=f.read()
    f.close()
    data=data.upper()
    data=data.split()
    c=data.count("SUCCESS")\
        +data.count("SUCCESS,")\
        +data.count("SUCCESS.")\
        +data.count("SUCCESS;")\
        +data.count("SUCCESS:")
    print(c)

15. def TOWER():
    f=open("writeup.TXT")
    data=f.read()

```

```

f.close()
data=data.upper()
data=data.split()
c=data.count("TOWER")\
+data.count("TOWER,")\
+data.count("TOWER.")\
+data.count("TOWER;")\
+data.count("TOWER:")
print(c)

16. def WORD4CHAR():
    f=open("fun.TXT")
    data=f.read()
    f.close()
    data=data.split()
    for word in data:
        if word[-1] in ".,:;":
            word=word[:-1]
        if len(word)==4:
            print(word,end=' ')

17. def DISP3CHAR():
    f=open("fun.TXT")
    data=f.read()
    f.close()
    data=data.split()
    for word in data:
        if word[-1] in ".,:;":
            word=word[:-1]
        if len(word)==3:
            print(word,end=' ')

18. def copyFile():
    sf=input("Enter source file name: ")
    tf=input("Enter target file name: ")
    f1=open(sf)
    f2=open(tf,'w')
    data=f1.read()
    f2.write(data)
    f1.close()
    f2.close()

19. def f1(sfn, tfn):
    sf=open(sfn)
    tf=open(tfn,'w')
    data=sf.read()
    while ' ' in data:
        data=data.replace(' ','')
    tf.write(data)
    sf.close()
    tf.close()

20. def write_file():
    import sys
    print("Enter a multi-line string,press ^D \
in the beginning of a line to terminate: ")
    a=sys.stdin.read()
    open('story1.txt','w').write(a)

```

```

21. def read_last_line(fn):
    f=open(fn,'r')
    data=f.readlines()
    print(data[-1])
    f.close()

22. def indexing(fn,indexFile):
    import pickle
    f=open(fn,'r')
    data=f.readlines()
    index={}
    i=0
    for line in data:
        i+=1
        for word in line.split():
            if word not in index:
                index[word]=[i]
            elif i not in index[word]:
                index[word]+= [i]
    f.close()
    f=open(indexFile,'wb')
    pickle.dump(index,f)
    f.close()

23. def readAndCount():
    f=open('BOOKS.TXT')
    l=u=d=0
    data=f.read()
    f.close()
    print(data)
    for ch in data:
        if ch.islower():
            l+=1
        elif ch.isupper():
            u+=1
        elif ch.isdigit():
            d+=1
    print('Lowercase characters:',l)
    print('Uppercase characters:',u)
    print('Digits:',d)

24. def fileSize():
    fn=input("Enter file name: ")
    f=open(fn)
    data=f.read()
    data=data.replace(' ','')
    data=data.replace('\n','')
    data=data.replace('\t','')
    print(len(data))

```

Binary File Operations

```

1. def update_pro():
    import pickle,os
    temp=open("file.tmp",'wb')
    with open("PRODUCT.DAT",'rb') as f:
        pc=input("Enter product code: ")
        st=int(input("Enter stock: "))
        found=0
        while(1):
            try:
                rec=pickle.load(f)
                if rec['prod_code']==pc:
                    rec['stock']=st

```

```

        found=1
        pickle.dump(rec,temp)
    except:
        break
temp.close()
if found==0:
    print("Record not found")
else:
    os.remove("product.dat")
    os.rename("file.tmp","product.dat")
    print("Record updated")
2. def show_percentage():
    found=0
    with open("student.dat",'rb') as f:
        while(1):
            try:
                rec=pickle.load(f)
                if rec[2]>75:
                    print(rec)
                    found=1
            except:
                break
    if found==0:
        print("No such record found")
3. def show_vehicle():
    c=0
    with open("speed.dat",'rb') as f:
        while(1):
            try:
                rec=pickle.load(f)
                print(rec); c+=1
            except:
                break
    print("Number of records =",c)
4. def search_book():
    with open("BOOK.DAT",'rb') as f:
        bn=int(input("Enter book number: "))
        found=0
        while(1):
            try:
                rec=pickle.load(f)
                if rec['BookNo']==bn:
                    print(rec); found=1
            except:
                break
    if found==0:
        print("Book not found")
5. def show_vintage():
    found=0
    with open("vintage.dat",'rb') as f:
        while(1):
            try:
                rec=pickle.load(f)
                if rec[2]>200000 and rec[2]<250000:
                    print(rec)
                    found=1
            except:
                break
    if found==0:
        print("No such record found")

```

```

6. def search_laptop():
    with open("laptop.DAT",'rb') as f:
        mn=int(input("Enter model number: "))
        found=0
        while(1):
            try:
                rec=pickle.load(f)
                if rec[0]==mn:
                    print(rec)
                    found=1
            except:
                break
        if found==0:
            print("Laptop not found")
7. def search_mobile():
    with open("mobile.DAT",'rb') as f:
        found=0
        while(1):
            try:
                rec=pickle.load(f)
                if rec[1]>1000:
                    print(rec)
                    found=1
            except:
                break
        if found==0:
            print("No such record found")
8. def search_game():
    with open("GAMES.DAT",'rb') as f:
        found=0
        while(1):
            try:
                rec=pickle.load(f)
                if rec[2]=="8 to 13":
                    print(rec)
                    found=1
            except:
                break
        if found==0:
            print("No such record found")
9. def search_item():
    with open("items.DAT",'rb') as f:
        found=0
        while(1):
            try:
                rec=pickle.load(f)
                if rec['Cost']<2500:
                    print(rec)
                    found=1
            except:
                break
        if found==0:
            print("No such record found")
10. def BUMPER():
    with open("gifts.DAT",'rb') as f:
        found=0
        while(1):
            try:
                rec=pickle.load(f)
                if rec[2]=="ON DISCOUNT":
                    print(rec)
                    found=1
            except:

```

```

        break
    if found==0:
        print("No such record found")

```

Stacks

- ```

def stackpush(nameStack):
 nm=input("Enter name to push: ")
 nameStack.append(nm)

def stackpop(stack):
 if nameStack==[]:
 return None
 else:
 return nameStack.pop()

```
- ```

def stackpush(stack):
    bn=int(input("Enter BNo: "))
    Desc=input("Enter Description: ")
    ele=[bn,Desc]
    stack.append(ele)

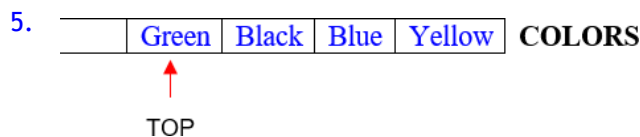
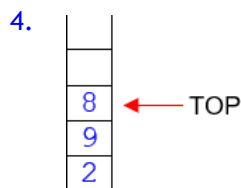
def stackpop(stack):
    if stack==[]:
        return None
    else:
        return stack.pop()

```
- ```

def PUSH(TEXTBOOKS):
 isbn=int(input("Enter ISBN: "))
 title = input("Enter title: ")
 price=float(input("Enter price: "))
 ele={'ISBN':isbn,'TITLE':title,'PRICE':price}
 TEXTBOOKS.append(ele)

def POP(TEXTBOOKS):
 if TEXTBOOKS==[]:
 return None
 else:
 return TEXTBOOKS.pop()

```



## RDBMS - Descriptive Questions

- (i) A table may have more than one such attribute/group of attributes that identify a row/tuple uniquely. All such attribute(s)/group(s) are known as Candidate keys. Out of the candidate keys, one is selected as primary key.

Example:

Relation: Stock

| Ino | Item   | Qty | Price |
|-----|--------|-----|-------|
| I01 | Pen    | 560 | 2     |
| I02 | Pencil | 600 | 1     |
| I03 | CD     | 200 | 3     |

In this relation Ino and Item are Candidate keys. Any one of these can be designated as the Primary key.

- (ii) Degree of a table is the number of columns (attributes) in it, whereas Cardinality is the number of rows (tuples) in it.  
Degree of the given table is 3 and its Cardinality is 2.
- (iii) A table may have more than one such attribute/group of attributes that identify a row/tuple uniquely. All such attribute(s)/group(s) are known as Candidate keys. Out of the candidate keys, one is selected as primary key and the other keys are known as alternate keys.  
Example:

Relation: Stock

| Ino | Item   | Qty | Price |
|-----|--------|-----|-------|
| I01 | Pen    | 560 | 2     |
| I02 | Pencil | 600 | 1     |
| I03 | CD     | 200 | 3     |

In this relation Ino and Item are Candidate keys. If Ino is selected as the primary key, then Item will be the alternate key, and vice-versa.

- (iv) Candidate keys : Id, Product;      Primary key : Id  
(v) Candidate keys : Code, Item;      Primary keys: Code  
(vi) Cartesian Product  
Degree = 4  
Cardinality = 6
- (vii) Cartesian Product  
Degree = 4  
Cardinality = 6

## SQL - Writing queries and finding outputs

- (i)
- `SELECT * FROM TEACHER WHERE DEPARTMENT = "History";`
  - `SELECT NAME FROM TEACHER WHERE DEPARTMENT = "Maths" AND SEX = "F";`
  - `SELECT NAME FROM TEACHER ORDER BY DATE_OF_JOIN;`
  - `SELECT NAME, SALARY, AGE FROM TEACHER WHERE SEX = "M";`
  - `SELECT COUNT(*) FROM TEACHER WHERE AGE>23;`
- (ii)
- `SELECT * FROM STUDENT WHERE DEPARTMENT = "History";`
  - `SELECT * FROM STUDENT WHERE DEPARTMENT = "Hindi" AND SEX='F';`
  - `SELECT * FROM STUDENT ORDER BY DATEOFADM;`
  - `SELECT NAME, FEE, AGE FROM STUDENT WHERE SEX="M";`
  - `SELECT COUNT(*) FROM STUDENT AGE>23;`
- (iii)
- `SELECT * FROM CLUB WHERE SPORTS = "Swimming";`
  - `SELECT Name FROM CLUB ORDER BY date_of_app desc;`
  - `SELECT COACHNAME, PAY, AGE, PAY*15/100 AS BONUS FROM CLUB;`
  - `INSERT INTO CLUB VALUES (11, "Neelam", 35, "Basketball", "2000/04/01", 2200, "F");`
- e)
- 4
  - 34
- (iv)
- `SELECT * FROM FURNITURE WHERE TYPE = "Baby cot";`
  - `SELECT ITEMNAME FROM FURNITURE WHERE PRICE > 15000;`
  - `SELECT ITEMNAME, TYPE FROM FURNITURE WHERE DATEOFSTOCK<"2002/01/22" ORDER BY ITEMNAME DESC;`
  - `SELECT ITEMNAME, DATEOFSTOCK FROM FURNITURE WHERE DISCOUNT>25;`
  - `SELECT COUNT(*) FROM FURNITURE WHERE TYPE="Sofa";`
  - `INSERT INTO ARRIVAL VALUES (14, "Velvet touch", "Double bed", "2003/03/03");`

- g)
- (i) 5
  - (ii) 30
  - (iii) 18.33
  - (iv) 65500

(v)

- a) SELECT GAMENAME, GCODE FROM GAMES;
- b) SELECT \* FROM GAMES WHERE PRZEMONEY > 7000;
- c) SELECT \* FROM GAMES ORDER BY SCHEDULEDATE;
- d) SELECT NUMBER, SUM(PRIZEMONEY) FROM GAMES GROUP BY NUMBER;

- (e1) 2  
4
- (e2)
- | MAX(ScheduleDate) | MIN(ScheduleDate) |
|-------------------|-------------------|
| 19-Mar-2004       | 12-Dec-2003       |
- (e3) 59000
- (e4) 101  
108  
103

(vi)

(a)

- (i) SELECT \* FROM WORKER ORDER BY DOB DESC;
- (ii) SELECT NAME, DESIG FROM WORKER WHERE PLEVEL IN ("P001", "P002");
- (iii) SELECT \* FROM WORKER WHERE DOB BETWEEN "19-JAN-1984" AND "18-JAN-1987";
- (iv) INSERT INTO WORKER VALUES  
(19, 'Daya kishore', 'Operator', 'P003', '19-Jun-2008', '11-Jul-1984');

(b)

(i)

| COUNT (PLEVEL) | PLEVEL |
|----------------|--------|
| 1              | P001   |
| 2              | P002   |
| 2              | P003   |

(ii)

| MAX (DOB)   | MIN (DOJ)   |
|-------------|-------------|
| 12-Jul-1987 | 13-Sep-2004 |

(iii)

| Name         | Pay   |
|--------------|-------|
| Radhey Shyam | 26000 |
| Chander Nath | 12000 |

(iv)

| PLEVEL | PAY+ALLOWANCE |
|--------|---------------|
| P003   | 18000         |

(vii)

(a)

- 1) SELECT VehicleName FROM CARHUB WHERE Color = 'WHITE';
- 2) SELECT VehicleName, Make, Capacity FROM CARHUB ORDER BY CAPACITY;
- 3) SELECT MAX(Charges) FROM CARHUB;
- 4) SELECT CName, VehicleName, FROM CUSTOMER, CARHUB  
WHERE CUSTOMER.Vcode = CARHUB.Vcode;

(b)

1)

| COUNT (DISTINCT Make) |
|-----------------------|
| 4                     |

2)

| MAX (Charges) | MIN (Charges) |
|---------------|---------------|
| 35            | 12            |

3)

|           |
|-----------|
| COUNT (*) |
| 5         |

4)

|             |
|-------------|
| VehicleName |
| SX4         |
| C Class     |

(viii)

- SELECT \* FROM ITEMS ORDER BY INAME;
- SELECT INAME, PRICE FROM ITEMS WHERE PRICE BETWEEN 10000 AND 22000;
- SELECT TCODE, COUNT(\*) FROM ITEMS GROUP BY TCODE;
- SELECT PRICE, INAME, QTY FROM ITEMS WHERE QTY > 150;
- SELECT INAME FROM TRADERS WHERE CITY IN ('DELHI', 'MUMBAI');
- SELECT COMPANY, INAME FROM ITEMS ORDER BY COMPANY DESC;

g 1)

|             |             |
|-------------|-------------|
| MAX (PRICE) | MIN (PRICE) |
| 38000       | 1200        |

g2)

|         |
|---------|
| AMOUNT  |
| 1075000 |

g3)

|                |
|----------------|
| DISTINCT TCODE |
| T01            |
| T02            |
| T03            |

g4)

|                |                  |
|----------------|------------------|
| INAME          | TNAME            |
| LED SCREEN 40  | DISP HOUSE INC   |
| CAR GPS SYSTEM | ELECTRONIC SALES |

(ix)

(a)

- SELECT IName, price from Item ORDER BY Price;
- SELECT SNo, SName FROM Store WHERE Area='CP';
- SELECT IName, MIN(Price), MAX(Price) FROM Item GROUP BY IName;
- SELECT IName, Price, SName FROM Item, Store Where Item.SNo = Store.SNo;

(b)

1)

|                |
|----------------|
| DISTINCT INAME |
| Hard disk      |
| LCD            |
| Mother Board   |

2)

|             |           |
|-------------|-----------|
| Area        | Count (*) |
| CP          | 2         |
| GK II       | 1         |
| Nehru Place | 2         |

3)

|                       |
|-----------------------|
| COUNT (DISTINCT AREA) |
| 3                     |

4)

|              |          |
|--------------|----------|
| INAME        | DISCOUNT |
| Keyboard     | 25       |
| Mother Board | 650      |
| Hard Disk    | 225      |

(x)

- (i) `SELECT Wno,Name,Gender FROM Worker  
ORDER BY Wno DESC;`
- (ii) `SELECT Name FROM Worker  
WHERE Gender='FEMALE';`
- (iii) `SELECT Wno, Name FROM Worker  
WHERE DOB BETWEEN '19870101' AND '19911201';  
OR  
SELECT Wno, Name FROM Worker  
WHERE DOB >='19870101' AND DOB <='19911201'`
- (iv) `SELECT COUNT(*) FROM Worker  
WHERE GENDER='MALE' AND DOJ > '19860101';`
- (v)
- | <u>COUNT(*)</u> | <u>DCODE</u> |
|-----------------|--------------|
| 2               | D01          |
| 2               | D05          |
- (vi)
- Department  
MEDIA  
MARKETING  
INFRASTRUCTURE  
FINANCE  
HUMAN RESOURCE
- (vii)
- | <u>NAME</u> | <u>DEPARTMENT</u> | <u>CITY</u> |
|-------------|-------------------|-------------|
| George K    | MEDIA             | DELHI       |
| Ryma Sen    | INFRASTRUCTURE    | MUMBAI      |
- (viii)
- | <u>MAX(DOJ)</u> | <u>MIN(DOB)</u> |
|-----------------|-----------------|
| 2014-06-09      | 1984-10-19      |

(xi)

- (i) `SELECT Eno,Name,Gender FROM Employee ORDER BY Eno;`
- (ii) `SELECT Name FROM Employee WHERE Gender='MALE';`
- (iii) `SELECT Eno,Name FROM Employee  
WHERE DOB BETWEEN '19870101' AND '19911201';  
OR  
SELECT Eno,Name FROM Employee  
WHERE DOB >='19870101' AND DOB <='19911201';  
OR  
SELECT Eno,Name FROM Employee  
WHERE DOB >'19870101' AND DOB <'19911201';`
- (iv) `SELECT count(*) FROM Employee  
WHERE GENDER='FEMALE' AND DOJ > '19860101';  
OR  
SELECT * FROM Employee  
WHERE GENDER='FEMALE' AND DOJ > '19860101';`
- (v)
- | <u>COUNT</u> | <u>DCODE</u> |
|--------------|--------------|
| 2            | D01          |
| 2            | D05          |

- (vi) Department  
 INFRASTRUCTURE  
 MARKETING  
 MEDIA  
 FINANCE  
 HUMAN RESOURCE
- (vii)    NAME            DEPARTMENT  
 George K        INFRASTRUCTURE  
 Ryma Sen        MEDIA
- (viii)   MAX(DOJ)        MIN(DOB)  
 20140609        19841019

(xii)

- (i) SELECT NO, NAME, TDATE FROM TRAVEL ORDER BY NO DESC;  
 (ii) SELECT NAME FROM TRAVEL  
       WHERE CODE=101 OR CODE=102;  
 (iii) SELECT NO, NAME from TRAVEL  
       WHERE TDATE BETWEEN '2015-04-01' AND '2015-12-31';  
 (iv) SELECT \* FROM TRAVEL WHERE KM > 100 ORDER BY NOP;
- (v)    COUNT(\*)        CODE  
       2                101  
       2                102
- (vi)   DISTINCT CODE  
       101  
       102  
       103  
       104  
       105
- (vii)   CODE    NAME            VTTYPE  
       104    Ahmed Khan    CAR  
       105    Raveena        SUV
- (viii)   NAME            KM\*PERKM  
       Raveena        3200

(xiii)

- (i) SELECT CNO, CNAME, TRAVELDATE FROM TRAVEL ORDER BY CNO DESC;  
 (ii) SELECT CNAME FROM TRAVEL  
       WHERE VODE=V01 OR VCODE=V02;  
 (iii) SELECT CNO, CNAME from TRAVEL  
       WHERE TRAVELDATE BETWEEN '2015-12-31' AND '2015-05-01';  
 (iv) SELECT \* FROM TRAVEL  
       WHERE KM > 120 ORDER BY NOP;
- (v)    COUNT(\*)        VCODE  
       2                V01  
       2                V02
- (vi)   DISTINCT VCODE  
       V01  
       V02  
       V03  
       V04  
       V05

|        |              |              |                    |
|--------|--------------|--------------|--------------------|
| (vii)  |              |              |                    |
|        | <u>VCODE</u> | <u>CNAME</u> | <u>VEHICLETYPE</u> |
|        | V02          | Ravi Anish   | AC DELUXE BUS      |
|        | V04          | John Malina  | CAR                |
| (viii) |              |              |                    |
|        | <u>CNAME</u> |              | <u>KM*PERKM</u>    |
|        | Sahanubhuti  | 2700         |                    |

## Computer Networks - Descriptive questions

1. A computer network is a collection of interconnected computers and other devices which are able to communicate with each other and share hardware and software resources.
2. HTTP - Hyper Text Transfer Protocol  
HTTPS - Hyper Text Transfer Protocol Secure  
SSH - Secure Shell  
SCP - Secure Copy Protocol  
POP - Post Office Protocol  
IMAP - Internet Message Access Protocol  
SMTP - Simple Mail Transfer Protocol  
FTP - File Transfer Protocol  
VoIP - Voice over Internet Protocol  
URL - Uniform Resource Locator  
GPRS - General Packet Radio Service
3. VoIP (Voice Over Internet Protocol) is a protocol used for transmission of voice and multimedia content over Internet Protocol (IP) networks.
4. VoIP
5. URL - [www.google.com/en/index.html](http://www.google.com/en/index.html)  
Domain Name - [www.google.com](http://www.google.com)
6. Domain Name: It is the unique name that identifies an Internet site  
IP Address: It is the unique address for each device on a TCP/IP network
7. (i) No need of repeater  
(ii) High speed data transfer
8. 2G: Better voice service, Speed around 64kbps  
3G: Improved data services with multimedia, Speed around 2Mbps
9. PAN
10. (i) Customer pays only for the services used.  
(ii) Customer gets almost all the resources demanded without worrying about from how and from where to procure these.
11. FTP is used to transfer files over a network, whereas http is used to transfer hyper text files (web pages) over a network.
12. Wired - Optical Fiber, Wireless - Microwave
13. PAN Examples:
  - (i) Connecting two cell phones to transfer data
  - (ii) Connecting smartphone to a smart watch
 LAN Examples:
  - (i) Connecting computers in a school
  - (ii) Connecting computers in an office
14. HTTP and HTTPS. Internet browser - Google Chrome
15. (i) 4G gives a speed of approximately 100 Mbps whereas 3G gives a speed of approximately 2 Mbps  
(ii) 4G takes less time than 3G in call establishment

16.

| PAN                                                                                       | LAN                                                                                                                                           |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| APAN (personal area network) is a computer network organized around an individual person. | A LAN (Local Area Network) interconnects a high number of access or node points or stations within a confined physical area upto a kilometer. |

17. FTP

18. Speed -

- Faster web browsing
- Faster file transfer

Service -

- Better video clarity
- Better security

19. **Attenuation:** Reduction in the strength of a signal during transmission. It happens when a signal travels long distances over a network.

20. IPv4 is a 32 bit address, whereas IPv6 is a 128 bit address. Examples:

IPv4: 192.168.72.54 IPv6: 2001:0cb8:85a3:0000:0000:8c2e:0370:7a34

21.

| Physical Address                                           | Logical Address                                           |
|------------------------------------------------------------|-----------------------------------------------------------|
| It is the MAC address of the NIC of the device.            | It is the IP address of the device.                       |
| It is used by switches for communication within a network. | It is used by routers for communication between networks. |

22. **Guided** media refers to cables such as Twisted Pair cables, Coaxial cables, and Optical Fiber cables. Unguided media refers to waves such as radio waves, micro waves, and infrared rays.

23. **(i) Remote Login:** Using remote login, a user is able to access a computer or a network remotely through a network connection. Remote login enables users to access the systems they need when they are not physically able to connect directly.

**(ii) Remote Desktop:** Remote desktop is a program or an operating system feature that allows a user to connect to a computer in another location, see that computer's desktop and interact with it as if it were local.

24. Application Layer is the top most Layer of a computer network, and is implemented in end nodes e.g. computers. Some protocols of Application Layer are FTP (File Transfer Protocol), HTTP (Hyper Text Transfer Protocol), SMTP (Simple Mail Transfer Protocol) etc.

25. **(i) Wi-fi** is a technology that is used for short distance wireless communication. Wi-Fi uses radio waves of frequency 2.4GHz and 5GHz.

**(ii) Access Point:** It is a device in a wireless network that broadcasts a wireless signal that devices can detect and "tune" into.

26. **DNS (domain name system):** It is a system of remote servers used to convert domain names to their corresponding IP addresses.

27.

| Bus Topology                                               | Star Topology                         |
|------------------------------------------------------------|---------------------------------------|
| Slower as compared to Star topology of network             | Expensive as compared to Bus topology |
| Breakage of wire at any point disturbs the entire network. | Long wire length is required.         |

28. 1) Optical Fiber can carry data without any loss

2) Optical fiber can carry data at the speed of light

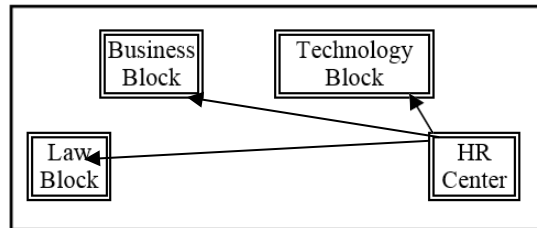
29. **Video Conferencing:** It is a conference between two or more participants at different locations in real time over the Internet or a private network using video camera, microphone and speakers.

30. A worm is a self-replicating computer program. It uses a network to send copies of itself to other computers on the network and it may do so without any user intervention.  
Most of the common anti-virus(anti-worm) remove worm.  
A Trojan Horse is a code hidden in a program, that looks safe but has hidden side effects typically causing loss or theft of data, and possible system harm.
31. When a Website with cookie capabilities is visited, its server sends certain information about the browser, which is stored in the hard drive as a text file. This text file is called a cookie. It's a way for the server to remember things about the visited sites.
32. Packet Switching follows store and forward principle for fixed packets. Fixes an upper limit for packet size. In Circuit Switching a physical connection is established between the sender and the receiver machines and this connection is sustained for the full duration of communication.
33. (a) Digital property: Digital property includes data, Internet accounts, and other rights in the digital world, including contractual rights and intellectual property rights. Data are the files and information stored and used by computers (such as e-mails, word processing documents, spreadsheets, pictures, audio files, and movies).  
(b) Intellectual property is a category of property that includes intangible creations of the human intellect. It generally includes inventions, literary and artistic works, symbols, names, and images.  
(c) Intellectual Property rights are legal rights governing the use of intellectual property.
34. (a) Plagiarism is an act of taking someone else's work or ideas and passing them off as one's own. It is an act of fraud.  
(b) A scam or confidence trick is an attempt to defraud a person or group by gaining their confidence.  
(c) Identity theft is the deliberate use of someone else's identity, usually as a method to gain a financial advantage or obtain credit and other benefits in the other person's name.  
(d) Phishing is the fraudulent attempt to obtain sensitive information such as usernames, passwords and credit card details by disguising oneself as a trustworthy entity in an electronic communication.  
(e) Illegal downloading is obtaining copyrighted files that you do not have the right to use from the Internet.  
(f) Child pornography is any visual depiction of sexually explicit conduct involving a minor (persons less than 18 years old). Images of child pornography are also referred to as child sexual abuse images.  
(g) Spam mail: Spam email (or junk email), is an email sent without explicit consent from the recipient. Spam emails usually try to sell questionable goods or are downright deceitful.
35. Cyber forensics ( or computer forensics) is a branch of digital forensic science pertaining to evidence found in computers and digital storage media. The goal of computer forensics is to examine digital media in a forensically sound manner with the aim of identifying, preserving, recovering, analyzing and presenting facts and opinions about the digital information.
36. The Information Technology Act, 2000 (also known as ITA-2000, or the IT Act) is an Act of the Indian Parliament (No 21 of 2000) notified on 17 October 2000. It is the primary law in India dealing with cybercrime and electronic commerce.
37. (a) A Creative Commons (CC) license is one of several public copyright licenses that enable the free distribution of an otherwise copyrighted "work". A CC license is used when an author wants to give other people the right to share, use, and build upon a work that they (the author) have created  
(b) GPL (General Public License) is a series of widely used free software licenses that guarantee end users the freedom to run, study, share, and modify the software.  
(c) The Apache License is a permissive free software license written by the Apache Software Foundation (ASF). It allows users to use the software for any purpose, to distribute it, to modify it, and to distribute modified versions of the software under the terms of the *license*, without concern for royalties.
38. (i) Identity theft, (ii) fraud, (iii) spam, (iv) fraud, (v) hacking
39. (ii), (iii)
40. (ii), (iii)

## Computer Networks - Network Setup

(i)

- a) HR Center as it has the maximum number of computers.
- b)

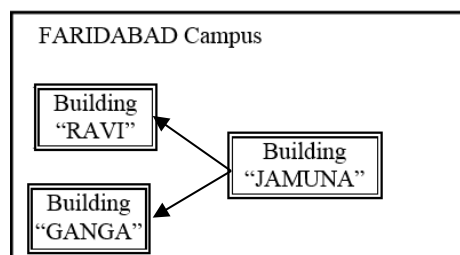


c) Switch

d) WAN as the given distance is more than the range of LAN and MAN.

(ii)

- a) Building “Jamuna” as it contains the maximum number of computers.
- b)



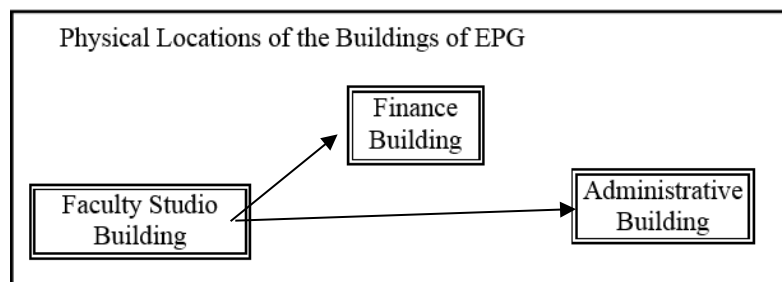
c)

- (i) Switch is needed to be placed in each building to interconnect the computers within that building.
- (ii) Repeater is needed to be placed between “Jamuna” and “Ravi” as the distance is more than 90m.

d) Optical Fibre cable

(iii)

- a) Faculty Studio as it contains the maximum number of computers.
- b)

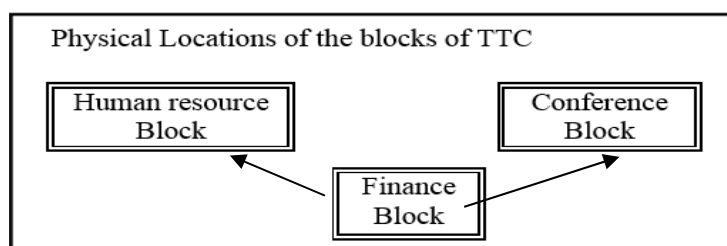


c) LAN

d) Satellite

(iv)

- a) Finance
- b)



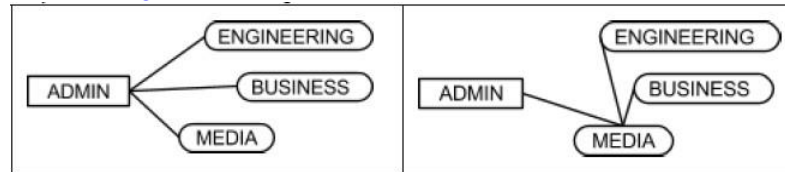
c) Satellite Link

d) Switch

(v)

- a) ADMIN (due to maximum number of computers)  
OR  
MEDIA (due to shorter distance from the other buildings)

b) Any one of the following:

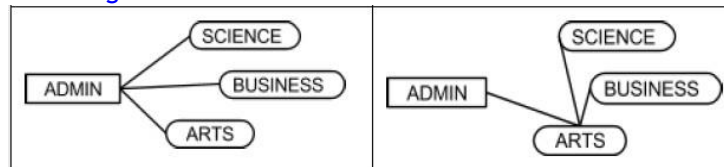


- c) Firewall OR Router  
d) Video Conferencing

(vi)

- a) ADMIN (due to maximum number of computers)  
OR  
ARTS (due to shorter distance from the other buildings)

b) Any one of the following

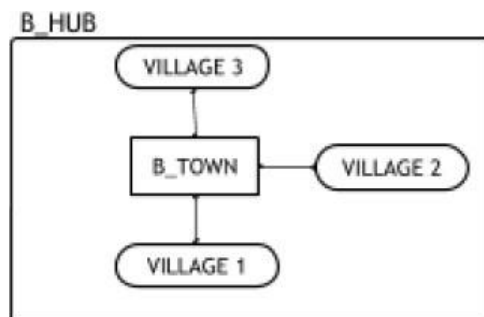


- c) Firewall OR Router  
d) Video Conferencing

(vii)

- a) B\_TOWN. Since it has the maximum number of computers and is closest to all other locations.

b)

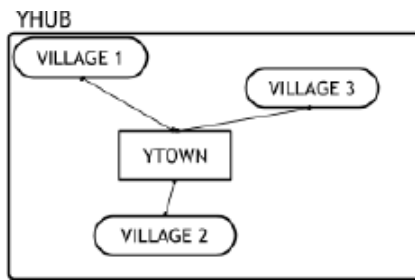


- c) Switch OR Hub  
d) Videoconferencing OR VoIP OR any other correct service/protocol

(viii)

- a) B\_TOWN. Since it has the maximum number of computers and is closest to all other locations

b)



- c) Switch OR Hub
- d) Videoconferencing OR VoIP OR any other correct service/protocol