MARKING SCHEME
Subject: Computer Science
Class: XII (2017-18)

Time: 3 Hrs. M.M.:70

Instructions:

(a) All questions are compulsory,

(b) Answer either Section A or Section B:

(i) Section A - Programming Language with C++

(ii) Section B - Programming Language with Python

(c) Section C is compulsory.

SECTION – A (C++)

Q. No.	Part	Question Description	Marks
Q1.	(a)	What is the role of a parameter/argument passed in a function? Can a default value be assigned to a parameter(Yes/No)? If yes, justify your answer with the help of a suitable example otherwise give reason.	2

	Ans	Parameters/arguments are values passed in the function for the attributes which are required by the function to work and provide desired output.
		Yes, an argument may be assigned a default value.
		E.g.
		int Sum(int a, int b=10) //Here b is given a default value of 10
		{ return (a+b); }
		void main()
		{
		int x=5;
		- cout<<Sum(x);
		}
		Output: 15
		
		(1 mark for correct role of parameter)
		(1/2 mark for correct answer)
		(1/2 mark for giving correct example)	

	(b)	Raman suggests Kishan the following header files which are required to be included in	1

		the given C++ program. Identify the header files which are **wrongly** suggested by Raman.
		Program:
		`void main()`
		`{`
		`char Grade;`
		`cin.get(Grade);`
		`if(isalpha(Grade))`
		`cout.put(Grade);`
		`}`
		<u>Suggested header files:-</u>
		1. iostream.h
		2. stdio.h
		3. conio.h
		4. ctype.h	

	Ans	stdio.h conio.h **(1/2 mark for each correct header file)**	

	(c)	Rewrite the following program after removing the syntactical errors (if any). Underline each correction.
		`#include<iostream.h>`
		`#include<conio.h>`
		`Typdef int Num;`
		`Num full=100;`
		`Num Calc(int X)`
		`{`
		`full=(X>2)?1:2;`
		`return (full%2)`
		`}`
		`void main`
		`{`
		`int full=1000;`
		`full=Calc(::full);`
		`cout<<::full<<"::">>full>>endl;`
		`}`
			2

	Ans	**#include<iostream.h>** **#include<conio.h>** **<u>typdef int Num;</u>** **//Typedef should be written as typedef** **Num full=100;**	

Num Calc(int X)

{

full=(X>2)?1:2;

return (full%2); **//; is missing**

}

void main()

{

int full=1000;

full=Calc(::full);

cout<<::full<<"::"<<full<<endl;

}

(1/2 mark for every corrected line of code) Or

(1 Mark for only identifying any 4 errors without suggesting corrections)

(d) Write the output of the following C++ program code(assume all necessary header files are included in program): 2

```
void Encrypt(char *S, int key)
{
        char *Temp=S;
        if(key%2==0)
        {       key--;          }
        while(*Temp!='\0')
        {
                *Temp+=key;
                Temp+= key;
        }
}
void main()
{
        int Key_Set[]={1,2,3};
        char Pvt_Msg[]="Computer2017";
        for(int C=0;C<2;C++)
        {
        Encrypt(Pvt_Msg, Key_Set[C]);
        cout<<"New Encrypted Message after Pass "<<C+1<<" is :"<<Pvt_Msg;
        cout<<endl;
        }
}
```

Ans Output:

New Encrypted Message after Pass 1 is : Dpnqvufs3128

New Encrypted Message after Pass 2 is : Eqorwvgt4239

		(1 mark of each correct line of output)	

	(e)	Write the output of the following C++ program code(assume all necessary header files are included in program):
		`struct Ticket`
		`{`
		`  char Level;`
		`  int Price;`
		`};`
		`void Compute(Ticket &T)`
		`{`
		`  if (T.Level=='A')`
		`  T.Price+=50;`
		`  else if (T.Level=='B')`
		`  T.Price+=30;`
		`  else if (T.Level=='C')`
		`  T.Price+=25;`
		`  cout<<T.Level<<"::"<<T.Price<<endl;`
		`}`
		`void main()`
		`{`
		`  Ticket Mon_Show[ ]={{'C',250},{'A',300},{'B',350}};`
		`  for(int count=2;count>=0; )`
		`  {`
		`  Compute(Mon_Show[count--]);`
		`  }`
		`}`
			3

	Ans	Output: B:380 A:350 C:275 **(1 mark of each correct line of output)**	
	(f)	Consider the following C++ program code and choose the option(s) which are **not** possible as output. Also, print the **minimum** & **maximum** value of variable **Pick** during complete execution of the program.(assume all necessary header files are included in program):	2

		``
		const int NUM=5;
		void main()
		{
		randomize();
		int V1=1, V2=5, Pick;
		while(V1<V2)
		{
		Pick = random(NUM) + (V2-V1);
		cout<<Pick<<":";
		V1++;
		}
		}
		``
		(a) 5:6:6:6:
		(b) 4:7:5:3:
		(c) 8:6:1:2:
		(d) 7:5:3:1	

	Ans	Output: Option (a) & (c) Maximum value of Pick will be 8 Minimum value of Pick will be 1 **(1/2 mark for each correct option)** **(1 mark each giving correct values of both max & min)**	
Q2.	(a)	What do you mean by Data Abstraction in OOPs? Explain its significance with a suitable example.	2
	Ans	Data abstraction in OOPs is the process of showing only the essential details of a class without going into background details. E.g.	

```
#include<iostream.h>
class PRODUCT
{
  int a,b;

public:
  void Mult()
   {
     int c;
     cout<<"Enter 2 nos";
     cin>>a>>b;
     c= a*b;
     cout<<"Product is:"<<c;
   }
};
void main()
{
PRODUCT p;
p.Mult();
}
```

In the above example, public member Mult( ) is invoked using the object p of class PRODUCT. Thus, demonstrating Data abstraction.

(1 mark for correct definition of data abstraction)

(1 mark for giving a valid example)

	(b)	Answer the question (i) & (ii) after going through the following code. (assume all necessary header files are included in program):-	2

```
class Game
{
        char Name[21];
        int No_of_Players;
public:
        Game()                          //Function 1
        {
                strcpy(Name,"Cricket");
                No_of_Players=11;
                cout<<"New Game Starts\n";
        }
        Game(char N[],int No)           //Function 2
        {
                strcpy(Name,N);
                No_of_Players=No;
                cout<<Name<<"comprises"<<No_of_Players<<" number of players\n";
        }
        ~Game()                         //Function 3
        {
                cout<<"Game Ends\n";
        }
};
```

(i) Give the name of the feature of OOP which is implemented by Function 1 & 2 together in the above class Game.

(ii) Anuj made changes to the above class Game and made Function 3 private. Will he be able to execute the Line 1 successfully given below? Justify.

```
void main()
{
        Game ABC;          //Line 1
}
```

	Ans	(i) Polymorphism or Function Overloading or Constructor Overloading **(1 mark for correct answer)** (ii) Yes, an error "Destructor for Game is not accessible" will come. As there is a destructor defined in the class and it cannot be made private. **(1/2 mark for correct answer Yes)** **(1/2 mark for correct reason)**	
	(c)	Define a class Bill in OOP with the following specification:- **Private members:** 1. Bill_no - type long(bill number) 2. Bill_period - type integer(number of months)	4

3. No_of_calls - type integer(number of mobile calls)
4. Payment_mode - type string("**online**" or "**offline**")
5. Amount - type float(amount of bill)
6. Calculate_Bill() function to calculate the amount of bill given as per the following conditions:

No_of_calls	**Calculation Rate/call (in rupees)**
<=500	**1.0**
501-1200	**2.0**
>1200	**4.0**

Also, the value of Amount should be reduced by 5% if Payment_mode is "online".

Public members:

1. A member function New_Bill() that will accept the values for Bill_no, Bill_period, No_of_calls, Payment_mode from the user and invoke Caluclate_Bill() to assign the value of Amount.
2. A member function Print_Bill() that will display all details of a Bill.

Ans

```
class Bill
{
        long Bill_no;
        int Bill_period;
        int No_of_calls;
        char Payment_mode[8];
        float Amount;
        void Calculate_Bill()
        {
                if( No_of_calls<=500)
                        Amount=(No_of_calls)*1.0;
                else if( No_of_calls<=1200)
                        Amount=(No_of_calls)*2.0;
                else
                        Amount=(No_of_calls)*4.0;

                if(strcmpi(Payment_mode,"online")==0)
                        Amount=Amount - (.05)*Amount;
        }
public:
        void New_Bill()
        {
                cout<<"Enter values for Bill No, Bill Period, No. of calls & Payment mode(online or offline)";
                cin>>Bill_no>>Bill_period>>No_of_calls;
                gets(Payment_mode);
                Calculate_Bill();
        }
        void Print_Bill()
        {
                cout<<"Bill No.:"<<Bill_no<<endl;
                cout<<"Bill period(in months):"<<Bill_period<<endl;
                cout<<"No. of Calls.:"<<No_of_calls<<endl;
                cout<<"Payment mode:"<<Payment_mode<<endl;
                cout<<"Amount of Bill:"<<Amount<<endl;
        }
};
```

(½ Mark for correct syntax of class header)

(½ Mark for correct declarations of data members)

(1 Mark for correct definition of Caluclate_Bill() function)

(1 Mark for correct definition of New_Bill() function)

(1 Mark for correct definition of print_Bill() function)

Note:

		Deduct ½ Mark if Caluclate_Bill() is not invoked properly inside New_Bill() function.	

	(d)	Answer the question from (i) to (iv) based on the given below code(assume all necessary header files are included in program):-
		`class City`
		`{`
		`int City_Id;`
		`char City_Name[30];`
		`protected:`
		`int City_Population;`
		`public:`
		`City();`
		`void Get_Population();`
		`void New_City();`
		`void Show_City();`
		`};`
		`class State : public City`
		`{`
		`int State_Id;`
		`char State_Name[25];`
		`protected:`
		`int State_Population;`
		`public:`
		`State();`
		`void New_State();`
		`void Print_State();`
		`};`
		`class Country : private State`
		`{`
		`int Country_Id;`
		`char Country_Name[25];`
		`public:`
		`Country();`
		`void New_Country();`
		`void Display_Country();`
		`};`
		(i) Write name of the class whose constructor is invoked first on the creation of a new object of class Country.
		(ii) Write name of the data members which are accessible through the object of class Country.
		(iii) List name of the members which are accessible through the member function "void New_Country()".
		(iv) What will be the size(in bytes) of an object of class Country & State respectively.
			4

	Ans	(i) class City **(1 mark for correct answer)** (ii) None **(1 mark for correct answer)** (iii) Data members: Country_Id, Country_Name[25], State_Population, City_Population Member functions: Display_Country(), New_State(), Print_State(), Get_Population(), New_City(), Show_City() **(1 mark for correct answer)** (iv) 90 bytes for object of class Country & 63 bytes for object of class State **(1/2 mark for each correct answer)**	
Q3	(a)	Write the definition of function named **Array_Swap()** that will accept an integer array & its size as arguments and the function will interchange/swap elements in such a way that the first element is swapped with the last element, second element is swapped with the second last element and so on, only if anyone or both the elements are odd. E.g. if initially array of seven elements is: **5, 16, 4, 7, 19, 8, 2** After execution of the above function, the contents of the array will be: **2,16, 19, 7, 4, 8, 5**	3

	Ans	`void Array_Swap(int A[],int size)`
		`{`
		`int Temp, I;`
		`for(I=0;I<size/2;I++)`
		`{`
		`if((A[I]%2!=0) || (A[size-1-I]%2!=0))`
		`{`
		`Temp=A[I];`
		`A[I]=A[size-1-I];`
		`A[size-1-I]=Temp;`
		`}`
		`}`
		`}`
		(½ Mark for correct function header)
		(½ Mark for correct loop)
		(1 Mark for correct checking of odd elements in each pair)
		(1 Mark for swapping the elements)	

	(b)	An array A[50][30] is stored along the row in the memory with each element requiring 4 bytes of storage. If the element A[10][15] is stored at 21500, then find out the base	3

		address of the array and the memory address of element stored at location A[30][25]?	
	Ans	**Row-major Formula:-** **$A[I][J]= B+ W*((I-L_r)*N_c + (J-L_c))$** **Nr=50, Nc=30, B=?, W=4, Lr=0, Lc=0, A(10,15)=21500** **A[10][15]= B + 4*((10-0)*30 + (15-0))** **21500= B + 4*(300+15)** **21500=B + 4*315** **B=21500 – 1260** **B=20240** **A[30][25] = 20240 + 4*((30-0)*30 + (25-0))** **A[30][25] = 20240 + 4*(900+25)** **A[30][25] = 20240 + 4*925** **A[30][25] = 23940** **(1 Mark for using correct formula for row major)** **(1/2 Mark each for substituting formula with correct values for calculation of Base address & address of A[30][25] element)** **(1/2 Mark for each correct final answer of Base address & address of A[30][25])**	

	(c)	Write the definition of a member function **Q_Insert()** for a class **Exam_Queue** in C++ to insert a new **Application** information in a dynamically allocated queue whose code is already given below as a part of the program(assume all necessary header files are included in program):
		`struct Application`
		`{`
		`  int App_Id;`
		`  char App_Name[21];`
		`  Application *Link;`
		`};`
		`class Exam_Queue`
		`{`
		`  Application *Front, *Rear;`
		`public:`
		`  Exam_Queue()  //Constructor`
		`  {`
		`  Front=Rear=NULL;`
		`  }`
		`  void Q_Insert ();`
		`  void Q_Delete();`
		`};`
			4

Ans

```
void Exam_Queue::Q_Insert()
{
        Application *Temp;
        Temp=new Application;
        cout<<"Enter the values of App. Id & App. Name \n";
        cin>>Temp->App_Id;
        gets(Temp->App_Name);
        Temp->Link = NULL;
        if(Front==NULL)
                Front=Temp;
        else
                Rear->Link=Temp;
                Rear=Temp;

}
```

(1 Mark for creating new node)

(½ Mark for entering values for the new node)

(½ Mark for assigning NULL value to the new node)

(½ Mark for assigning Front to the first node)

(½ Mark for linking the last node to the new node)

(1 Mark for assigning Rear to the new node)

(d) Write the definition of a user-defined function **REPEAT_ROW(int A[][3],int R, int C)** in C++ that will store the elements in the following manner — 2

1. All row elements except the 1st element replaced by the 1st element,
2. All row elements except the 1st & 2nd element replaced by the 2nd element,
3. All row elements except the 1st , 2nd & 3rd element replaced by the 3rd element and so on.

For example: if initially the array was:-

5	**6**	**10**	**2**
2	**6**	**9**	**12**
18	**14**	**5**	**6**

Then, the contents of the array after execution of the above function will be:-

5	**5**	**5**	**5**
2	**6**	**6**	**6**
18	**14**	**5**	**5**

Ans

```
void REPEAT_ROW(int  A[][3],int R, int C)
{
        for(int I=0;I<R;I++)
        {       int X=A[I][I];
                for(int J=I+1;J<C;J++)
                {       A[I][J] = X;    }
        }
}
```

(1 Mark for correct loop)

(1 Mark for correct placing elements)

(e) Evaluate the following POSTFIX expression. Show the status of Stack after execution of each operation separately: 2

TRUE, FALSE, OR, NOT, TRUE, FALSE, AND, OR

Ans

S. No.	Element Scanned	Operation	Stack Status
1	True	Push (True)	True
2	False	Push (False)	True, False
3	OR	Pop(False) Pop(True) OR(True, False)=True Push (True)	True
4	NOT	Pop(True) NOT(True)=False	False
5	True	Push (True)	False, True
6	False	Push (False)	False, True, False
7	AND	Pop(False) Pop(True) AND(False, True)=False Push False	False, False
8	OR	Pop(False) Pop(False) OR(False, False)=False	False

		The result is False **(½ Mark for evaluating till OR operator)** **(½ Mark for evaluating till NOT operator)** **(½ Mark for evaluating till AND operator)** **(½ Mark for evaluating till OR operator)** **Note: (1 Mark to be given for writing correct answer as FALSE without showing the Stack Status)**	
Q4.	(a)	Answer the questions (i) & (ii) in the program segment given below for the required task.	1

```
class Route
{
        int Route_No;                   //Route Number
        char Route_Name[21];            //Name of Route
        int No_Kms;                             //Distance in kms on Route
public:
        void New_Route();                       //Accepts details of new Route
        void Show_Route();                      //Display details of a Route
        int Get_RouteNo()                       //Return the Route Number
        {       return Route_No;        }
        void Update_Kms(int K)
        {       No_Kms=K;       }
};
void Update_Route(int No, int New_Kms)          //Update No_Kms of a Route
{
        Route R;
        fstream File("ROUTE.DAT",ios::in | ios::out | ios::binary);
        while(!File.eof())
        {
                File.read((char*)&R, sizeof(R));
                if( (R.Get_RouteNo()==No))
                {       R.Update_Kms(New_Kms);
                        ____________________________            //Statement 1
                        ____________________________            //Statement 2
                        cout<<"Route Details updated\n";
                }
        }
        File.close();
}
```

(i) Write Statement 1 to position the file pointer to the appropriate place so that the data updation is done for the correct Route.

(ii) Write Statement 2 to perform the write operation so that the updation is done in the binary file "ROUTE.DAT".

	Ans	**(i) File.seekg(-sizeof(R), ios::cur);** **(ii) File.write((char*)&R,sizeof(R));** **(½ Mark for each correct answer)**	
	(b)	Write a user-defined function named **Count()** that will read the contents of text file named **"Report.txt"** and display the count of the number of lines that start with either 'I' or 'M'. E.g. In the following paragraph, there are 3 lines starting with 'I' or 'M': ***"India is the fastest growing economy.*** ***India is looking for more investments around the globe.*** ***The whole world is looking at India as a great market.*** ***Most of the Indians can foresee the heights that India is capable of reaching."***	2

	Ans	`void Count()`
		`{`
		`ifstream f("Report.txt");`
		`int C=0;`
		`char S[40];`
		`while(!f.eof())`
		`{ f.getline(S,40,'.');`
		`if((S[0]=='I') || (S[0]=='M'))`
		`{ C++; }`
		`}`
		`cout<<"No. of line starting with I or M are :"<<C;`
		`f.close();`
		`}`
		
		(½ Mark for opening opinion.txt correctly)
		(½ Mark for fetching each line from the file correctly)
		(½ Mark for counting each word)
		(½ Mark for correct displaying the no. of lines which starts with 'M' or 'I')	

	(c)	Consider the following class Item:-	3

```
class Item
{
        int ItemId;
        int Quantity;
        float Price;
public:
        void NewItem()
{
        cin>>ItemId>>Quantity>>Price;
        }
        void ShowItem()
{
        cout<<ItemId<<":"<<Quantity<<":"<<Price<<endl;
}
        void Set_Price(float P)
        {       Price=P;                }
        int Ret_Id()
        {       return ItemId;  }
};
```

Write a function named **Change_Item(int Id, float Pr)** to modify the price of the item whose Itemid & new price are passed as an argument.

Ans

```
void Change_Item(int Id, float Pr)
{
        fstream File("ITEM.DAT",ios::in|ios::out|ios::binary);
        Item I;
        while(!File.eof())
        {
                File.read((char*)&I, sizeof(I));
                if(I.Ret_Id()==Id)
                {       I.Set_Price(Pr);
                        File.seekg(-sizeof(I), ios::cur);
                        File.write((char*)&I,sizeof(I));
                }
        }
        File.close();
}
```

(½ Mark for opening ITEM.DAT correctly)

(1 Mark for reading all records from the file)

(1 Mark for comparing value of Id from file & calling Set_Price() function)

(½ Mark for writing new value of price in file)

SECTION – B (Python)

Q1 (a) Differentiate between break and continue statement with the help of an example. 2

Ans break statement is used to terminate the execution of the loop.

For example:

		``
		for i in range(6):
		    if i==3:
		        break
		    print i
		``
		The output of the above code will be:
		``
		0
		1
		2
		``
		The loop terminates when i becomes 3 due to break statement
		Whereas,
		continue statement is used to force the next iteration while skipping the statements in the present iteration.
		``
		for i in range(6):
		    if i==3:
		        continue
		    print i
		``
		The output of the above code will be:
		``
		0
		1
		2
		4
		5
		``
		continue statement forces next iteration when i becomes 3 , bypassing the print statement .Thus ,in the output 3 is missing.
		
		(1 mark for explaining break statement with example)
		(1 mark for explaining continue statement with example)	

	(b)	Identify and write the name of the module to which the following functions belong: i. ceil( ) ii. findall()	1
	Ans	i. ceil( ) - math module ii. findall( ) – re module **(½ mark for each module)**	

	(c)	Observe the following Python code very carefully and rewrite it after removing all syntactical errors with each correction underlined.
		``
		DEF execmain():
		    x= input("Enter a number:")
		    if(abs(x)= x):
		        print "You entered a positive number:"
		    else:
		        x=*-1
		        print "Number made positive:"x
		
		execmain()
		``
			2

	Ans	**def** execmain():
		x= input("Enter a number:")
		if(abs(x)== x):
		print "You entered a positive number:"
		else:
		x *= -1
		print "Number made positive:",x
		execmain()
		
		(½ mark for each correction)	

	(d)	Write the output of the following Python code:
		
		`i=5`
		`j=7`
		`x=0`
		`i=i+(j-i)`
		`x=j+i`
		`print x,":",i`
		`j=j**2`
		`x=j+i`
		`i=i+1`
		`print i,":",j`
			2

	Ans	14 : 7 8 : 49 **(1 mark for each line of correct output)**	

	(e)	Write the output of the following Python program code:
		`Data =['D','o',' ','I','t',' ','@',' ','1','2','3',' ','!']`
		
		`for i in range(len(Data)-1):`
		
		`if (Data[i].isupper()):`
		`Data[i]=Data[i].lower()`
		`elif (Data[i].isspace()):`
		`Data[i]=Data[i+1]`
		`print Data`
			3

	Ans	['d', 'o', 'I', 'i', 't', '@', '@', '1', '1', '2', '3', '!', '!'] **(½ mark for converting 'D' to 'd')** **(½ mark for converting 'I' to 'i')** **(½ mark for substituting each ' ' with the consecutive character)**	
	(f)	Study the following program and select the possible output(s) from the options (i) to (iv)	2

		following it. Also, write the maximum and the minimum values that can be assigned to the variable Y.
		
		`import random`
		`X= random.random()`
		`Y= random.randint(0,4)`
		`print int(X),":",Y+int(X)`
		
		i) 0 : 0
		ii) 1 : 6
		iii) 2 : 4
		iv) 0 : 3	

	Ans	i) and iv) are the possible output(s) Minimum value that can be assigned to Y = 0 Maximum value assigned to Y = 3 **(½ mark for each correct possible output)** **(½ mark for each correct possible minimum and maximum value)**	
Q2	(a)	Explain operator overloading with the help of an example.	2
	Ans	The feature where an operator can be used in different forms is known as Operator Overloading. It is one of the methods to implement polymorphism. '+' operator behaves differently with different data types. With integers it adds the two numbers and with strings it concatenates or joins two strings. For example: Print 8+9 will give 17 and Print "Python" + "programming" will give the output as Python programming. **(2 marks for correct explanation using an example)** **(1 mark for only writing a definition)**	

	(b)	Observe the following Python code and answer the questions (i) and (ii):
		`class BOOK :`
		`  count=0`
		`  def __init__(self):  # Function 1`
		`  self.Author="Not assigned"`
		`  self.Publisher = "Not assigned"`
		`  self.ISBN = "Not assigned"`
		`  def display(self):`
		`  print self.Author,self.Publisher,self.ISBN`
		`  @staticmethod`
		`  def bookcount():  # Function 2`
		`  BOOK.count=BOOK.count+1`
		`  return BOOK.count`	

	(i)	**How is data member 'count' different from data member 'Author'?**	1
	Ans	Data member '**count**'is a **Class attribute** whereas the data member '**Author**' is an	

Instance attribute.
Class Attributes belong to the class itself. These attributes will be shared by all the instances. Such attributes are defined in the class body part, usually at the top, for legibility.
Attributes defined for each class instance are known as **Instance Attributes.** These are called instance attributes and they belong to each instance/object of a class.

(1 mark for correct point of difference)

(ii) **Fill in the blanks:** 1

B= BOOK()

_____ #Write statement to invoke Function 2

_____ #Write statement to invoke Function 3

Ans

```
B.display()
BOOK.bookcount()
```

(½ mark for each correct statement)

(c) Define a class COURSE in Python with the following description : 4

Instance Attributes:

REGNO Integer
CNAME String
Score Float
Fees Float

Methods:

- A constructor to assign REGNO as 0, Score and Fees as 0.0
- SetCourse() to assign Course and Fees on the basis of the Score input as per the following criteria:

Score	**CNAME**	**Fees**
>=9.0 -<=10.0	Clinical Psychology	10000.0
>=8.0 - <9.0	Corporate Counselling	8000.0
>=5.0 - <8.0	Guidance and Counselling	6000.0
less than 5.0	Not Eligible	0.0

- GETDATA() to input REGNO and Score and invoke SetCourse()
- DISPLAY() to display all the details.

	Ans	 **(½ mark for correct definition of __init__())** **(2 marks for correct definition of SetCourse() :** **1 mark for applying conditions using if..elif..else** **1 mark for assigning correct values to CNAME and Fees** **)** **(1 mark for correct definition of GETDATA())** **(½ mark for correct definition of DISPLAY())**	
	(d)	Answer the questions (i) and (ii) based on the following:	4

```
class Vehicle(object):
    def __init__(self,l=0,w=0):
        self.length=1
        self.width=w
    def define(self):
        print "Vehicle with length", self.length,"in & width",self.width,"in"
class Car(Vehicle):
    def __init__(self,clr,seats,l,w):
        Vehicle.__init__(self,l,w)                  #Line 3
        self.colour=clr
        self.seatingCapacity=seats
    def changeGears(self,gr):
        print "changed to gear",gr
    def turn(self,direction):
        print "turned to",direction,"direction"
class RacingCar(Car):
    def __init__(self,clr,seats,l,w,tr,spd):        # Line 1
        Car.__init__(self,clr,seats,l,w)            #Line 2
        self.turnRadius=tr
        self.speed=spd

    def start(self):
        self.define()
        self.changeGears(2)
        print"Racing car starts-ready to vroom!"
```

(i) Explain the relationship between Line 1 , Line 2 and Line 3.

Ans **Line 1** is a parameterized constructor of derived class RacingCar that accepts values for its instance variables turnRadius ,speed . It accepts clr,seats,l,w to initialize the instance variables colour with clr , seatingCapacity with seats of base class Car through its constructor function/__init__()**(Line 2)** and invokes constructor function/__init__() of base class Vehicle to initialize its instance variables length with l and width with w**(Line 3).**

(2 marks for appropriate answer justifying the passing of parameters to initialize members of base class via __init__( ))

(ii) Predict the output that will be produced on the execution of the following statements :

```
rcar=RacingCar('Blue',2,206,78.5,6,200)
rcar.start()
rcar.turn("left")
```

Ans

```
Vehicle with length 1 in & width 78.5 in
changed to gear 2
Racing car starts-ready to vroom!
turned to left direction
```

(½ mark for each line of output)

<table>
<tr><td>Q3</td><td>(a)</td><td>Write the definition of a function Reverse(X) in Python, to display the elements in reverse order such that each displayed element is the twice of the original element (element * 2) of the List X in the following manner:
Example:
If List X contains 7 integers is as follows:
<table><tr><th>X[0]</th><th>X[1]</th><th>X[2]</th><th>X[3]</th><th>X[4]</th><th>X[5]</th><th>X[6]</th></tr><tr><td>4</td><td>8</td><td>7</td><td>5</td><td>6</td><td>2</td><td>10</td></tr></table>After executing the function, the array content should be displayed as follows:
20 4 12 10 14 16 8</td><td>2</td></tr>
<tr><td></td><td>Ans</td><td><pre>def Reverse(X):
    for i in range(len(X)-1,-1,-1):
        print X[i]*2</pre>(1 mark for correct loop)
(1 mark for displaying twice of the list element)</td><td></td></tr>
<tr><td></td><td>(b)</td><td>Consider the following unsorted list :
[22, 54, 12, 90, 55, 78]
Write the passes of selection sort for sorting the list in ascending order till the 3rd iteration.</td><td>3</td></tr>
<tr><td></td><td>Ans</td><td>Pass 1: [12, 54, 22, 90, 55, 78]
Pass 2 : [12, 22, 54, 90, 55, 78]
Pass 3 : [12, 22, 54, 90, 55, 78]

(1 mark to produce correct List after each pass.)</td><td></td></tr>
<tr><td></td><td>(c)</td><td>Consider the following class Order and do as directed:
<pre>class ORDER:
    L=[]
    def __init__(self):
        self.OID = 0
    def insertorder(self):
        self.OID = input("Enter Order Id")
        _____ → Blank 1
    def delorder(self):
        :
        :</pre>i. Fill in the blank 1 with a statement to insert OID in the Queue maintained using List L.
ii. Complete the definition of delorder() to delete OID from the Queue maintained using List L, the function should return the OID being deleted or -1 in case the Queue is empty.</td><td>4</td></tr>
<tr><td></td><td>Ans:</td><td>i. self.L.append(self.OID)

(1 mark for the correct answer)
ii.</td><td></td></tr>
</table>

```
def delorder(self):
    if (len(self.L)<0):
        print "Order Q is empty"
        return(-1)
    else:
        x= self.L[0]
        del(self.L[0])
        return(x)
```

(1 mark for applying condition to check if Queue is empty)
(½ mark for returning -1)
(1 mark for deleting the first element from the Queue)
(½ mark for returning the deleted value)

d) Write a generator function to generate odd numbers between a and b (including b).Note: a and b are received as an argument by the function. 3

Ans:

```
def generateodd(a,b):
    for i in range(a,b+1):
        if(i%2!=0):
            yield(i)
```

(½ mark for correct function header)

(1 mark for correct use of loop)

(½ mark for condition)
(1 mark for using yield() to yield the correct value)

(e) Evaluate the following postfix expression using a stack. Show the contents of stack after execution of each operation: 2
10,40,25,-,*,15,4,*,+

Ans

Symbol	Operation	Stack	Result
10	Push(10)	10	
40	Push(40)	10,40	
25	Push(25)	10,40,25	
-	Pop(25) Pop(40) Push(40-25) =15	10,15	
*	Pop(15) Pop(10) Push(10*15) =150	150	
15	Push(15)	150,15	
4	Push(4)	150,15,4	
*	Pop(4) Pop(15) Push(15*4)=60	150,60	

+	Pop(60) Pop(150) Push(150+60)=210	210	210

(½ mark for correct stack status till '-')

(½ mark for correct stack status till '*')

(½ mark for correct stack status till '*')

(½ mark for correct stack status till '+')

or

(½ mark for writing the correct result without showing the working of Stack)

Q4.	(a)	Nancy intends to position the file pointer to the beginning of a text file.Write Python statement for the same assuming F is the Fileobject.	1
	Ans	F.seek(0) **(1 mark for the correct answer)**	
	(b)	Write a function **countmy**( )in Python to read the text file "DATA.TXT" and count the number of times "my" occurs in the file. For example if the file "DATA.TXT" contains: "This is my website. I have displayed my preferences in the CHOICE section." The **countmy**( ) function should display the output as: "my occurs 2 times".	2

	Ans	`def countmy():`
		`  f= open("DATA.TXT","r")`
		`  count =0`
		`  x=f.read()`
		`  word= x.split()`
		`  for i in word:`
		`  if (i=="my"):`
		`  count=count+1`
		`  print "my occurs",count,"times"`
		
		(½ mark for reading the file using read)
		(½ mark for correctly using split())
		(½ mark for the correct loop)
		(½ mark for displaying the correct value of count)	

	(c)	Write a function in Python to search and display details of all those students, whose stream is "HUMANITIES" from pickled file "Student.dat". Assuming the pickled file is containing the objects of the following class:	3

```
class STUDENT:
    def __init__(self):
        self.RNO = 0
        self.NAME = " "
        self.STREAM = " "
        self.PERCENT = 0.0
    def ACCEPT(self):
        self.RNO = input("Enter Roll no")
        self.NAME = raw_input("Enter Name")
        self.STREAM = raw_input("Enter Stream")
        self.PERCENT = input("Enter percentage")
    def DISPLAY(self):
        print self.RNO,self.NAME,self.STREAM,self.PERCENT
    def RET_STREAM(self):
        return(self.STREAM)
```

Ans:

```
def readfile():

    f= open("Student.dat","rb")

    try:
        while(True):
            S= pickle.load(f)
            if(S.RET_STREAM()=="HUMANITIES"):
                S.DISPLAY()
    except EOFError:
        pass
    f.close()
```

(½ mark for opening the file in correct mode)
(½ mark for try.. except EOFError)
(½ mark for while loop)
(½ mark for using pickle.load() correctly)
(½ mark for comparison using if)
(½ mark for displaying)

SECTION – C

Q5	(a)	Differentiate between DDL & DMLcommands. Identify DDL & DML commands from the following:- (UPDATE, SELECT, ALTER, DROP)	2
	Ans	**DDL stands for Data Definition language and comprises of commands which will change the structure of database object.** **DML stands for Data Manipulation Language and comprises of commands which are used to insert, edit, view & delete the data stored in a database object.** **DDL Commands: ALTER, DROP** **DML Commands: UPDATE, SELECT**	

		(1 Mark for correct definition of DDL & DML commands) **(½ Mark each for correct identification of commands)**	
	(b)	Consider the following relations MobileMaster & MobileStock:-	6

MobileMaster

M_Id	M_Company	M_Name	M_Price	M_Mf_Date
MB001	Samsung	Galaxy	4500	2013-02-12
MB003	Nokia	N1100	2250	2011-04-15
MB004	Micromax	Unite3	4500	2016-10-17
MB005	Sony	XperiaM	7500	2017-11-20
MB006	Oppo	SelfieEx	8500	2010-08-21

MobileStock

S_Id	M_Id	M_Qty	M_Supplier
S001	MB004	450	New Vision
S002	MB003	250	Praveen Gallery
S003	MB001	300	Classic Mobile Store
S004	MB006	150	A-one Mobiles
S005	MB003	150	The Mobile
S006	MB006	50	Mobile Centre

Write the SQL query for questions from (i) to (iv) & write the output of SQL command for questions from (v) to (viii) given below:-

(i) Display the Mobile company, Mobile name & price in descending order of their manufacturing date.

(ii) List the details of mobile whose name starts with 'S'.

(iii) Display the Mobile supplier & quantity of all mobiles except 'MB003'.

(iv) To display the name of mobile company having price between 3000 & 5000.

(v) SELECT M_Id, SUM(M_Qty) FROM MobileStock GROUP BY M_Id;

(vi) SELECT MAX(M_Mf_Date), MIN(M_Mf_Date) FROM MobileMaster;

(vii) SELECT M1.M_Id, M1.M_Name, M2.M_Qty, M2.M_Supplier FROM MobileMaster M1, MobileStock M2 WHERE M1.M_Id=M2.M_Id AND M2.M_Qty>=300;

(viii) SELECT AVG(M_Price) FROM MobileMaster;

Ans

(i) SELECT M_Compnay, M_Name, M_Price FROM MobileMaster ORDER BY M_Mf_Date DESC;

(½ mark for correct SELECT)

(½ mark for correct ORDER BY)

(ii) SELECT * FROM MobileMaster WHERE M_Name LIKE 'S%';

(½ mark for correct SELECT)

(½ mark for correct WHERE clause)

(iii) SELECT M_Supplier, M_Qty FROM MobileStock WHERE M_Id <> 'MB003';

(½ mark for correct SELECT)

(½ mark for correct WHERE clause)

(iv) SELECT M_Company FROM MobileMaster WHERE M_Price BETWEEN 3000 AND 5000;

(½ mark for correct SELECT)

(½ mark for correct BETWEEN clause)

(v)

M_Id	SUM(M_Qty)
MB004	450
MB003	400
MB001	300
MB006	200

(½ mark for correct output)

(vi)

MAX(M_Mf_Date)	MIN(M_Mf_Date)
2017-11-20	2010-08-21

(½ mark for correct output)

(vii)

M_Id	M_Name	M_Qty	M_Supplier
MB004	Unite3	450	New_Vision

			MB001	**Galaxy**	**300**	**Classic Mobile Store**	

(½ mark for correct output)

(viii) 5450

(½ mark for correct output)

Q6. (a) State & prove De-Morgan's law using truth table. 2

Ans **De-morgan's Law: (A+B)' = A'.B'**

(A.B)' = A'+B'

Proof using Truth Table

A	B	A+B	(A+B)'	A'	B'	A'.B'
0	0	0	1	1	1	1
0	1	1	0	1	0	0
1	0	1	0	0	1	0
1	1	1	0	0	0	0

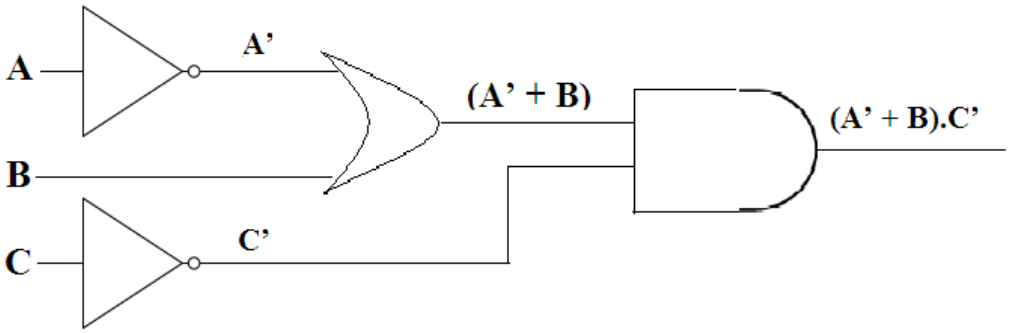
(½ mark each for stating correct De-morgan's law)

(1 mark for correct proof)

(b) Draw the equivalent logic circuit diagram of the following Boolean expression:- 2

(A' + B).C'

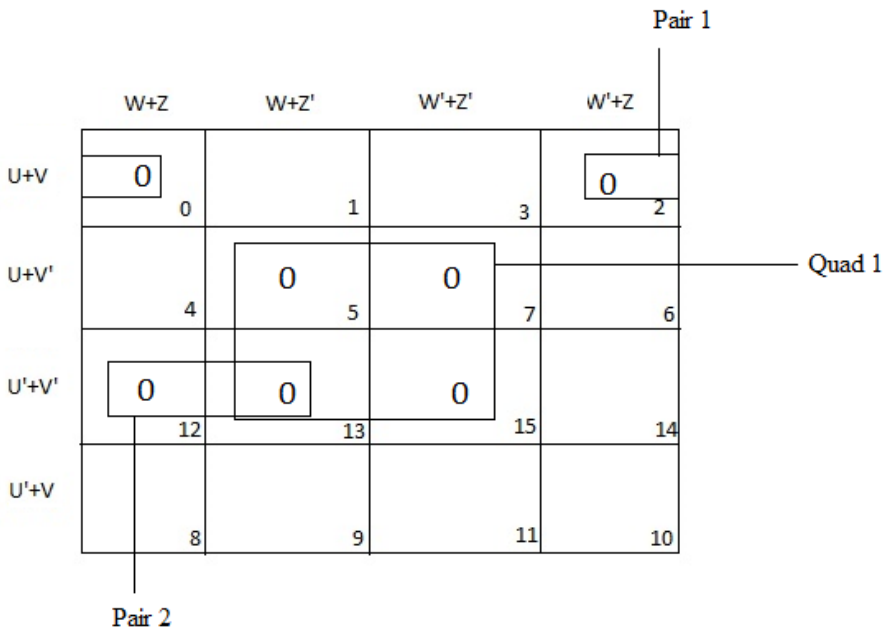
Ans Logic Circuit Diagram for (A' + B).C' is given as:-



(½ mark each for correct placement of gate)

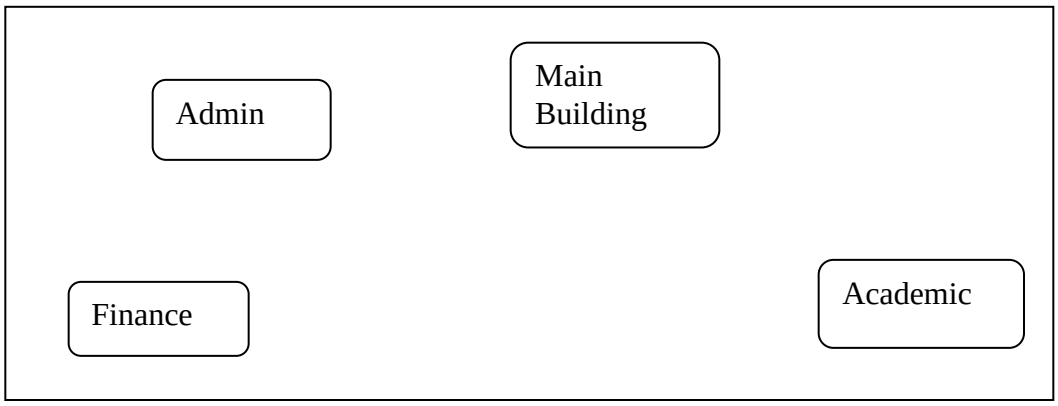
(c) Write the SOP form for the Boolean Function F(X,Y,Z) represented by the given truth table:- 1

X	Y	Z	F
0	0	0	0
0	0	1	1
0	1	0	1

			0	1	1	0		
			1	0	0	0		
			1	0	1	0		
			1	1	0	1		
			1	1	1	1		
	Ans	**SOP Form is : X'.Y'.Z + X'.Y.Z' + X.Y.Z' + X.Y.Z** **(1 mark for correct answer)** **Note: Deduct ½ mark if wrong variable names are written in the expression**						
	(d)	Reduce the following Boolean expression using K-Map:- F(U,V,W,Z)= π(0,2,5,7,12,13,15)						3
	Ans	**POS form using K-Map is given as:-**  **Quad 1: (V'+Z')** **Pair 1: (U+V+Z)** **Pair 2: (U'+V'+W)** **POS Form: (V'+Z').(U+V+Z).(U'+V'+W)** **(½ Mark for drawing K-Map with correct variable names)** **(½ Mark each for correct placement of 0)** **(½ Mark each for 3 groupings)** **(½ Mark for writing final expression in reduced/minimal form)** **Note: Deduct ½ mark if wrong variable names are used**						
Q7.	(a)	A teacher provides **"http://www.XtSchool.com/default.aspx"** to his/her students to						1

		identify the URL & domain name.	
	Ans	**URL: http://www.XtSchool.com/default.aspx** **Domain name: XtSchool.com** **(½ mark for each correct answer)**	
	(b)	Which out of the following does **not** come under Cyber Crime? (i) Copying data from the social networking account of a person without his/her information & consent. (ii) Deleting some files, images, videos, etc. from a friend's computer with his consent. (iii) Viewing & transferring funds digitally from a person's bank account without his/her knowledge. (iv) Intentionally making a false account on the name of a celebrity on a social networking site.	1
	Ans	**(ii)** **(1 mark for correct answer)**	
	(c)	Expand the following:- 1. GSM 2. TDMA	1
	Ans	**GSM: Global System for Mobile Communication** **TDMA: Time Division Multiple Access** **(½ mark for each correct answer)**	
	(d)	What is the significance of cookies stored on a computer?	1
	Ans	Cookies is small text file that web servers send to a web browser so that the web server can keep track of the user's activity on a particular website. **(1 mark for correct answer)**	
	(e)	Kabir wants to purchase a Book online and placed the order for that book using an e-commerce website. Now, he is going to pay the amount for that book online using his Mobile, he needs which of the following to complete the online transaction:- 1. A bank account, 2. A Mobile connection/phone which is attached to above bank account, 3. The mobile banking app of the above bank installed on that mobile,	1

		4. Login credentials(UserId & Password) provided by the bank, 5. All of above.	
	Ans	**Option No.5** **(1 mark for correct answer)**	
	(f)	What do you mean by data encryption? For what purpose it is used for?	1
	Ans	**Data encryption is a technique used for data security in which original message is converted or encoded using an algorithm into a form not understood by anyone except the person who has the key to decode it.** **(½ mark for correct definition)** **(½ mark for its purpose: data security)**	
	(g)	Sanskar University of Himachal Pradesh is setting up a secured network for its campus at Himachal Pradesh for operating their day-to-day office & web based activities. They are planning to have network connectivity between four buildings. Answer the question (i) to (iv) after going through the building positions in the campus & other details which are given below:	



The distances between various buildings of university are given as:-

Building 1	Building 2	Distance(in mtrs.)
Main	Admin	50
Main	Finance	100
Main	Academic	70
Admin	Finance	50
Finance	Academic	70
Admin	Academic	60

Number of computers:-

Building	No. of Computers
Main	150
Admin	75
Finance	50
Academic	60

As a network expert, you are required to give best possible solutions for the given queries of the university administration:-

(a) Suggest cable layout for the connections between the various buildings,

(b) Suggest the most suitable building to house the server of the network of the university, 1

(c) Suggest the placement of following devices with justification: 1

1. Switch/Hub

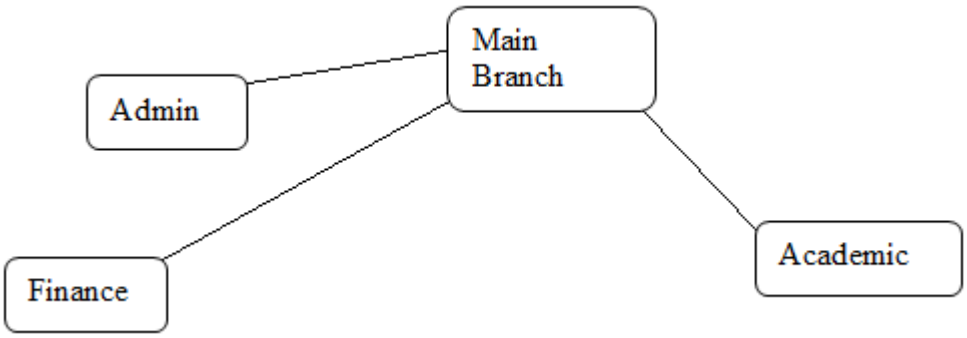
2. Repeater 1

(d) Suggest the technology out of the following for setting-up very fast Internet connectivity among buildings of the university 1

1. Optical Fibre
2. Coaxial cable
3. Ethernet Cable

Ans

(a) Star topology



(1 mark for drawing correct layout)

(b) Server should be placed at Main Building as it has the maximum number of computers.

(1 mark for correct answer)

(c) Hub/Switch each would be needed in all the buildings to interconnect the group of cables from the different computers in each building

A repeater needs to be placed along the wire between main building & finance building as the distance between them is more than 70 mtr.

		(½ mark for each correct placement) **(½ mark for each correct justification)** (d) Optical Fibre **(1 mark for correct answer)**	

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