SAMPLE QUESTION PAPER
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

	(b)	Raman suggests Kishan the following header files which are required to be included in 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);`
		`}`
		
		Suggested header files:-
		1. iostream.h
		2. stdio.h
		3. conio.h
		4. ctype.h
			1

	(c)	Rewrite the following program after removing the syntactical errors (is any). Underline each correction.	2

```
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;
}
```

(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;
        }
}
```

(e) Write the output of the following C++ program code(assume all necessary header files are included in program): 3

		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--]);
		}
		}	

	(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):
		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
			2

Q2.	(a)	What do you mean by Data Abstraction in OOPs? Explain its significance in programming with a suitable example.	2
	(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
}
```

(c) Define a class Bill in OOP with the following specification:- 4

Private members:

1. Bill_no - type long(bill number)
2. Bill_period - type integer(number of months)
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.	

	(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.
			4

		(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.	
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 son 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
	(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 address of the array and the memory address of element stored at location A[30][25]?	3

	(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

	(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 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	2

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**	**14**	**14**

(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

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".	
	(b)	Write a user-defined function named **Count()** that will read the contents of text file named **"Report.txt"** and count the number of lines which starts with either 'I' or 'M'. E.g. In the following paragraph, there are 2 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

	(c)	Consider the following class Item:-
		`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.
			3

		SECTION – B (Python)	
Q1	(a)	Differentiate between break and continue statement with the help of an example.	2
	(b)	Identify and write the name of the module to which the following functions belong: i. ceil( ) ii. findall()	1

	(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

	(d)	Write the output of the following Python code:	2

		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	

	(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

	(f)	Study the following program and select the possible output(s) from the options (i) to (iv) 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
			2

Q2	(a)	Explain operator overloading with the help of an example.	2

	(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
	(ii)	**Fill in the blanks:** **B= BOOK()** **_____ #Write statement to invoke Function 2**	1

		_____ **#Write statement to invoke Function 3**	
	(c)	Define a class COURSE in Python with the following description : **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: <table><tr><th>Score</th><th>CNAME</th><th>Fees</th></tr><tr><td>>=9.0 -<=10.0</td><td>Clinical Psychology</td><td>10000.0</td></tr><tr><td>>=8.0 - <9.0</td><td>Corporate Counselling</td><td>8000.0</td></tr><tr><td>>=5.0 - <8.0</td><td>Guidance and Counselling</td><td>6000.0</td></tr><tr><td>less than 5.0</td><td>Not Eligible</td><td>0.0</td></tr></table> • GETDATA() to input REGNO and Score and invoke SetCourse() • DISPLAY() to display all the details.	4

	(d)	Answer the questions (i) and (ii) based on the following:
		`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!"`
			4

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

	(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")`	

<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>(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>(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>d)</td><td>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.</td><td>3</td></tr>
<tr><td></td><td>(e)</td><td>Evaluate the following postfix expression using a stack. Show the contents of stack after execution of each operation:
10,40,25,-,*,15,4,*,+</td><td>2</td></tr>
<tr><td>Q4.</td><td>(a)</td><td>Nancy intends to position the file pointer to the beginning of a text file. Write Python statement for the same assuming F is the File object.</td><td>1</td></tr>
<tr><td></td><td>(b)</td><td>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”.</td><td>2</td></tr>
<tr><td></td><td>(c)</td><td>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:</td><td>3</td></tr>
</table>

```
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)
```

SECTION – C

Q5 (a) Differentiate between DDL & DML. Identify DDL & DML commands from the following:- 2

(UPDATE, SELECT, ALTER, DROP)

(b) Consider the following relation 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

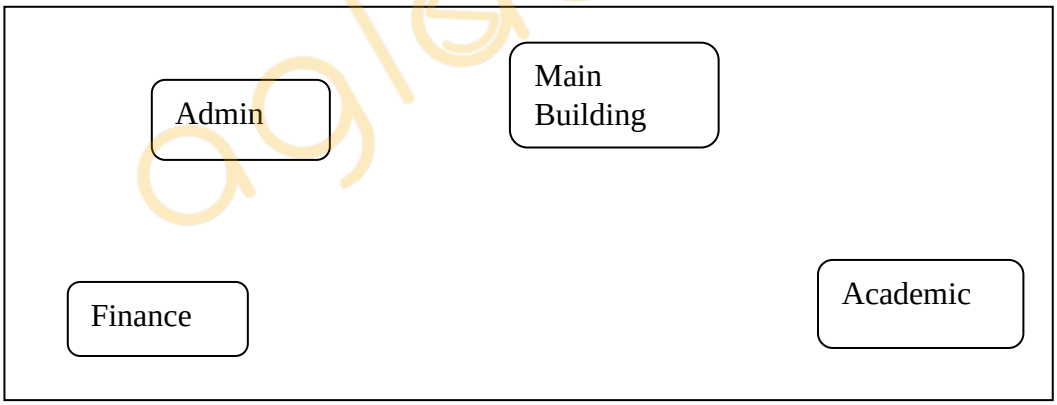
Write the SQL query for questions from (i) to (iv) & write the output of SQL command for questions from (v) to (viii) given below:-

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

		manufacturing date, (ii) List the details of mobile whose name starts with 'S' or ends with 'a', (iii) Display the Mobile supplier & quantity of all mobiles except 'MB003', (iv) List showing 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_Date), MIN(M_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;	
Q6.	(a)	State & prove De-Morgan's law using truth table.	2
	(b)	Draw the equivalent logic circuit diagram of the following Boolean expression:- (A' + B).C'	2
	(c)	Write the SOP form for the Boolean Function F(X,Y,Z) represented by the given truth table:-	1
	(d)	Reduce the following Boolean expression using K-Map:- F(U,V,W,Z)= π(0,2,5,7,12,13,15)	3
Q7.	(a)	A teacher provides **"http://www.XtSchool.com/default.aspx"** to his/her students to identify the URL & domain name.	1
	(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	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

		networking site.	
	(c)	Expand the following:- 1. GSM 2. TDMA	1
	(d)	What is the significance of cookies stored on a computer?	1
	(e)	Kabir wants to purchase a Book online and he has 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, then he needs which of the following to complete the online transaction:- 1. A bank account, 2. Mobile phone which is attached to above bank account, 3. The mobile banking app of the above bank installed on that mobile, 4. Login credentials(UID & Pwd) provided by the bank, 5. Or all of above.	1
	(f)	What do you mean by data encryption? For what purpose it is used for?	1
	(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:- 1

(a) Suggest cable layout for the connections between the various buildings, 1

(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

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

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

****