Kendriya Vidyalaya Sangathan
Model Question Paper-1
Class – XII
Subject - Computer Science (083)
Max. Marks: 70

Blue Print

S. No.	UNIT	VSA	SA I	SA II	LA	TOTAL
		(1 Mark)	(2 Marks)	(3 Marks)	(4 Marks)	
1	Review of C++ covered in Class XI	1 (1)	8 (4)	3 (1)		12 (6)
2	Object Oriented Programming in C++					
	a Introduction to OOP using C++	2 (1)			4 (1)	6 (2)
	b Constructor & Destructor	2 (1)				2 (1)
	c Inheritance				4 (1)	4 (1)
3	Data Structure & Pointers					
	a Address Calculation			3 (1)		3 (1)
	b Static Allocation of Objects		2 (1)	3 (1)		5 (2)
	c Dynamic Allocation of Objects				4 (1)	4 (1)
	d Infix & Postfix Expressions		2 (1)			2 (1)
4	Data File Handling in C++					
	a Fundamentals of File Handling	1(1)				1 (1)
	b Text File		2 (1)			2 (1)
	c Binary Files			3 (1)		3 (1)
5	Database and SQL					
	a Database Concepts		2(1)			2 (1)
	b Structured Query Language		2 (1)		4(1)	6(2)
6	Boolean Algebra					
	a Introduction to Boolean Algebra & Laws		2 (1)			2 (1)
	b SOP & POS	1(1)				1 (1)
	c Karnaugh Map			3 (1)		3 (1)
	D Basic Logic Gates		2 (1)			2(1)
7	Communication & Open Source Concepts					
	a Introduction to Networking	1(1)	2(1)			3 (2)
	b Transmission Media, Devices, Topologies & Protocols	1(1)			4(1)	5 (2)
	c Wireless/Mobile computing	1(1)				1(1)
	d Networking concepts		1(1)			1(1)

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Model Question Paper-1

Class – XII **Subject - Computer Science (083)**

Time Allowed: 3 hours **Maximum Marks: 70**

Note. ***(i) All questions are compulsory.***
(ii) Programming Language: C+ +

1.	a)	Differentiate between an identifier and keywords.	(2)
	b)	Name the header files, to which following inbuilt function belong to: a) abs( ) b) open( )	(1)

	c)	Identify the errors in the following program code:
		#include<iostream.h>
		class int
		{ int I,j; public:
		int(int a, int b)
		{
		I=a; j=b;
		}
		};
		class class2
		{
		int I,j; public:
		class2(int a, int b)
		{
		I=a; j=b;
		}
		};
		int main( )
		{
		int x(10,20) ; class2
		y ; x=y ;
		}
			(2)

	d)	Give the output of the following program:
		#include<iostream.h>
		int global=10;
		void func(int &x, int y)
		{
		x=x-y ;y=x*10 ; cout<<x<<’,’<<y <<”\n” ;
		}
		
		void main()
		{
		int global=7 ;
		func(::global,global) ; cout<<global<<’,’<<::global<<”\n”;
		func(global,::global) ; cout<<global<<’,’<<::global<<”\n”;
		}
			(2)

	e)	Find the output of the following program :
		#include<iostream.h>
		#include<string.h>
		#include<ctype.h>
		void Change(char Msg[], int Len)
		{
		for(int Count=0;Count<Len;Count++)
		{
		if(islower(Msg[Count])) Msg[Count]=toupper(Msg[Count]);
		else if(isupper(Msg[Count])) Msg[Count]=tolower(Msg[Count]);
		else if(isdigit(Msg[Count]))
		Msg[Count]=Msg[Count]+1;
		else Msg[Count]='*';
		}
		}
		void main()
		{
		char Message[]="2015 Happy New Year";
		int Size=strlen(Message);
		Change(Message,Size);
		cout<<Message<<endl;
		for(int C=0,R=Size-1;C<=Size/2;C++,R--)
		{
		char Temp=Message[C]; Message[C]=Message[R] ;
		Message[R]=Temp ;
		}
		cout<<Message<<endl;
			(3)

	f)	Study the following program and select the possible output from it:. Also justify your answer.
		#include<iostream.h>
		#include<stdlib.h>
		const int Max=3;
		void main( )
		{
		randomize( ); int Div;
		Div=1+random(Max);
		for(int N=1;N<5;N++)
		{
		cout<<100%Div<<"#";
		}
		}
			(2)

2.	a)	What is Function Overloading? Give an example in C++ to illustrate the same.	(2)

	b)	Answer the questions (i) and (ii) after going through the following program:
		#include<iostream.h>
		#include<string.h>
		class AirIndia
		{
		char flno; int Nop;
		public:
		AirIndia() //function1
		{
		strcpy(flno," "); Nop=0;
		}
		AirIndia(chat *str,int n) //function2
		{
		strcpy(flno,str); Nop=n;
		}
		void input //function3
		{
		cin>>flno; cin>>Nop;
		}
		~AirIndia() //function4
		{
		cout<<"counter closed"<<endl;
		}
		};
		(i) In Object Oriented Programming, which concept is illustrated by Function1 and Function2 together?
		(ii) Write the statement to call these functions (Function 1 and Function 2).
			(2)

	c)	Define a class cricket in C++ with the following description: **Private members:** • Target_score of type integer • Overs_bowled of type integer • Extra_time of type integer • Penalty of type integer • Cal_penalty() a member function to calculate penalty as follows: If Extra_time<=10, Penalty=1 If Extra_time>10 but <=20 Penalty=2, otherwise, Penalty=5 **Public members**: • A function Extradata () to allow user to enter values for Target_score, Over_bowled, Extra_time. • A function DispData( ) to allow user to view the contents of all data members.	(4)
	d)	Consider the following and answer the questions given below: class MNC { char Cname[25]; protected: char Hoffice[25]; public:	(4)

		void EnterDate ( );
		void DisplayData ( );
		};
		class Branch:public MNC
		{ long NOE:
		char Ctry[25];
		protected:
		void Association( );
		public:
		Branch( );
		void Add( );
		void Show( );
		};
		class Outlet: public Branch
		{ char State[25];
		public: Outlet( );
		void Enter ();
		void Output();
		};
		i) Which class's constructor will be called first at the time of declaration of an object of class Outlet?
		ii) How many bytes an object belonging to class Outlet require?	

3.	a)	Write a function in C++ which accepts a 2D array of integers and its size as arguments and display the elements which lie on diagonals. [Assuming the 2D array to be a square matrix with odd dimension, i.e., 3x3, 5x5, etc..] Example, if the array contents is 5 4 3 6 7 8 1 2 9 Output through the function should be : Diagonal One : 5 7 9 Diagonal Two: 3 7 1	(3)
	b)	An array Arr[15][20] is stored in the memory along the row with each element occupying 4 bytes. Find out the Base Address and address of the element Arr[3][2], if the element [5][2] is stored at the address 1500.	(3)
	c)	Give the necessary declaration of queue containing integer. Write a user defined function in C++ to delete an integer from the queue. The queue is to be implemented as a linked list.	(4)
	d)	Write a function in C++ to print the sum of all the values which are either divisible by 2 or are divisible by 3 present in a two-dimensional array passed as the argument to the function.	(2)
	e)	Evaluate the following postfix notation of expression: 10 20 + 25 15 - * 30 /	(2)

4.	a)	Observe the program segment given below carefully and fill the blanks marked statement 1 and statement 2 using seekg( ) and tellg( ) function for performing the required task.
		#include<fstream.h>
		class Employee
		{
		int Eno;
		char Ename[30];
		public:
		//Function to count the total number of records
			(1)

```
int Countrec( );
};
int Employee:: Countrec( )
{
fstream File;
File.open("Emp.Dat",ios::binary||ios::in);
_____// Statement 1
int Bytes =_____// Statement 2
int count = Bytes/sizeof(item);
File.close( );
return count;
}
```

b) Write a function in C++ to count the number of alphabets present in a textfile "Para.Txt". (2)

c) Write a function in C++ to add new objects at the bottom of a binary file "Student.Dat", assuming the binary file is containing the object of the following class (3)

```
class STUD
{  int Rno;
    char Name[20]; public :
  void Enter ()
  {
    cin>>Rno ;
    gets(Name);
  }
  void Display()
  {   cout<<Rno<<Name<<endl;
  }
};
```

5. a) What do you mean by Candidate Key and Foreign Key? (2)

b) Consider the following tables STORE and SUPPLIERS a. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii). (6)

Table: STORE

ItemNo	Item	Scode	Qty	Rate	LastBuy
2005	Sharpner Classic	23	60	8	31-Jun-09
2003	Ball Pen 0.25	22	50	25	01-Feb-10
2002	Gel Pen Premium	21	150	12	24-Feb-10
2006	Gel Pen Classic	21	250	20	11-Mar-09
2001	Eraser Small	22	220	6	19-Jan-09
2004	Eraser Big	22	110	8	02-Dec-09
2009	Ball Pen 0.5	21	180	18	03-Nov-09

Table: SUPPLIERS

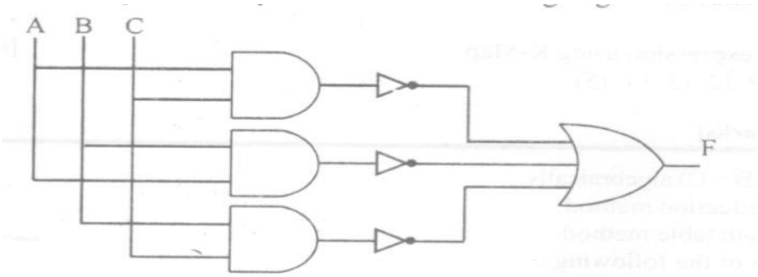
Scode	Sname
21	Premium Stationary
23	Soft Plastics
22	Tetra Supply

i) To display details of all the items in the Store table in ascending order of LastBuy.

ii) To display Itemno and item name of those items from store table whose rate is more than 15 rupees.

iii) To display the details of those items whose supplier code is 22 or Quantity in store is more than 110 from the table Store.

		iv) To display minimum rate of items for each Supplier individually as per Scode from the table Store.
		v) SELECT COUNT(DISTINCT Scode) FROM STORE;
		vi) SELECT Rate*Qty FROM STORE WHERE Itemno=2004;
		vii) SELECT Item,Sname FROM STORE S, SUPPLIER P WHERE S.Scode=P.Scode AND ItemNo=2006.
		viii) SELECT MAX(LastBuy)FROM STORE;	

6.	a)	State and verify Associative Law.	(2)
	b)	Write the equivalent expression for the following Logic Circuit: 	(2)
	c)	Convert the following three function F denoted by expression F=∑(0,1,2,5) into its Canonical Sum of Product Form	(1)
	d)	Reduce the following Boolean Expression using K-Map: F(P,Q,R,S)= ∑ (0,3,5,6,7,11,12,15)	(3)
7.	a)	Name the two transmission media for networking. Also write one advantage for each.	(2)
	b)	Expand the following terms: i) WLL ii) GSM	(1)
	c)	Define the following: i) Circuit Switching ii) Packet switching	(1)
	d)	KVS organization is setting up the network between the different wings. There are 4 wings names as Senior(S), Junior(J), Admin(A) and Hostel(H). i. Suggest a suitable Topology for Networking the computer of all wings ii. Name the wing where the server is to be installed. Justify your answer iii Suggest the placement of Hub/Switch in the network iv. Mention an economic technology to provide internet accessibility to all wings Distance between various wings Wing A to Wing S: 100m Wing A to Wing J: 200m Wing A to Wing H: 400m Wing S to Wing J: 300m Wing S to Wing H: 100m Wing J to Wing H: 450m Numbers of computers Wing A: 10 Wing S: 200 Wing J: 100 Wing H: 50 iv. .	(4)
	e)	What do you know about Interspace	(1)
	f)	Differentiate Micro wave and Radio wave	(1)

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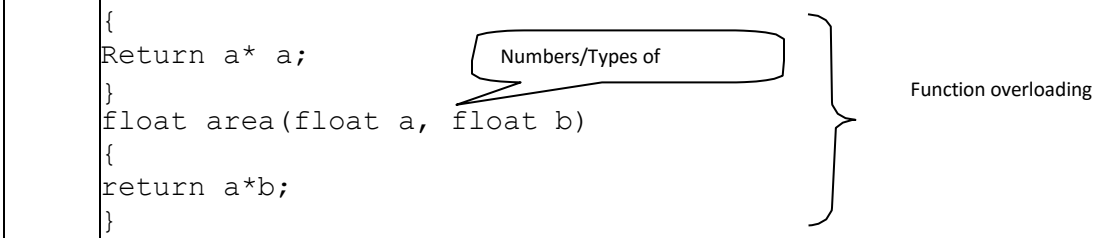
<table>
<tr><td>Q</td><td colspan="3"></td><td>M</td></tr>
<tr><td>1.</td><td>a)</td><td colspan="2">Differentiate between an identifier and keywords.
<table><tr><th></th><th>Identifiers</th><th>Keywords</th></tr><tr><td></td><td>• They are the user specific names given to different components of a program
• An identifiers is an arbitrarily long sequence of letters and digits where first character must be a letter or underscore
• Example like chess, instance, sum etc</td><td>• Keywords are the words that convey a special meaning to language compiler
• Keywords are reserved and are a few
• Example like goto, switch, else etc.</td></tr></table>(1/2 Mark for each point of difference)
(1/2 Mark for example of Identifiers) (1/2 Mark for example of Keywords)
OR
(Full 2 Marks to be awarded if the difference is explained with the help of suitable example)</td><td>(2)</td></tr>
<tr><td></td><td>b)</td><td colspan="2">a) abs( ) – Math.h
b) open( )- fstream.h
(1/2 Mark for mentioning name of each header file)</td><td>(1)</td></tr>
<tr><td></td><td>c)</td><td colspan="2">Identify the errors in the following program code:
<pre>
#include<iostream.h>
class class1
{
int I,j;
public:
class1(int a, int b)
{
 I=a; j=b;
}
};
class class2
{
int I,j;
public:
class2(int a, int b)
{
 I=a; j=b;
}
};
int main( )
{
class1 x(10,20);
class2 y(20,30);
x=y;
return 0 ;
}
</pre>(1/2 Mark for correcting each error)</td><td>(2)</td></tr>
</table>

		OR *(1 Mark for identifying all the 4 errors with no correction)*	
	d)	3,30 7,3 4,40 4,3 *(½ Mark for each correct line of output)* OR (½ mark for partial answers i.e, up to two correct numbers in each line) Note:**Deduct ½ Mark for not showing , in the output** **Deduct ½ Mark for not considering endl**	(2)
	e)	3126*hAPPY*nEW*yEAR RAEy*WEn*YPPAh*6213 ***(1 Mark for writing all alphabets at correct positions)*** ***(1/2 Mark for writing * at correct position*** OR (½ mark for partial answers in each line for any two sets of strings)	(3)
	f)	Possible Answer is i) 0#0#0#0# ii) 1#1#1#1# (1 Mark for each line of correct output) OR (½ mark for partial answers i.e, up to two correct numbers in each line) Note: Deduct ½ marks for not considering # from the total marks obtained in this question.	(2)
2.	a)	Function Overloading: A function name having several definitions that are differentiable by the numbers or types of their arguments is known as function overloading.  ***(1 Mark for each definition and explanation)*** **OR** ***(Full 2 marks for explaining both with the help of an example)***	(2)
	b)	i) Constructor Overloading OR Function Overloading OR Polymorphism (1 mark for mentioning any of the above or similar term) OR (Only ½ mark for mentioning just as Constructor) ii) AirIndia A; AirIndia A("Boeing ", 100); (½ mark for each statement)	(2)
	c)	class cricket { int Target_Score; int Overs_bowled; int Extra_time;	(4)

```
int Penalty;
void Cal_penalty();
public:
void Extradata();
void DispData();
};
void cricket::Cal_penalty()
{
if (extra_time<=10)
                Penalty=1;
else if (extra_time>10) && (extra_time<=20) Penalty=2;
else
                Penalty=5;
}
void cricket::Extradata()
{
cout<<"Target Score                :";cin>>Target_score;
cout<<"Over Bowled                 :" ;cin>>Over_bowled ;
cout<<"Extra Time                  :";cin>>Extra_time;
Cal_penalty();
}
void cricket::DispData()
{
cout<<"Target Score                :"<<Target_score<<endl;
cout<<"Over Bowled                 :"<<Over_bowled<<endl ;
cout<<"Extra Time                  :"<<Extra_time<<endl;;
cout<<"Penalty                     :"<<Penalty<<endl;;
}
```

(1 Mark for correctly declaring Data Members)
(3 Mark for correctly defining Cal_penalty()) (½ Mark for correctly defining Extradata())
(½ Mark for calling Cal_penalty() from ExtradataE())
(½ Mark for correctly defining DspData()) (½ Mark for correct syntax of class)

d) (4)

i) First of All constructor of class MNC will be called, then Branch, at last Outlet
ii) 129
iii) MNC::EnterData(), MNC::DisplayData(), Branch::Add(), Branch::show(), Outlet::Enter(), Outlet::Output
iv) MNC::Country

(1 Mark for each correct answer)

3. a) (3)

```
void Diag(int A[N][N],int N)
{
cout<<"Diagonal One :";
for (int I=0;I<N;I++)
{
cout<<A[I][I]<<" ";
}
cout<<"\nDiagonal Two :"; for (int
I=0;I<N;I++)
{
cout<< A[I][N-I-1]<<" ";
}
}
```

(½ Mark for initialization of desired variables)

		(½ Mark for correct formation of loop) ***(1 Mark for statement to add left diagonal elements)*** ***(1 Mark for statement to add right diagonal elements)***	
	b)	Given, W=4 N=15 M=20 Loc(ArrS[5][2])=1500 Row Major Formula: Loc(Arr[I][J]) =Base(Arr)+W*(M*I+J) Loc(Arr[5][2]) =Base(Arr)+4*(20*5+2) 1500 =Base(Arr)+4*(100+2) Base(Arr) =1500- 408 Base(Arr) =1092 Loc(ArrS[3][2]) =1092+4*(20*3+2) =1092+4*(60+2) =1092+248 =1340 ***(1/2 Mark for correct formula/substitution of values in formula) (1 ½ Mark for correctly calculating Base Address)*** ***(1 Mark for correctly calculating address of desired location)***	(3)

	c)	`struct NODE`
		`{`
		`int num; NODE *Link;`
		`};`
		`class QUEUE`
		`{`
		`NODE *r,*f; public:`
		`QUEUE();`
		`void Insert(); void Delete();`
		`};`
		`void QUEUE::Delete()`
		`{`
		`NODE *ptr; if (f==NULL)`
		`{`
		`cout<<"Queue Empty"; return;`
		`}`
		`else`
		`{`
		`ptr=f;`
		`int x=ptr->num; if (r==f)`
		`r=f=NULL`
		`else`
		`f=f->link; delete ptr;`
		`}`
			(4)

}

(½ Mark for appropriate function header)
(½ Mark for declaring a Temporary pointer - ptr)
(1 Mark for correct use of input/assignment of Temporary pointer- ptr) (1 Mark for checking FRONT f as NULL and displaying empty queue)
(1 Mark for connecting f to link part of f and deleting ptr)

d)

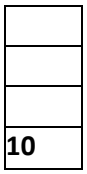
```
void sumArrElements(int A[][20], int r, int c)
{
int I, j, sum=0; for(i=0;i<r;i++)
for(j=0;j<c;j++)
if (A[i][j]%2==0)
sum+=A[i][j]; else if (A[i][j]%3==0)
sum+=A[i][j]; cout<<"The Sum is : "<<sum<<endl;
}
```

(½ Mark for initialization of desired variables) (½ Mark for correct formation of loop)
(½ Mark for statement to add Elements divisible by 2) (½ Mark for statement to add Elements divisible by 3)

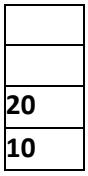
(2)

e)

Step 1: Push



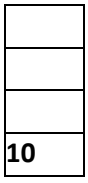
Step 2: Push

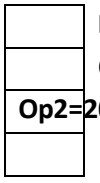


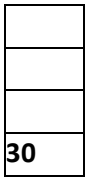
Step 3: +

Push

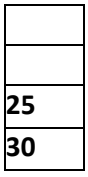
Pop



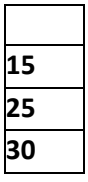




Step 4: Push



Step 5: Push



Step 6: -

Push

(2)

		Pop **Op2=15** **25** **30**	**Pop** **Op1=25** **Op2=15** **30**
		Step 7: * **Push** **Pop** **Op2=10** **Op2=10** **30**	**Pop** **Op1=30** **300**
		Step 8: Push **30** **300**	
		Step 9: / **Push** **Pop** **Op2=30** **Op2=30** **300**	**Pop** **Op1=300** **10**
		Step 10: Pop **Result 10**	
		(¼ Mark for showing stack position for each operation +,-, *and /) (1 Mark for correctly evaluating the final result)	
4.	a)	File.seekg(0,ios::end); File.tellg(); (½ Marks for Correct Syntax)	(1)

	b)	`int countalpha()`
		`{`
		`ifstream fin("Para.Txt"); char ch;`
		`int count=0;`
		`while(!fin.eof())`
		`{`
		`fin.get(ch);`
		`if(isalpha(ch)) count++;`
		`}`
		`fin.close();`
		`return count;`
		`}`
		(½ mark for opening the file)
		(½ mark for initializing the variable for counting lines to 0) (½ mark for reading each letters)
			(2)

		(½ mark for incrementing and displaying/returning value of variable)	

	c)	`void WriteObject()`
		`{`
		`fstream fout("Student.Dat", ios::app|ios::binary);`
		`STUD St;`
		`St.Enter();`
		`fout.write((char *)&St, sizeof(St)); fout.close();`
		`}`
		(½ mark for correct syntax of function header and body)
		(½ mark for opening the file in 'app' mode)
		(½ mark for correct object creation from class STUD)
		(½ mark for calling correct function from class object of STUD) (½ mark for correct write function to file of class STUD)
		(½ mark for closing the file)
			(3)

5.	a)	Candidate Key: All attribute combination inside a relation that can serve as Primary Key. Foreign Key: A non-key attributes whose values are derived from the primary key of some other table. ***(1 mark for definition of Degree)*** ***(1 mark for definition of Cardinality)***	(2)
	b)	i) `Select * from store order by LastBuy asc;` ii) `Select Itemno, item from store where rate>15;` iii) `Select * from store where scode=22 or qty>110;` iv) `Select Min(Rate) from store group by scode;` v)3 vi)880 vii) Gel Pen Classic Premium Stationary viii) 24-Feb-10 (1 marks for each SQL Syntax) (½ Marks for each correct output)	(6)
6.	a)	State and verify Associative Law. The Associative Laws states (i) X+(Y+Z)=(X+Y)+Z (ii) X(YZ)=(XY)Z Showing the results through Truth Table ***(1 mark for stating the correct law)*** ***(1 mark for the appropriate verification using truth table OR algebraic method)***	(2)
	b)	F=(AC)'+(BA)'+(BC)' ***(Full 2 marks for obtaining the correct Boolean Expression for the Logic Circuit) OR*** ***(1 mark correctly interpreting SUM terms)***	(2)
	c)	F=m0+m1+m2+m5 m0=000=X'Y'Z' m1=001=X'Y'Z m2=010=X'YZ' m5=101=XY'Z S-O-P: X'Y'Z'+X'Y'Z+X'YZ'+XY'Z ***(1 mark for correct SOP representation)***	(1)
	d)	There are 1 quad, 2 pairs and 2 blocks Quad(m3+m7+m15+m11) =RS Pair(m5+m7)=P'QS Pair(m7+m6)=P'QR	(3)

		Block m0=P'Q'R'S' Block m12=PQR'S' Hence the final expression is F=RS+P'QS+P'QR+P'Q'R'S'+PQR'S' ***(1 mark for correctly drawing K-Map with 1s represented on right places) (½ mark for minimizing Quad)*** ***(½ mark for minimizing Pair and Block)*** ***(1 mark for writing the complete Boolean Expression)***	
7.	a)	Twisted Pair-It is cheap and best solution for the local networking. Microwave- Easy to Deploy over remote area. ***(½ marks for mentioning the medium and its significance correctly)***	(2)
	b)	Expand the following terms: WLL- Wireless Local Loop or Wireless in Local Loop GSM =Global System for Mobile ***(½ mark each expansion)***	(1)
	c)	***(½ marks for mentioning the correct Definition)***	(1)
	d)	i) Star Topology ii) Server at Wing S as it has maximum number of computers. iii) Hub/Switch required at all the wings. iv) Using Proxy server at Wing S and connect to the internet. ***(1 mark for suggesting the appropriate economic way)***	(4)
	e)	***(1 marks for mentioning the correct Definition)***	(1)
	f)	***(1/2 mark each for any correct Difference)***	(1)