



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION
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WINTER – 2015 EXAMINATION
Model Answer

Subject Code: 17212

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Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.

Q.1) Attempt any TEN of the following:

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- a) Write syntax and use of if-else statement.
(Syntax 1M, Use 1M)

Ans: Syntax of if-else statement

```
if (test expression)
{
    True-block statement (s)
}
else
{
    False-block statement (s)
}
Statement-x;
```

Use:

If-else statement is a decision making statement and is used to control the flow of execution of statements. It allows the computer to evaluate the expression first and then depending on whether the value of the expression is true or false, it transfers the control to the particular statement block.



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- b) State difference between array and string.
(Any two points, each point 1M)

Ans: Difference between Array and String:

Sr. No.	Array	String
1.	An Array is a fixed size sequenced collection of elements of the same data type.	A string is a sequence of characters that is treated as single data item.
2.	The last element of an array is an element of the specific type.	The last character of a string is a null ('\0') character.
3.	Syntax: data_type arr_name[size];	Syntax: char string_name[size];
4.	Example: int a [5];	Example: char name [10];

- c) Define function.
(Correct Definition 2M)

Ans: A function is a self-contained block of code that performs a particular task.

Syntax of Function

```
Return_type function_name([Parameter List])  
{  
    Function_body;  
}
```

- d) Explain strlen() string function.
(Definition 1M, Syntax 1M)

Ans: strlen () Function

This function counts and returns the number of characters in a string.

Syntax:

n= strlen (string); where n is an integer variable, which receives the value of the length of the string.

- e) What is mean by lifetime and scope of variable?
(Explanation of Lifetime 1M, Scope of variable 1M)

Ans: **Lifetime of a Variable:**

The lifetime of a variable is the duration in which a variable exists in the memory during execution.

Scope of Variable:

It is the region of a program in which a variable is available for use.



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- f) **Define token and identifier.**
(Definition of Token 1M, Definition of Identifier 1M)

Ans: Token:

In a program, the smallest individual unit is known as Token.
e.g. keyword, constants

Identifier:

Identifier is a user-defined name and consists of a sequence of letters and digits. It refers to the names of variables, functions and arrays.
e. g. main, amount

- g) **What is conditional operator?**
(Correct Explanation 2M)

Ans: Conditional Operator (Ternary Operator):

It takes the form ‘? :’ to construct conditional expressions

The operator ‘? :’ works as follows:

exp1 ? exp2 : exp 3

Where exp1, exp2 and exp3 are expressions.exp1 is evaluated first, If it is true, then the expression exp2 is evaluated and becomes the value of the expression. If exp1 is false, exp3 is evaluated and its value becomes the value of the expression.

e.g. int a=10,b=5,x;
x=(a>b) ? a : b;

- h) **What is function? What is need of function?**
(Definition of Function 1M, Need of Function 1M)

Ans: Function:

A function is a self-contained block of code that performs a particular task.

Need of Function:

1. The program may become too large and complex and as a result the task of debugging, testing and maintaining a program becomes difficult. So program is divided into different functions, then each function may be independently coded and later can be combined into a single unit.
2. Functions are easy to understand, debug and test. Hence the task becomes easy.



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- i) State any four control statements.
(Each control statement ½ M)

Ans: Control Statements:

1. if statement
2. switch statement
3. Conditional operator statement
4. goto statement

- j) State what is the use of break and continue statement.
(Use of break statement 1M, Use of continue statement 1M)

Ans: break :

The break statement is used to break the control in the loops or in the general statements it is used to break the sequence.

continue:

The continue statement is used to transfer the control in the beginning of the loop. Whenever the continue statement is encountered immediately the control passes to the beginning of the loop.

- k) Give the meaning of :- `int *ptr;`
`int a;`
`ptr= &a;`

(Correct answer 2M)

Ans: `int *ptr; :-` Declaration of pointer variable ptr of integer data type.

`int a; :-` Declaration of integer variable a.

`ptr= &a; :-`Address of variable a is assigned to a variable ptr.

- l) What is difference between while and do-while loop?
(Any two relevant points, each 1M)

Ans:

Sr. No.	while loop	do while loop
1.	Syntax: while (test condition) { body of the loop }	Syntax: do { body of the loop } while (test condition);



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2.	In while loop test condition is evaluated at the starting of the loop.	In do while loop test condition is evaluated at the bottom of the loop.
3.	It is an entry-controlled loop statement.	It is an exit-controlled loop.
4.	This loop is executed only for true conditions.	This loop is executed at least once.
5.	Example: while(i<5) { print i; i++; }	Example: do { print i; i++; } while(i<5);

Q.2) Attempt any **FOUR** of the following:

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a) Write a C program to calculate factorial of a number.

(Program Logic 2M, Correct Syntax 2M)

Note: Any other relevant logic can be considered.

Ans: #include<stdio.h>
#include<conio.h>
void main()
{
 int n, i;
 long int fact=1;
 clrscr();
 printf("enter value of n:");
 scanf("%d",&n);
 for(i=1;i<=n;i++)
 {
 fact=fact*i;
 }
 printf("factorial of number is %ld",fact);
 getch();
}



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- b) Explain with syntax and example strcmp() and strcat() functions.
(Definition of strcmp() 1M, Definition of strcat() 1M, example 1M each)

Ans: strcmp() Function:

The strcmp function compares two strings which are passed as arguments to it. If the strings are equal then function returns value 0 and if they are not equal the function returns some numeric value.

Syntax:

```
strcmp(string1,string2);
```

Example:

Consider str1="abc" and str2="abc"

Then strcmp(str1,str2) returns 0 as both the strings are same.

strcat() Function:

The strcat function joins two strings together. Strings are passed as arguments to the function.

Syntax:

```
strcat (string1,string2);
```

Example:

Consider str1="abc" and str2="def"

strcat(str1,str2); returns abcdef in str1 and str2 remains unchanged.

- c) Explain formatted input and formatted output statement.
(Suitable explanation of Formatted Input 2M, Formatted Output 2M)

Ans: Formatted Input:

Formatted input refers to an input data that has been arranged in a particular format.

The format of the input i.e. scanf() function includes:

1. Format specification, consisting of the conversion character %, a data type character and an optional number specifying the field width.
2. Blanks, tabs or newlines.

Example: scanf("%2d",&num1);

For the above statement suppose input number is 31426 then by %2d it will only take 31 from 31426.



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Formatted Output:

Formatted output refers to an output data that has been arranged in a particular format. The format of the output i.e. printf() function includes:

Example:

1. Characters
2. Format specification
3. Escape sequence characters such as \n, \t and \b.

Example:

```
printf(“%6d”,9876);
```

Output:

		9	8	7	6
--	--	---	---	---	---

In the above example 6 is the field width. Hence for the number 9876 two leading spaces will be appeared in the output..

**d) What is recursive function? Explain with example.
(Recursive function definition 2M, Any suitable example 2M)**

Ans: Recursive function:

Recursion is the process of function calling itself again and again. A recursive function contains function call to itself in the body of function.

Example:

```
#include<stdio.h>
#include<conio.h>
int factorial(int n);
void main()
{
int n,fact;
clrscr();
printf("enter the number");
scanf("%d",&n);
fact=factorial(n);
printf("factorial of %d=%d",n,fact);
getch();
}
int factorial(int n)
```



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```
{  
if(n==1)  
{  
return(1);  
}  
else  
{  
return(n * factorial(n-1));  
}  
}
```

In the above example recursive function factorial() is used to print the Factorial of a number.

- e) **With syntax explain else if ladder and it's execution. Also draw flowchart for else- if ladder.**

(Syntax 1M, Explanation 1M, Flowchart 2M)

Ans: else if ladder is used to take a multipath decision. It is used in a program when there are more than one conditions are involved.

Syntax:

```
if (condition 1)  
    statement-1;  
else if (condition 2)  
    statement-2;  
else if (condition 3)  
    statement-3;  
else if(condition n)  
    statement-n;  
else  
    default statement;  
statement-x;
```

Explanation:

1. The above construct is known as else if ladder.
2. The conditions are evaluated from the top to the bottom.
3. As soon as the true condition is found, the statement associated with it is executed and the control is transferred to the statement-x.



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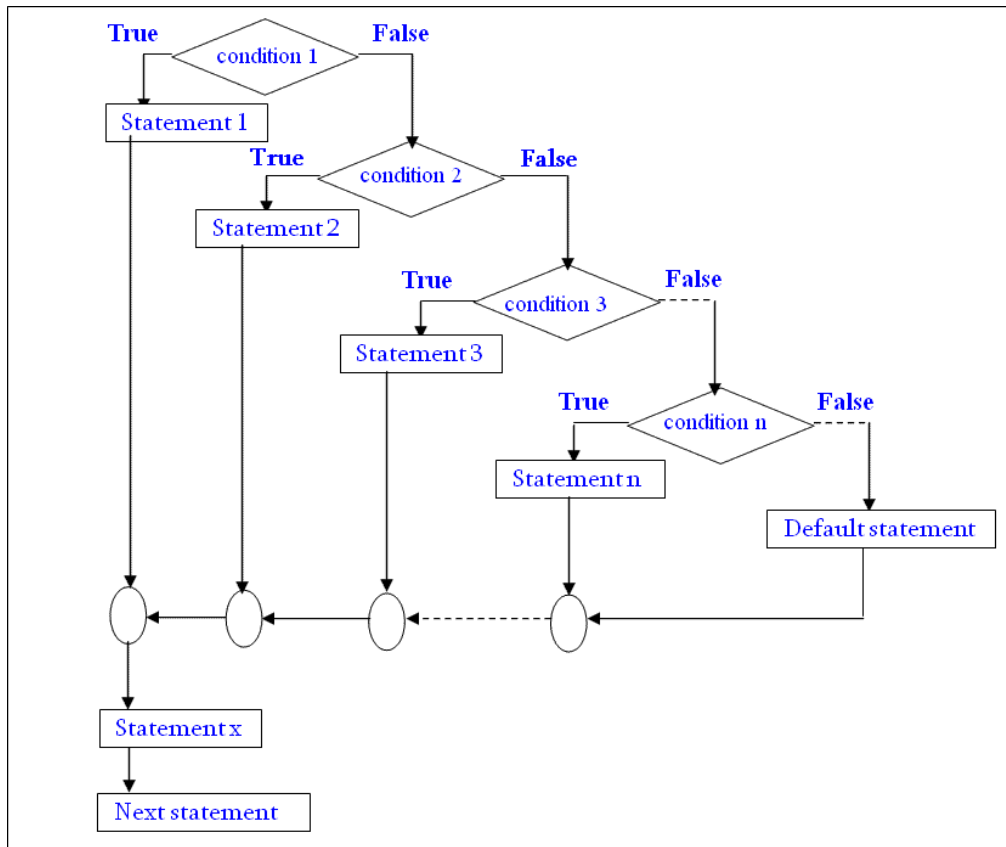
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4. When all the conditions become false, then the final else containing the default statement will be executed.

Flowchart:



- f) Write a program using pointer to swap the value of two integer numbers.

(Program Logic 2M, Correct Syntax 2M)

Note: Any other relevant logic can be considered.

Ans:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a,b,*p1,*p2,temp;
clrscr();
printf("Enter the value of a:");
scanf("%d",&a);
printf("Enter the value of b:");
scanf("%d",&b);
```



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```
printf("\nValues before swapping are: a=%d b=%d",a,b);
p1=&a;
p2=&b;
temp=*p1;
*p1=*p2;
*p2=temp;
printf("\nValues after swapping are: a=%d b=%d",a,b);
getch();
}
```

Q.3) Attempt any FOUR of the following:

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a) Explain in brief auto and extern storage class.

(Explanation of auto 2 marks & extern 2Marks)

Ans: auto:

Automatic variables are generally declared in the function in which they get utilized. They are known as local variable. Automatic variable can be created when function is called and get destroyed when execution of function gets over. We can declare variable with auto as follows:

```
main( )
{ auto int number;
.....
.....
}
```

extern:

External variables are global variable which are declared above the main () function. Since they are global, they are accessible to all the functions in the program. Scope of these variables is throughout the program.

```
extern int a;//declarations
main()
{
.....
.....
}
```

b) Explain with example array of pointer

(Explanation 2 marks, Example 2marks)

(Note: any suitable program/example can be considered)

Ans: A pointer is a variable that contains an address which is a location of another variable in memory.



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Syntax to create an array of pointers:

```
data type * arr_name[size];
```

Example:

```
int *x[2];
```

```
char *name[3]={"Nashik","Mumbai","Pune"};
```

Program:

```
#include<stdio.h>
#include<conio.h>
void main( )
{
char *str[5]={"keyboard", "monitor", "CPU", "harddisk", "SMPS"};
int i =0;
clrscr( );
for(i=0;i<=4;i++)
printf("\n %d element = %s",i,str[i]);
getch();
}
```

c) **Explain special operator in C with example.**

(2 marks for explanation, 2 marks for example)

Note: Any relevant explanation with example can be considered.

Ans: C supports following special operators:

- 1) Comma operator
- 2) Sizeof operator
- 3) Address operator (&)
- 4) Pointer operator (*)

1) **Comma operator:** A comma operator can be used to link the related expressions together.

Example: for(n=1,m=10,n<=m; n++,m++)

2) **sizeof operator:** This is a compile time operator when used with an operand it returns the number of bytes the operand occupies.

Example: m=sizeof(sum);

3) **Address operator:** This operator is assignment to address to the variable

Example: p = &x;

4) **Pointer operator:** This operator is used to indicate pointer variable.

Example: datatype *varname;

int *p;



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- d) Write a program to declare structure employee having data member name, street, city. Accept data for three employees and display it.
(Program Logic 2M, Correct Syntax 2M)
Note: Any other relevant logic can be considered.

```
Ans #include<stdio.h>
#include<conio.h>
struct employee
{
char name[20],street[20],city[20];
};
void main()
{
struct employee e[3];
int i;
clrscr();
for(i=0;i<3;i++)
{
scanf("%s",e[i].name);
scanf("%s",e[i].street);
scanf("%s",e[i].city);
}
printf("\n Following are the details of employees:");
for(i=0;i<3;i++)
{
printf("%s",e[i].name);
printf("%s",e[i].street);
printf("%s",e[i].city);
}
getch();
}
```

- e) Explain working of for loop with syntax and example.
(1 Mark explanation, 1 mark syntax, 2 marks for example/program)

Ans: for loop is an entry controlled loop. In this loop, control conditions are tested before the start of the loop execution.

Syntax:

```
for(initialization; test condition; increment)
{
body of loop
}
```



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Program:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int i;
for(i=0;i<=10;i++)
printf(“%d”,i);
getch();
}
```

- f) Write a program for addition of two 3 x 3 matrix.
(Program Logic 2M, Correct Syntax 2M)

Note: Any other relevant logic can be considered.

Ans:

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a[3][3],b[3][3],c[3][3],i,j;
clrscr();
printf("Enter first matrix elements:\n");
for(i=0;i<3;i++)
{
for(j=0;j<3;j++)
{
scanf("%d",&a[i][j]);
}
}
printf("\nEnter second matrix elements:\n");
for(i=0;i<3;i++)
{
for(j=0;j<3;j++)
{
scanf("%d",&b[i][j]);
}
}

for(i=0;i<3;i++)
{
for(j=0;j<3;j++)
{
c[i][j]=a[i][j]+b[i][j];
}
```



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```
}  
}  
printf("\n\nAddition of two matrices is:");  
for(i=0;i<3;i++)  
{  
printf("\n\n");  
for(j=0;j<3;j++)  
{  
printf("%d\t",c[i][j]);  
}  
}  
getch();  
}
```

Q.4) Attempt any **FOUR** of the following:

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- a) Write a program to read string from keyboard and find whether it is palindrome or not.

(Program Logic 2M, Correct Syntax 2M)

Note: Any other relevant logic can be considered.

Ans: #include<stdio.h>
#include<conio.h>
void main()
{
char str1[20],str2[20];
clrscr();
printf("\n Enter string which is to be checked:");
scanf("%s",str1);
strcpy(str2,str1);
strrev(str2);
if(strcmp(str1,str2)==0)
printf("\n String is palindrome");
else
printf("\n String is not palindrome");
getch();
}



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b) Explain arithmetic and logical operator.

(Explanation of arithmetic operator: 2 marks, logical operator: 2M)

Ans: Arithmetic operators: Arithmetic operators are used to do basic arithmetic operations.

Following are the arithmetic operators

Operator	Meaning
+	Addition or unary plus
-	Subtraction or unary minus
*	Multiplication
/	Division

Example:

Sum= 10+20;

Logical operators: logical operators are used to test more than one condition and make decision.

Operator	Meaning
&&	Logical AND
	Logical OR
!	Logical NOT

Example: a>b && X= = 10;

c) Write a program to find smallest number in 5 element integer array.

(Program Logic 2M, Correct Syntax 2M)

Note: Any other relevant logic can be considered.

Ans: #include<stdio.h>
#include<conio.h>
void main()
{
int a[5],i=0,small=0;
clrscr();
for(i=0;i<5;i++)
{



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```
scanf("%d",&a[i]);
}
small=a[0];
for(i=0;i<5;i++)
{
if(a[i]<=small)
{
small=a[i];
}
}
printf("\n%d is the smallest number in the array",small);
getch();
```

d) Write difference between call by value and call by reference.
(Any four relevant differences- 1 mark for each)

Ans:

Call by value	Call by reference
1) In call by value, a copy of actual argument is passed to formal arguments of the called function.	1) In call by reference the location (address) of actual argument is passed to formal arguments of called function.
2) Any changes made to the formal arguments in called function have no effect on the values of actual argument.	2) Any changes made to the formal argument in called function affects the values of actual argument
3) Pointers are not used	3) Pointers are used
4) #include<stdio.h> void swapbyvalue(int,int); int main() { int n1=10, n2=20; swapbyvalue(n1,n2); printf("n1=%d,n2=%d",n1,n2); } void swapbyvalue(int a, int b) { int t; t=a; a=b; b=t; }	4) #include<stdio.h> void swapbyreference(int *, int *); int main() { int n1=10, n2=20; swapbyreference(&n1,&n2); printf("n1=%d,n2=%d",n1,n2); } void swapbyreference(int * a, int* b) { int t; t=*a; a=*b; *b=t; }



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e) Explain meaning of following statement with reference to pointers.

`int *a,b;`

`b=20;`

`*a=b;`

`a=&b;`

(1 marks for each statement sentence explanation)

Ans: 1) `int *a, b;`

Here is a integer pointer variable and b is a normal integer variable.

2) `b=20;`

Here value of b is 20

3) `*a=b;`

In this sentence *a is assigned value of b i.e. 20.

4) `a=&b;`

Here a stores the address of variable b.

f) Write a syntax of switch case statement and write it's example.

(Syntax 2 Marks, example 2 Marks)

(Any suitable example can be considered)

Ans: Syntax:

```
switch (expression)
```

```
{
```

```
case value-1:
```

```
.....
```

```
.....
```

```
break;
```

```
case value-2:
```

```
.....
```

```
.....
```

```
break;
```

```
default:
```

```
.....
```

```
.....
```

```
break;
```

```
}
```

Here value1, value 2 are probable conditions or cases

Program:

```
#include<stdio.h>
```

```
void main()
```



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```
{
int no=0;
clrscr();
printf("Enter numbers 1-3");
scanf("%d", &no);
switch(no)
{
case 1:
printf("\n one");
break;
case 2:
printf("\n two");
case 3:
printf("\n three");
break;
default:
printf("\n Invalid Number");
}
getch();
}
```

Q.5) Attempt any **FOUR** of the following:

16

- a) Write a program to print even number between 1 to 100 numbers.
(Program logic 2M, Correct syntax: 2M)
(Note: Any other relevant logic can be considered)

Ans:

```
#include<stdio.h>
#include<conio.h>
main()
{
int i;
clrscr();
printf("Even numbers from 1 to 100 are :\n");
for(i=1 ; i<=100;i++)
{
if(i%2==0)
printf("%d ", i);
}
}
```



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- b) What is meant by increment and decrement operator? Explain with example.
(Increment operator with example – 2M, decrement operator with example – 2M)

Ans: Increment operator:

- i. Increment operator (++) is an unary operator. It operates on one operand.
- ii. It is used to add 1 in existing value.

Example:

```
# include <stdio.h>
# include<conio.h>
void main()
{
int a=6;
clrscr();
printf(“%d”,a);
  a++;
printf(“\n%d”,a);
getch ();
}
```

In above example due to increment operator (++) value of a will become 7.

Decrement operator:

- i. Decrement operator(--) is an unary operator. It operates on one operand.
- ii. It is used to subtract one from its existing value.

Example:

```
# include <stdio.h>
# include<conio.h>
void main()
{
int a=5;
clrscr();
printf(“%d”,a);
  a--;
printf(“\n%d”,a);
getch ();
}
```

In above example due to decrement operator (--) value of a will become 4.



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- c) What is array? How element of array can be accessed?
(Explanation of array – 2M, array access – 2M)

Ans:

An array is a fixed size sequenced collection of elements of similar data types which share a common name.

Syntax :

Data type array name[size];

Eg :

Considering array of 5 integer elements:

```
int a[5];
```

Array elements can be accessed by their position. For example, if its an array of 5 integers, the first position is considered as 0, next 1 and so on last index position is 4.

Eg : `int a[5]={2,4,3,5,6};`

Then `a[0]=2, a[1]=4, a[2]=3, a[3]=5, a[4]=6;`

The elements can be accessed with help of a looping statement like 'for' as follows:

```
for(i=0;i<5;i++)  
{  
printf("%d",a[i]);  
}
```

- d) What is pointer? Explain one example of integer and character pointer.
(pointer explanation – 2M, integer pointer example – 1M, character pointer example – 1M)

Ans:

Pointers are variables used to store the memory addresses of the variables.

Variables store the values and pointers stores their addresses at which these variables are located.

The values stored in the pointers are unsigned integer values.

Syntax:- `data_type * name_of_variable;`

In declaration statement of pointer name of pointer variable is preceded by * (indirection operator) operator.

Example of integer and character pointer:

Integer pointer :

```
int *ptr;
```

```
int a=5;
```

```
ptr = &a;
```



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Character pointer :

```
char *p;  
char ch='x';  
p=&ch;
```

e) Write a program using loop to print

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

(Program logic 2M, Correct syntax: 2M)

(Note: Any other relevant logic can be considered)

Ans:

```
# include <stdio.h>  
# include <conio.h>  
main ()  
{  
int i, j ;  
clrscr();  
for ( i=1; i<=4; i++)  
{  
for(j=1; j<=i; j++)  
{  
printf("* ");  
}  
printf("\n");  
}  
}
```

f) List different categories of function and explain any one.

(List – 2M, explanation of any one category – 2M)

Ans:

Different categories of function

- 1) Function with no arguments and no return value.
- 2) Function with arguments and no return value.
- 3) Function with no arguments and return value.
- 4) Function with arguments and return value.

1) Function with no arguments and no return value.

This category of function cannot return any value back to the calling program and it does not accept any arguments also. It has to be declared as void.



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For example:

```
void add()
{
inta,b,c;
a=5;
b=6;
c=a+b;
printf(“%d”,c);
}
```

It should be called as add();

2) Function with arguments and no return value:

This category of function cannot return any value back to the calling program but it takes arguments from calling program. It has to be declared as void. The number of arguments should match in sequence, number and data type.

For example:

```
void add(intx,int y)
{
int z;
z=x+y;
printf(“%d”,z);
}
```

It should be called as add(4,5); where x will take 4 and y will take 5 as their values.

3) Function with no arguments and return value:

This category of function can return a value back to the calling program but it does not take arguments from calling program. It has to be declared with same data type as the data type of return variable.

For example :

```
int add()
{
inta,b,c;
a=5;
b=6;
c=a+b;
return(c);
}
```

It should be called as int x = add(); where x will store value returned by the function .



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4) Function with arguments and return value:

This category of function can return a value back to the calling program but it also takes arguments from calling program. It has to be declared with same data type as the data type of return variable.

For example:

```
int add(int x, int y)
{
    int z;
    z = x + y;
    return(z);
}
```

It should be called as `int s = add(4,5);` where `x` will have 4 and `y` will have 5 as their values and `s` will store value returned by the function.

Q.6) Attempt any FOUR of the following:

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a) Explain array of structure with example.

(Explanation – 2M, example -2M)

Ans: Array of structure:-

Array of structures means collection of structure variables.

It can be used when we want to use many variables of the same structure.

For example:

If a structure for student data is defined and it has to be used for 10 different students then array of structure can be declared as

```
struct student
{
    int rollno;
    char name[20];
} s[10];
```

Here data in the form of rollno and name can be stored or accessed for 10 students.

For eg : `s[0].rollno` and `s[0].name` will be the data for first student.

`s[1].rollno` and `s[1].name` will be the data for second student and so on.

b) List and explain bitwise operator used in C.

(List – 2M, Explanation of any 2 operators –2 M)

Ans: Bitwise operators:

- | – Bitwise OR
- & – Bitwise AND
- ~ – Bitwise NOT
- ^ – Bitwise XOR



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<< – left shift

>> – right shift

Explanation:

Bitwise OR – |

It takes 2 bit patterns, and performs OR operations on each pair of corresponding bits. The following example will explain it.

```
    1010
    1100
    -----
OR   1110
```

Bitwise AND – &

It takes 2 bit patterns, and perform AND operations with it.

```
    1010
    1100
    -----
AND  1000
    -----
```

The Bitwise AND will take pair of bits from each position, and if only both the bit is 1, the result on that position will be 1. Bitwise AND is used to Turn-Off bits.

Bitwise NOT

One's complement operator (Bitwise NOT) is used to convert each "1-bit to 0-bit" and "0-bit to 1-bit", in the given binary pattern. It is a unary operator i.e. it takes only one operand.

```
    1001
    ----
NOT  0110
    -----
```

Bitwise XOR ^

Bitwise XOR ^, takes 2 bit patterns and perform XOR operation with it.

```
    0101
    0110
    -----
XOR  0011
    -----
```

Left shift Operator – <<

The left shift operator will shift the bits towards left for the given number of times.
int a=2<<1;



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Right shift Operator – >>

The right shift operator will shift the bits towards right for the given number of times.
int a=8>>1;

c) **Define.**

(i) **Function Definition**

(ii) **Function Body**

(iii) **Function call**

(iv) **Function prototype**

(Each definition - 1M)

(Note: Example showing each term also can be considered.)

Ans:

i) Function Definition

A function is a self-contained block of code that performs a specific task.

ii) Function Body

It is defined as the code associated with a function name. It is written inside the block of function definition.

iii) Function call

Function call is invoking a function wherever it is needed in the program. It can be done by writing name of the function ended with semicolon and with proper arguments given as per the function definition and prototype.

iv) Function prototype

Function prototype is a function declaration before it is invoked.

It consists of function return type, function name, parameter list and terminating semicolon.

Example :

```
main()
{
void add(int,int); -----> function prototype
int a=5,b=6;
add(5,6); -----> function call
}
void add(int x, int y) -----> function definition
{
int z=x+y;
printf("sum=%d",z);
} -----> function body
```



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d) Write a program to accept any integer number and display it's hexadecimal and octal format.

(Program logic 2M, Correct syntax: 2M)

(Note: Any other relevant logic can be considered)

Ans: #include<stdio.h>
include <conio.h>
main ()
{
int a;
clrscr();
printf("Enter a number :");
scanf ("%d",&a);
printf("Hexadecimal : %x\n",a);
printf("Hexadecimal : %o\n",a);
}

e) Write a menu driven program for following options :

(i) To find eneterd year is a leap year or not.

(ii) To display sum of digits of input number.

(Menu driven logic – 1M, leap year logic 1½ M , sum of digits -1½ M)

Ans:
include <stdio.h>
include <conio.h>
main ()
{
int ch=0,year;
int rem=0,sum=0,num;
clrscr();
printf("1. To find leap year\n");
printf("2. To print sum of digits of a number\n");
printf("Enter a choice : ");
scanf ("%d",&ch);
switch(ch)
{
case 1:
printf("Enter year :");
scanf("%d",&year);
if(year%4==0)
printf("Its a leap year ");
else
printf("Its not a leap year ");
break;



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```
case 2:
printf("enter number");
scanf("%d",&num);
while(num!=0)
{
rem=num%10;
sum=sum+rem;
num=num/10;
}
printf("Sum of Digits is %d",sum);
getch();
break;
default:
printf("Invalid choice!!!");
break;
}
}
```

f) What is two dimensional array? How is it declared and initialized? Give example of it.
(Two dim array – 1M, Declaration- 1M, Initialization by any one type – 1M, Example – 1M)

Ans: Two dimensional array:

The array which is used to represent and store data in a tabular form is called as two dimensional array. Such type of array is specially used to represent data in a matrix form.

Declaration of two dimensional arrays:

Syntax:-

Data type arrayname [row size] [column size];

Eg :

```
intarr[3][4];
```

this will declare array 'arr' with 3 rows and 4 columns.

Initialization can be done as design time or runtime.

1. **Design time:** This can be done by providing 'row X column' number of elements to the array. Eg for a 3 rows and 4 columns array , 3X4=12 elements can be provided as :arr[3][4]={ { 2,3,4,6},{ 1,4,6,3},{ 6,6,4,3},{ 6,7,8,9 } };

2. **Runtime:**For this loop structures like 'for' can be used in a nested form, where outer loop will increment row and inner loop will increment column.

Eg :

```
for(i=0;i<3;i++)
```

```
{
```

```
    for(j=0;j<4;j++)
```

```
    {
```



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```
scanf("%d",&arr[i][j]);
```

```
}  
}
```

Example :

```
main()  
{  
int arr[2][2]={{1,2},{4,5}};  
int i,j;  
for(i=0;i<2;i++)  
{  
for(j=0;j<2;j++)  
{  
printf( "%d",arr[i][j]);  
}  
}  
printf("\n");  
}  
}
```