

1

[2 1/2 Hours]

[Total Marks: 75]

- N.B. 1) All questions are compulsory.
 2) Figures to the right indicate marks.
 3) Illustrations, in-depth answers and diagrams will be appreciated.
 4) Mixing of sub-questions is not allowed.

Q. 1	Attempt All (Each of 5Marks)	(15M)
(A)	<p>Multiple Choice Questions</p> <p>i. What will be the output of the following C code?</p> <pre>#include <stdio.h> void main() { while () printf("In while loop "); printf("After loop\n"); }</pre> <p>a) In while loop After loop b) Compile Time Error c) After loop d) Infinite loop</p> <p>Ans. b.</p> <p>ii. What will be the output of the following C code?</p> <pre>#include <stdio.h> void main() { switch (printf("Do")) { case 1: printf("First\n"); break; case 2: printf("Second\n"); break; default: printf("Default\n"); break; } }</pre> <p>a) Do b) DoFirst c) DoSecond d) DoDefault</p> <p>Ans. c.</p> <p>iii. What is the output of the following C code?</p> <pre>#include <stdio.h> int main() { void foo(), f(); f(); } void foo() { printf("2 "); }</pre>	

```

}
void f()
{
    printf("1 ");
    fcc();
}

```

- a) Compile Time Error
- b) 1 2
- c) 2 1
- d) Depends on compiler

Ans. a.

iv. Which of following logical operation can be applied to pointers?
(Assuming initialization int *a = 2; int *b = 3;)

- a) a | b
- b) a ^ b
- c) a & b
- d) None of the mentioned

Ans. d.

v. What is the output of the following code?

```

#include<stdio.h>
main()
{
    int n;
    n=f(6);
    printf("%d",n);
}
f(int x)
{
    if(x==2)
        return 2;
    else
    {
        printf("+");
        f(x-1);
    }
}

```

- a) ++++2
- b) +++++2
- c) ++++
- d) 2

Ans a

(b)

Fill in the blanks

- i. The strcat() function is used to concatenate one string to the end of another string
- ii. A C program is basically a collection of functions.
- iii. In the C programming language, array elements always have contiguous address
- iv. An operation with only one operand is called unary operation
- v. The default return type of a function in C is int

(c)

Short Answers

- i. What is a structure? Give an example
Ans. 1 mark for correct answer
- ii. What is a pointer?
Ans. 1 mark for correct answer
- iii. Write the syntax of fopen?

	<p>Ans. 1 mark for correct answer</p> <p>iv. What is an escape sequence?</p> <p>Ans. 1 mark for correct answer</p> <p>v. Give syntax of do..while() loop.</p> <p>Ans. 1 mark for correct answer</p>									
Q. 2	Attempt the following (Any THREE)(Each of 5Marks)	(15M)								
(a)	<p>Differentiate between compilers and interpreters.</p> <p>Ans.</p> <table border="1"> <tr> <td>Any 5 points of compilers (whole program taken, object code generation, speed, memory requirement, error message etc.)</td> <td>5 x 1/2 = 2 1/2 marks</td> </tr> <tr> <td>Any 5 points of interpreters (line wise taken, no object code generation, speed, memory requirement, error message etc.)</td> <td>5 x 1/2 = 2 1/2 marks</td> </tr> </table>	Any 5 points of compilers (whole program taken, object code generation, speed, memory requirement, error message etc.)	5 x 1/2 = 2 1/2 marks	Any 5 points of interpreters (line wise taken, no object code generation, speed, memory requirement, error message etc.)	5 x 1/2 = 2 1/2 marks					
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Any 5 points of interpreters (line wise taken, no object code generation, speed, memory requirement, error message etc.)	5 x 1/2 = 2 1/2 marks									
(b)	<p>What are the various data types available in C? Explain the memory size and range of data possible.</p> <p>Ans.</p> <table border="1"> <tr> <td>5 primary data type and their details(void, char, int, float, double)</td> <td>5 x 1/2 = 2 1/2 marks</td> </tr> <tr> <td>5 secondary/derived data type and their details(arrays, pointers, structures, enum, union)</td> <td>5 x 1/2 = 2 1/2 marks</td> </tr> </table>	5 primary data type and their details(void, char, int, float, double)	5 x 1/2 = 2 1/2 marks	5 secondary/derived data type and their details(arrays, pointers, structures, enum, union)	5 x 1/2 = 2 1/2 marks					
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5 secondary/derived data type and their details(arrays, pointers, structures, enum, union)	5 x 1/2 = 2 1/2 marks									
(c)	<p>What are bitwise operators? Explain citing an example for each.</p> <p>Ans.</p> <table border="1"> <tr> <td>Explain working of &, and !</td> <td>3 x 1 = 3 marks</td> </tr> <tr> <td>Example of &, and !</td> <td>2 marks</td> </tr> </table>	Explain working of &, and !	3 x 1 = 3 marks	Example of &, and !	2 marks					
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Example of &, and !	2 marks									
(d)	<p>Write a 'C' program to accept number and find out whether it is even or odd.</p> <table border="1"> <tr> <td>Declaring variable</td> <td>1 mark</td> </tr> <tr> <td>Accepting value from user</td> <td>1 mark</td> </tr> <tr> <td>Check to find divisibility by 2</td> <td>2 marks</td> </tr> <tr> <td>Print result</td> <td>1 mark</td> </tr> </table>	Declaring variable	1 mark	Accepting value from user	1 mark	Check to find divisibility by 2	2 marks	Print result	1 mark	
Declaring variable	1 mark									
Accepting value from user	1 mark									
Check to find divisibility by 2	2 marks									
Print result	1 mark									
(e)	<p>Distinguish between If-else Structure and Switch Statement. Give example to support your answer.</p> <table border="1"> <tr> <td>Syntax of if() and switch</td> <td>2 marks</td> </tr> <tr> <td>Example</td> <td>2 marks</td> </tr> <tr> <td>Explanation</td> <td>1 mark</td> </tr> </table>	Syntax of if() and switch	2 marks	Example	2 marks	Explanation	1 mark			
Syntax of if() and switch	2 marks									
Example	2 marks									
Explanation	1 mark									
(f)	<p>Trace the output of the following code:</p> <pre> i. void main() { int a = 4; switch (a) { default : printf("In default"); case 1 : printf("In 1"); break; case 2 : printf("In 2"); break; } } </pre>									

4

```
}  
}
```

ii. **Ans.** In defaultIn 1

```
void main()  
{  
  int i = 0, x = 0;  
  for (i = 1; i < 10; i ++)  
  {  
    if (i %2 == 1)  
      x = x + 1;  
    else  
      x --;  
    printf("%d", x);  
  }  
}
```

Ans. 101010101

Q. 3 Attempt the following (Any THREE) (Each of 5Marks) (15M)

(a) Write syntax and explain the use of the following functions:

i. getch()

Syntax of getch()	1/2 mark
Explanation	1/2 mark

ii. getche()

Syntax of getche()	1/2 mark
Explanation	1/2 mark

iii. getchar()

Syntax of getchar()	1/2 mark
Explanation	1/2 mark

iv. getc()

Syntax of getc()	1/2 mark
Explanation	1/2 mark

v. gets()

Syntax of gets()	1/2 mark
Explanation	1/2 mark

(b) Differentiate between pass by value and pass by reference. Support your answer with an example

Ans.

Explaining pass by value and pass by reference	2 x 1 = 2 marks
Example for pass by value and pass by reference	2 x 1 1/2 = 3 marks

(c) How are strings in C implemented? Explain with an example.

Ans.

Explanation of string in C	2 marks
Importance of null character	1 mark
Example using string	2 marks

(d) What is an array? What are the advantages and disadvantages of an array?

Ans.

Definition of arrays/method of declaration	1 mark
--	--------

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Advantages: (any 2)

1. It is used to represent multiple data items of same type by using only single name.
2. It can be used to implement other data structures like linked lists, stacks, queues, trees, graphs etc.
3. 2D arrays are used to represent matrices.

Disadvantages(any 2):

1. We must know in advance that how many elements are to be stored in array.
2. Array is static structure. It means that array is of fixed size. The memory which is allocated to array cannot be increased or reduced.
3. Since array is of fixed size, if we allocate more memory than requirement then the memory space will be wasted. And if we allocate less memory than requirement, then it will create problem.
4. The elements of array are stored in consecutive memory locations. So insertions and deletions are very difficult and time consuming.

Advantages:

2 x 1 = 2 marks

Disadvantages:

2 x 1 = 2 marks

(e) Write a program to copy one string to another without using standard library function.

Ans.

Declaring and initializing 2 strings (can be taken from user also)	1 mark
Loop to copy element by element from source to target	2 marks
Take care of null character	1 mark
Printing the resultant string	1 mark

(f) Trace the output of the following code

```

int fun(int n, int *fg)
{
    int t, f;
    if(n <= 1)
    {
        *fg = 1;
        return 1;
    }
    t = fun(n-1, fg);
    f = t + *fg;
    *fg = t;
    return f;
}
int main()
{
    int x = 15;
    printf ("%d\n", fun (5, &x));
    return 0;
}

```

Ans 8												
Q. 4	Attempt the following (Any THREE) (Each of 5Marks)	(15)										
(a)	What are nested structures? Explain with an example. Ans.											
	<table border="1"> <tr> <td>Definition of nested structures</td> <td>1 mark</td> </tr> <tr> <td>Syntax of nested structure</td> <td>1 mark</td> </tr> <tr> <td>Code example of nested structure</td> <td>3 marks</td> </tr> </table>	Definition of nested structures	1 mark	Syntax of nested structure	1 mark	Code example of nested structure	3 marks					
Definition of nested structures	1 mark											
Syntax of nested structure	1 mark											
Code example of nested structure	3 marks											
(b)	What are the types of files available in C? Explain the various file opening modes in C. Ans.											
	<table border="1"> <tr> <td>File types: Text files and Binary Files</td> <td>2 x 1 = 2 marks</td> </tr> <tr> <td>Any 6 modes (r,w,a,r+,w+,a+,rb,wb,ab...)</td> <td>6 x 1/2 = 3 marks</td> </tr> </table>	File types: Text files and Binary Files	2 x 1 = 2 marks	Any 6 modes (r,w,a,r+,w+,a+,rb,wb,ab...)	6 x 1/2 = 3 marks							
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(c)	Write a note on unions in C. Support your answer with an example. Ans.											
	<table border="1"> <tr> <td>Explanation of unions</td> <td>2 marks</td> </tr> <tr> <td>Syntax of union declaration</td> <td>1 mark</td> </tr> <tr> <td>Code Example for union</td> <td>2 marks</td> </tr> </table>	Explanation of unions	2 marks	Syntax of union declaration	1 mark	Code Example for union	2 marks					
Explanation of unions	2 marks											
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(d)	Explain malloc() and calloc() with syntax and example. How are they different? Ans.											
	<table border="1"> <tr> <td>Explanation of use of malloc() and calloc()</td> <td>2 x 1/2 = 1 mark</td> </tr> <tr> <td>Syntax of malloc() and calloc()</td> <td>2 x 1 = 2 marks</td> </tr> <tr> <td>Code Example for malloc() and calloc()</td> <td>2 x 1 = 2 marks</td> </tr> </table>	Explanation of use of malloc() and calloc()	2 x 1/2 = 1 mark	Syntax of malloc() and calloc()	2 x 1 = 2 marks	Code Example for malloc() and calloc()	2 x 1 = 2 marks					
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(e)	Write a program to accept Student information (Roll no., name, percentage of marks) for 'n' students (Dynamically allocated). Store this in file and display it in well format (Accept 'n' from the user.) Ans.											
	<table border="1"> <tr> <td>Declaring the structure and accepting n from user</td> <td>1 mark</td> </tr> <tr> <td>Dynamic allocation of structure array</td> <td>1 mark</td> </tr> <tr> <td>Creating file</td> <td>1 mark</td> </tr> <tr> <td>Storing structure in file</td> <td>1 mark</td> </tr> <tr> <td>Displaying data</td> <td>1 mark</td> </tr> </table>	Declaring the structure and accepting n from user	1 mark	Dynamic allocation of structure array	1 mark	Creating file	1 mark	Storing structure in file	1 mark	Displaying data	1 mark	
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(f)	Trace the output of the following code: i. <pre># include <stdio.h> void main() { int i = 3, *j, k; clrscr(); j = &i; printf("%d\n", i**j * i+ *j); }</pre> Ans. 30 ii. <pre># include <stdio.h> void main() { int x[25]; x[0] = 100; x[24] = 400; printf("\n%d%d", *x, *(x+24)+*(x+0)); }</pre> Ans. 100500											

Q. 5	Attempt the following (Any THREE) (Each of 5Marks)	(15)												
(a)	<p>Give the difference between while() and do..while() loops. Use an example to support your answer.</p> <p>Ans.</p> <table border="1" data-bbox="279 224 1197 425"> <tr> <td>Explanation of while() and do..while() loops</td> <td>2 x 1 = 2 marks</td> </tr> <tr> <td>Syntax of Commands used: for()/while() and do..while()</td> <td>2 x 1 = 2 marks</td> </tr> <tr> <td>Code Example for entry controlled and exit controlled</td> <td>2 x 1/2 = 1 marks</td> </tr> </table>	Explanation of while() and do..while() loops	2 x 1 = 2 marks	Syntax of Commands used: for()/while() and do..while()	2 x 1 = 2 marks	Code Example for entry controlled and exit controlled	2 x 1/2 = 1 marks							
Explanation of while() and do..while() loops	2 x 1 = 2 marks													
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Code Example for entry controlled and exit controlled	2 x 1/2 = 1 marks													
(b)	<p>Explain any 2 library functions provided in 'C' language to manipulate strings.</p> <p>Ans. Can give any 2 : strlen(), strcmp(), strcat(), strrev(), strcpy() or any other</p> <table border="1" data-bbox="279 548 1005 683"> <tr> <td>Syntax</td> <td>2 x 1 1/2 = 3 marks</td> </tr> <tr> <td>Explanation</td> <td>2 x 1/2 = 1 mark</td> </tr> <tr> <td>Example</td> <td>2 x 1/2 = 1 mark</td> </tr> </table>	Syntax	2 x 1 1/2 = 3 marks	Explanation	2 x 1/2 = 1 mark	Example	2 x 1/2 = 1 mark							
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Explanation	2 x 1/2 = 1 mark													
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(c)	<p>Write a program using recursive function to find factorial of a number accepted from the user.</p> <p>Ans.</p> <table border="1" data-bbox="279 761 1236 963"> <tr> <td>Accepting number from user</td> <td>1 mark</td> </tr> <tr> <td>Declaring function for calculating factorial</td> <td>1 mark</td> </tr> <tr> <td>Ensuring function is recursive</td> <td>1 mark</td> </tr> <tr> <td>Ensuring there is terminating condition in function</td> <td>1 mark</td> </tr> <tr> <td>Printing result</td> <td>1 mark</td> </tr> </table>	Accepting number from user	1 mark	Declaring function for calculating factorial	1 mark	Ensuring function is recursive	1 mark	Ensuring there is terminating condition in function	1 mark	Printing result	1 mark			
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(d)	<p>Write a program in C to accept a string and check if the string is palindrome or not. Print a suitable message.</p> <p>Ans.</p> <table border="1" data-bbox="279 1052 1236 1254"> <tr> <td>Declaring string and Accepting string from user</td> <td>1 mark</td> </tr> <tr> <td>Loop till end of string</td> <td>1 mark</td> </tr> <tr> <td>Condition to check palindrome</td> <td>1 mark</td> </tr> <tr> <td>Exiting if condition not satisfied</td> <td>1 mark</td> </tr> <tr> <td>Printing suitable message</td> <td>1 mark</td> </tr> </table>	Declaring string and Accepting string from user	1 mark	Loop till end of string	1 mark	Condition to check palindrome	1 mark	Exiting if condition not satisfied	1 mark	Printing suitable message	1 mark			
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(e)	<p>Explain the following with declaration syntax and example</p> <p>i. , pointer to array</p> <p>Ans.</p> <table border="1" data-bbox="279 1355 1252 1568"> <tr> <td>Explanation</td> <td>1 mark</td> </tr> <tr> <td>Declaration syntax (eg. int a[5], *p; p=a;)</td> <td>1 mark</td> </tr> <tr> <td>Example</td> <td>1/2 mark</td> </tr> </table> <p>ii. array of pointers</p> <p>Ans.</p> <table border="1" data-bbox="279 1612 1252 1769"> <tr> <td>Explanation</td> <td>1 mark</td> </tr> <tr> <td>Declaration syntax (eg. int *a[5];)</td> <td>1 mark</td> </tr> <tr> <td>Example</td> <td>1/2 mark</td> </tr> </table>	Explanation	1 mark	Declaration syntax (eg. int a[5], *p; p=a;)	1 mark	Example	1/2 mark	Explanation	1 mark	Declaration syntax (eg. int *a[5];)	1 mark	Example	1/2 mark	
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