2021

ELECTRONICS — HONOURS

Paper : CC-4

(C Programming and Data Structures)

Full Marks : 50

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer **question no. 1** and **any four** from the rest.

1. Answer **all** questions : 1×10

   (a) Which one of the following is an identifier in C-language?

      (i) || (ii) Kolkata.wb

      (iii) _kolkata   (iv) -kolkata.

   (b) The maximum length of a variable of type 'double' in C-language is :

      (i) 16 bits   (ii) 32 bits

      (iii) 8 bits   (iv) 4 bits.

   (c) Which of the following operators has the highest priority among themselves?

      (i) %   (ii) +

      (iii) ++   (iv) ||.

   (d) An array 'cbcs' is declared as : int cbcs[12][7]. What is the number of elements of the array 'cbcs'?

      (i) 84   (ii) 18

      (iii) 77   (iv) 154.

   (e) What is the range of an integer in C-language?

      (i) –32.768 to 32,767   (ii) 0 to 65,353

      (iii) 0 to 65,535   (iv) –32.768 to 32,768.

   (f) Which linear structure has a provision of the Last-In-First-Out (LIFO) mechanism for its elements?

      (i) Stack   (ii) Queue

      (iii) Both (i) and (ii)   (iv) None of these.

Please Turn Over

(g) In C-language the symbol "<<" is used for

　　(i) Relational operator　　　　　　(ii) Left shift

　　(iii) Bitwise left shift　　　　　　(iv) None of these.

(h) Which of the following is an operator in C-language?

　　(i) $　　　　　　　　　　　　(ii) @

　　(iii) ,　　　　　　　　　　　　(iv) None of these.

(i) Which type of linked list comprises the adjacently placed first and the last elements?

　　(i) Singly Linked List　　　　　　(ii) Circular Linked List

　　(iii) Doubly Linked List　　　　　(iv) All of these.

(j) In C-language a function can be called by

　　(i) Value　　　　　　　　　　(ii) Reference

　　(iii) Type　　　　　　　　　　(iv) Value and reference.

2. Explain with examples, what is meant by data type casting. What is the difference between float and double data types? How many bytes correspond to a char data type? What are escape sequences? Explain with two examples what is meant by operator precedence and associativity.　　2+2+1+1+(2+2)

3. What is the difference between a postfix ++ and a prefix ++ operator? What is a two-dimensional array? How do you declare and initialize a 2×3 two-dimensional array in a single statement? How do you use the scanf function to read a string literal from the keyboard into a string variable?

　　Write the output result of the following program segment and explain your answer :

　　....

　　int x = –1;

　　if (x)

　　　printf("One");

　　else

　　　printf("Two");

　　....　　　　　　　　　　　　　　　　　　　　　　2+(1+2)+2+(1+2)

4. Write a program in C to print numbers 1 to N using any loop (for, while or do while). N is arbitrary and is to be read from the keyboard. Write another program in C to print numbers 1 to N *without* using any loop. N is arbitrary and is to be read from the keyboard.　　　　　　5+5

5. How can you initialize members of a structure variable and access their values? Explain with an example.

Write the output and explain the working of the following program :

```
#include <stdio.h>
void update (int *m);
void main(){
int k = 5;
update(&k);
printf("k=%d",k);
}
void update(int *p){
*p=*p * *p;
}
```

Why is C++ called an OOP language?   (2+2)+(2+2)+2

6. Name the different operations that can be carried out on different data structures. What is a LIFO stack? What is the use of such a stack? What is meant by stack overflow? What are prefix and postfix expressions? Write down the prefix and postfix forms of the expression :

$$(x+y)*(z/(x-2))$$ 2+1+2+1+2+2

7. What is a Queue? How is it different from a linked list? What are the different types of linked list? What is a circular linked list? How is a linked list different from an array?   2+2+2+2+2

8. Write any one sorting algorithm to sort a collection of numbers in ascending order. What is a Binary Search Tree (BST)? Explain insertion and searching in a BST with an example.   4+(2+4)

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