(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 7303 Roll No. 1 1 2 9 0 1 4 0 1 6

M.C.A.

(Semester-I) Theory Examination, 2011-12

COMPUTER CONCEPTS & PROGRAMMING IN 'C'

Time : 3 Hours] *[Total Marks : 100*

Note: (i) Attempt questions from each Section as indicated.

(ii) Be very precise in your answers.

Section-A

1. Short Answer Type Questions: Attempt *all* parts : 2×10=20

(a) Write a 'C' program without using any semicolon which output will : Hello India.

(b) What is the meaning of prototype of a function ?

(c) What are the merits and demerits of array in C?

(d) What is the difference between pass by value and pass by reference ?

(e) Consider the following :

x_1 is an integer pointer with initial value of 2800

x_2 is a long integer pointer with initial value of 1411

x_3 is a character type pointer with initial value of 1201.

Give with explanation, what is the new value of x_1 after $x_1 = x_1 + 1$, x_2 after $x_2 = x_2 + 1$ and x_3 after $x_3 = x_3 + 1$.

(f) Are the following statement valid ? Justify your answer :

$$m = (\text{float}*)\ \&p\ .$$

(g) Explain, in brief the purpose of the strcmp function. Also give its syntax.

(h) Consider the following macro definition :

```
# define root (a, b) sqrt ((a)*(a)+(b)*(b))
```

What will be the result of the following macro call statement root (a++, b++) if a=3 and b=4 ?

(i) Differentiate between syntax error and logical error.

(j) What is dynamic memory allocation ?

Section-B

2. Attempt *all* parts : 6×5=30

(a) Explain, what do you mean by algorithm ? What are the different types of algorithm used ? What are the properties of a good algorithm. Discuss about the termination of algorithm. Write an algorithm to find the largest of 3 numbers.

(b) What is an operator ? What are the various types of arithmetic, relational, logical bitwise and increment and decrement operators ? Clearly state their meaning and example of each.

(c) Explain the use of all conditional statements and program loop with help of an example, available in 'C' programming.

(d) The End Semester Examination results of 100 students are tabulated as follows :

Roll No.	Subject 1	Subject 2	Subject 3
⋮			

Write a program in 'C' using array to read the data and determine the following (assume max. marks is 100 for each subject).

(i) Total marks obtained by each student.

(ii) The highest marks in each subject and the Roll No. of the student who secured it.

(e) What is a macro and how is it different from a C variable name ? Give the advantages of using macro definitions in a program. Explain conditional compilation and how does it help a programmer.

Section-C

Attempt *all* questions :

3. Attempt any *two* parts : 5×2=10

(a) Draw a neat labelled diagram of a digital computer and explain briefly each part.

(b) What is an operating system ? How does it act as a resource manager ? Briefly explain the terms multiprogramming and multithreading.

(c) Perform the following :

(i) $(786)_{10} \rightarrow (\ )_2$

(ii) $(10101.1101)_2 \rightarrow (\ )_8$

(iii) $(161)_8 \rightarrow (\ )_{10}$

(iv) $(11101001)_2 \rightarrow (\ )_{16}$

4. Attempt any two parts : 5×2=10

(a) If a five-digit number is input through the keyboard, write a program using modulus operator to calculate the sum of its digits.

(b) Given below the various storage class complete the following table :

Type of Storage Class	Storage	Default Initial Value	Scope	Life
1. Automatic				
2. Register				
3. External				
4. Static				

(c) A program has been compiled and linked successfully. When you run this program you face one or more of the following situations :

(i) Program executed, but no output

(ii) It produces incorrect answers.

(iii) It does not stop running.

What are the possible causes in each case and what steps would you take to correct them ?

5. Attempt any two parts : 5×2=10

(a) Write a program in 'C' to print the following :

A
B A
A B A
B A B A
A B A B A.

(b) Write a program using recursive function to calculate the factorial of a positive integer.

(c) Write a program in 'C' to find whether a given number is a prime number or not.

6. Attempt any *one* part : 10×1=10

(a) What are pointers ? Why are they required ? How do you declare and initialize them ? Write a program to read two integers x and y and swap the contents of the two variables x and y using pointers.

(b) Write short notes on the following :

(i) Dynamic array

(ii) Structure

(iii) Stack

(iv) Linked List.

7. Attempt any one part : 10×1=10

(a) Write a program that reads a string from the keyboard and determine whether the string is a palindrome or not.

(b) A file named DATA contains a series of integer numbers. Write a program to read these numbers and then write all 'odd' numbers to a file to be called ODD and all 'even' numbers to a file to be called EVEN.