Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (NEW)/SEM-2/CS-201/2011

2011

BASIC COMPUTATION AND PRINCIPLES OF COMPUTER PROGRAMMING

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks

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

GROUP A

(Multiple Choice Type Questions)

1. Choose the correct alter atives for the following : $10 \times 1 = 10$

   i) The purpose of mode r+ is to

      a) open for only reading

      b) open for only writing

      c) open for both reading and writing

      d) none of these.

   ii) Pointer is

      a) a variable containing the address of a variable

      b) a value

      c) a memory location

      d) none of these.

iii) A function may contain

a) one return statement

b) two return statements

c) more than two return statements

d) none of these.

iv) Which of the following is not used as secondary storage ?

a) Semiconductor memory

b) Magnetic discs

c) Magnetic drums

d) Magnetic tapes.

v) The ALU of computer normally contains a number of high speed storage elements called

a) semiconductor memory

b) registers

c) hard disc

d) magnetic disc.

vi) The register which contains the instructions that are two execute is known as

a) Index register

b) Instruction register

c) Memory address register

d) Memory data register.

vii) A 32 bit microprocessor has the word length equal to

a) 2 bytes b) 4 bytes

c) 1 byte d) 8 bytes.

viii) The union holds

a) one object at a time b) multiple objects

c) both (a) and (b) d) none of these.

ix) The minimum number of auxiliary variables required in a swap routine in C language to interchange two variables is

a) 0 b) 1

c) 2 d) indeterminate.

x) Language C uses

a) call by value b) call by reference

c) call by name d) none of these.

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. If K bytes are required to store a number in hexadecimal number system, find how many bytes will be required to store the number in binary number system ?

3. If C_1 and C_2 are two computer languages, what do you mean by the statement. "The level of language C_1 is higher than that of C_2." Is it possible to convert the language of a particular level into another language of other level ? If so, how ? If no, why ? 3 + 2

4. Write a program in *C* to compu e the average of a few input quantities with minimum use of storage variables, where the number of inputs is not known beforehand.

5. a) What is recur ion ?

   b) What do you mean by pointer arithmetic ? Explain with example. 2 + 3

6. a) Why do we use functions in programming ?

   b) Write a function prototype which accepts an integer, a float pointer, a string and a structure pointer as parameters.

   c) How do you access a structure variable through a structure pointer ? Explain with example. $1\frac{1}{2} + 1\frac{1}{2} + 2$

GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Explain two input Exclusive NOR gate using truth table. $2\frac{1}{2}$

   b) Why is NOR gate called universal gate ? $2\frac{1}{2}$

   c) Simplify :

   $(A + \overline{B})\cdot(A\cdot C) + (A\cdot\overline{B} + \overline{A}\cdot C)\cdot(\overline{A + D})$ 4

   d) Convert the following : 3×2

   i) $(2AD)_{16} = (\ )_2$

   ii) $(11100111\ 01)_2 = (\ )_{16}$

   iii) $(25\cdot125)_{10} = (\ )_2$.

8. a) Draw a block diagram of a computer and briefly explain its various components. Is it possible to realize a digital computer without a primary memory ? Justify. 5 + 3

   b) What is the significance of different levels of computer language ? 3

   c) Distinguish between complier and interpreter. 4

9. a) Allocate a two-dimensional array dynamically using pointers in C language. 5

b) What is the utility of break statement in loop ? Give an example. How is break statement different from an exit ( ) statement ? 2 + 2

c) Write a program in *C* to find a l the prime numbers in the range 10 to 100. 6

10. a) Write down the difference between malloc ( ) and calloc ( ). 2

b) What are auto, extern and static variables ? Explain their uses with suitable example. 6

c) Write a program to read a file and display its contents along with line number before each line. 7

11. a) What are the differences between recursion and iterations ? 3

b) Write a C program to print the following pattern (till *n* rows, where *n* is taken as input)

```
1
2 2
3 3 3
4 4 4 4
```

5

c) Create a structure to specify data on students give below :

Roll Number, Name, Department, Course, and Year of admission.

Assume tha there are not more than 450 students in collage.

Write a program to print names of all students who joined in a particular year. 7