ENGINEERING & MANAGEMENT EXAMINATIONS, DECEMBER – 2006

INTRODUCTION TO COMPUTING (COMPUTER PROGRAMMING WITH C)

(SEMESTER – 1)

Time : 3 Hours] [Full Marks : 70

GROUP – A

(Multiple Choice Questions)

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

i) Find out the output of following program segment :

```
main ( )
{
    int a, b, c ;
    b = 2 ;
    a = 2 * ( b + + ) ;
    c = 2 * ( + + b ) ;
}
```

a) $a = 4,\ c = 6$ b) $a = 3,\ c = 8$

c) $a = 3,\ c = 6$ d) $a = 4,\ c = 8.$ ☐

ii) In the following statement

fprintf (fpt, " %d ", i), the variable fpt is

a) a character variable b) a pointer to a file

c) a file variable d) arbitrarily assigned value. ☐

iii) How many times will the loop be executed ?

```
C1 = 'a' ;
while ( C1 > = 'a' && C1 < = 'z' )
    .C1 ++ ;
```

a) 25 b) 26

c) 0 d) 1. ☐

iv) If an array is used as a function argument, the array is passed

a) by value

b) by reference

c) array cannot be used as function argument

d) call by name. ☐

v) If integer needs 2 bytes storage, then maximum value of an unsigned integer is

a) $2^{16} - 1$ b) $2^{15} - 1$

c) 2^{16} d) 2^{15}. ☐

vi) Which of the following operators takes only integer operands ?

a) + b) *

c) / d) %. ☐

vii) Assume that $x = 50$. Then what is the value of y where $y = x == x++$; ?

a) 0 b) 1

c) 51 d) 50. ☐

viii) Register variables have the default value

a) garbage b) 0

c) 1 d) NULL. ☐

ix) The function func (n) = 1 + 2 + 3 + ... + n can be recursively written as

a) func (n) = func (1) + func (2) + ... + func (n)

b) func (n) = n + func ($n - 1$) , when $n > 1$

= 1 , when $n = 1$

c) func (n) = func ($n - 1$) + func ($n - 2$), when $n > 1$

= 1 , when $n = 1$

d) func (n) = func ($n - 1$) + 1, when $n > 1$

= 1 , when $n = 1$ ☐

x) If a two-dimensional array int a [10] [20] is represented as an array of pointers, then the element a [4] [5] can be denoted as

a) * (a + 4) + 5 b) * a [4] + 5

c) * (* (a + 4) + 5) d) * (a [4] + 5). ☐

GROUP – B

(Short Answer Questions)

Answer any *three* questions. $3 \times 5 = 15$

2. Define symbolic constant. During compilation process, what happens to symbolic constants that appear within C program ? Explain with an example. 2 + 3

3. a) What is function overhead ? Explain with an example. 3

   b) Differentiate between recursion and iteration. 2

4. a) Is it possible to pass a portion of an array to a function ? Illustrate with an example. 2

   b) What is the difference between '*x*' and "*x*" ? 2

   c) How is a two-dimensional array represented in memory ? 1

5. How can the indirection operation (*) be used to access multidimensional array element ? What are the diferences between structure and union ? 2 + 3

GROUP – C

(Long Answer Questions)

Answer any *three* questions. $3 \times 15 = 45$

6. a) The equation $x^2 + y^2 = r^2$ represents a circle which centres at origin and radius is *r*. Write a program that read *r* from the keyboard and print the number of points with integer co-ordinate that lie on the circumference of the circle. 5

   b) Write a program to print Pascal's triangle of the form : 6

```
        1
      1   1
    1   2   1
  1   3   3   1
.....................
.....................
```

   c) Write a program to find the transpose of a matrix. 4

7. a) What are the disadvantages of an array ? 3

   b) Write a program to insert an element (given by the user) into an array in a particular position (given by the user). 6

   c) Write two functions to implement the library functions using pointers — strcat ( ) and strrev ( ). 3 + 3

8. a) Explain the meaning of the following declarations :

   i) float (* *p*) [25] ;

   ii) int (* *p*) (char * *a*) ; 2

   b) Differentiate between call by value and call by reference. 5

   c) Define a structure called 'employee', to store information about an employee (e-no, e-name, basic-pay, DA, HRA and gross-pay). Write a program to input the e-no, e-name and basic-pay of several employees. The program will calculate the DA (65% of basic), HRA (15% of basic) and gross pay (Basic + DA + HRA) of all employees. Also display the details of the employee having the highest salary. 8

9. a) What do you mean by operator precedence and associativity ? 4

   b) Write a program in *C* to find the roots of a quadratic equation. Your program should print the imaginary roots in the form $a + ib$. 6

   c) Write a program in *C* to find the LCM of two integers. 5