

2006 INDIRA GANDHI NATIONAL OPEN UNIVERSITY (IGNOU) M.C.A

PROBLEM SOLVING AND PROGRAMMING

MCS-011(s)

Time : 3 hour

Marks : 100

Note : Question number 1 is compulsory. Answer any three questions from the rest.

1. (a) Design an algorithm, draw a corresponding flow chart and write a program in C, to print the output in the following format : (10)

```
1
2 1 2
3 2 1 2 3
4 3 2 1 2 3 4
5 4 3 2 1 2 3 4 5
```

(b) Write a loop that will calculate the sum of every third integer, beginning with $I = 2$ (i.e., calculate the sum of $2+5+8+11.i-\dots.j$, for all values of i that are less than 100. Write the loop in three different ways : (15)

- (i) Using 'while' statement
- (ii) Using 'do-while' statement
- (iii) Using 'for' statement

(c) Design an algorithm, draw a corresponding flow chart and write a program in C to convert a decimal number to its binary equivalent. (10)

(d) Explain 'Structure' and 'Union' with an example for each, with appropriate syntax. Further, explain the difference between them. (5)

2. (a) Summarize the use of the gets and puts functions to transfer strings between the computer and the standard input/output devices. Compare the use of these functions with the string transfer feature in the scanf and printf statements, with an example for each. (10)

(b) Write a program in C using structures to simulate a bill application for a super-market. (10)
Note : Assumptions can be made wherever necessary and should be listed.

3. (a) Write an interactive C program that will encode or decode a line of text. To encode a line of text, proceed as follows : (10)

- (i) Convert each character, including blank spaces, to its ASCII equivalent.
- (ii) To decode the text, convert its ASCII to its character equivalent.

(b) When can two matrices of order $a \times b$ and $c \times d$ be multiplied ? Also write a program in C to multiply two such matrices. (10)

4. (a) What is the relationship between an array name and a pointer ? How is an array name to be interpreted when it appears as an argument to a function ? Explain this with an example. (5)

(b) Write the usage of the following datatypes, with an example for each : (7)

- (i) enum
- (ii) typedef

(c) Write a function definition as well as a macro for the following : (8)

- (i) To find the cube of a given number
- (ii) To find the largest number among three given numbers.

5. (a) Without using the strcat function, write a program to append a string2 to a string1, and find the length of the resultant string. 10

(b) What are the various purposes of the library function feof ? How might the feof function be utilized within a program that updates an unformatted data file ? Explain this with an example. 10