

**M.Sc 1st Semester Examination, 2011**

**APPLIED MATHEMATICS WITH OCEANOLOGY  
AND COMPUTER PROGRAMMING**

**PAPER—MTM-104**

*( Introduction to Computing )*

*Full Marks : 50*

*Time : 2 hours*

**Answer Q. No. 1 and any four from the rest**

*The figures in the right-hand margin indicate marks*

**1. Answer any two questions : 2 × 2**

- (a) Write down the conversion rule of Gray to binary code. Using this convert the Gray code 10101111 to binary.
- (b) How can the 'getchar' function be used to read a multicharacter string ?

*( Turn Over )*

- (c) Write a program segment in C that will evaluate the following function :

$$\begin{aligned} y &= 4x + 100 \quad \text{for } x < 40 \\ &= 300 \quad \quad \quad \text{for } x = 40 \\ &= 5x + 150 \quad \text{for } x > 40 \end{aligned}$$

using else if statements.

2. (a) Using recursion technique, write a program in C to display the first 10 Fibonacci numbers, where

$$F_1 = 1, F_2 = 1, F_n = F_{n-1} + F_{n-2}, n > 2 \quad 4$$

- (b) What are the differences between 'while' and 'do-while' structures writing a program to find the sum of ten consecutive natural numbers. 5

3. (a) Write a program to find the average of  $n$  numbers using dynamic memory allocation. 4

- (b) Explain the concepts of pointer and pointer variable. How can a pointer variable be initialized? What is the relationship between an array and a pointer? 5

4. (a) A hamming code sequence is transmitted and due to error in one bit position the code 101101010 is received. Using four odd parity bits, locate the position of error if any and then correct it. 4
- (b) Write a program for printing all triplets  $(a, b, c)$  which satisfy the Pythagoras condition  $a^2 + b^2 = c^2$  lies between 1 and 50. 5
5. (a) "The normalised floating point representation is able to store a much wide range of numbers." Explain it. Find the value of  $0.1234 \times 10^3 + 0.4568 \times 10^2$  using a register with a capacity of six digits and a sign bit and the excess 50 form representation. 5
- (b) Write a switch statement that will examine the value of a char-type variable called colour and print one of the following messages, depending on the character assigned to colour : 4
- (i) RED if either  $r$  or  $R$  is assigned to colour.
- (ii) GREEN if either  $g$  or  $G$  is assigned to colour.
- (iii) BLUE if either  $b$  or  $B$  is assigned to colour.
- (iv) BLACK if colour is assigned any other character.

6. (a) Explain 'if-elseif' and switch statements and point out the difference between these two structures. 4
- (b) A file named DATA contains a series of integer numbers. Write a C-program to read these numbers and then write all odd numbers to a file to be ODD and all even numbers to a file to be called EVEN. 5
7. (a) What is meant by opening a data file ? How is this accomplished ? What is the purpose of the 'fclose' function ? Must a call to this function appear within a program that utilizes a data file ? What is the functions of 'fscanf' and 'fprintf' functions ? 5
- (b) A C program contains the following statements :

```
int i, j = 25 ;
int pi, * pj = & j ;
* pj = j + 5 ;
i = * pj + 5 ;
pi = pj ;
* pi = i + j ;
```

Suppose each integer quantity occupies 2 bytes of memory. If the value assigned to  $i$  begins at (hexadecimal) address F9C and the value assigned to  $j$  at address F9E then



(i) What value is represented by  $\&i$  ?

(ii) What value is represented by  $\&j$  ?

(iii) What value is assigned to  $pj$  ?

(iv) What value is assigned to  $*pj$  ? 4

8. (a) Write a program in C to find the largest number among  $n$  numbers not using array. 5

(b) Explain the use of the following string functions with proper arguments : 4

(i) `strlen`

(ii) `strcmp`

(iii) `strcat`

(iv) `strcpy`.

[ *Internal Assessment* : 10 Marks ]

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