M.Sc. 1st Semester Examination, 2013

APPLIED MATHEMATICS WITH OCEANOLOGY
AND COMPUTER PROGRAMMING

( Introduction to Computing )

PAPER—MTM-104

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 x 2

   (a) Express (−25) in (i) sign magnitude form, (ii) 1's complement form and 2's complement form using 8 bits register.

   (b) What will be the output of the following program and explain it :

       Void main()
       {
           int i;
           for (i=1; i++<=5; Print f("%d",i));
       }

   ( Turn Over )
(c) Perform BCA addition of the following numbers. Show result in BCD form. \(67 + 53 = ?\)

2. (a) What is an escape sequence? What is its purpose? Can escape sequences be included in a string constant? Explain how do string constants differ from character constants?

(b) Declaring two arrays A and B, write a program in C to find \(A \cup B\).

3. (a) Explain the parity method for error detection. Determine the single-error correcting code for the information bits 1101 using odd parity.

(b) Write a program to print first \(n\) natural numbers without using any loops.

4. (a) What is storage class? What types of storage class are available in C? Explain with examples.

(b) Write a program in C to display all prime numbers which are also Fibonacci numbers within a range given by you.

5. (a) Explain the general form of a user defined function in C and an example with justification.
(b) Write a C program to calculate the roots of the quadratic equation.

6. (a) How do we initialize the structure during declaration? Give an example. Explain the difference between two member access operators ‘.’ and ‘→’. What is a union? How does it differ from a structure?

(b) The value of \( \pi \) can be calculated from the infinite series

\[
\pi = 4 - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \frac{4}{11} + \cdots
\]

write a program to find out the number of terms which have to be used before first getting the value 3.1415.

7. (a) Simplify the Boolean function

\[
F(w, x, y, z) = \sum(1, 3, 7, 11, 15)
\]

with the don’t care conditions

\[
d(w, x, y, z) = \sum(0, 2, 5)
\]
(b) Explain Macro and Enumeration with suitable examples.

[ *Internal Assessment: 10 Marks* ]