M.Sc. 1st Semester Examination, 2010

APPLIED MATHEMATICS WITH OCEANOLOGY AND COMPUTER PROGRAMMING

(*Introduction to Computing*)

PAPER—MA-1104

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

```
void main()
{
int i;
for(i=1;i++<=5;printf("%",i));
}
```

(*b*) What is conditional operator ? Give example.

(*c*) Determine the decimal values of the signed binary numbers expressed in 1's complement:
11101000 and 00101011.

2. (*a*) Write a C-program that will generate a table of the first *n* integers and identify each as perfect, abundant or deficient. 4

(*b*) How can the getchar and putchar functions be used to read and write multicharacter strings ? 5

3. (*a*) What is the relationship between the address of a variable *v* and the corresponding pointer variable *pv* ? What is the purpose of the indirection operator ? What library function is used to allocate memory dynamically ? How is the size of the memory block specified ? What kind of information is returned by the library function ? 5

(*b*) Using structure to define a complex number. Write a C-program to multiply and add two complex numbers using functions. 4

4. (*a*) Write a program to find the sum of the digits of an integer number. 4

(*b*) What is structure ? How does a structure differ from an array ? How can structure variables be declared ? How are the members of structure variable assigned initial values ? How is a structure member accessed ? 5

5. (*a*) Write a C-program to find the median of an array of n floating point values. 4

(*b*) Simplify the Boolean function

$$F(w, x, y, z) = \Sigma(1, 3, 7, 11, 15)$$

with the don't care conditions

$$d(w, x, y, z) = \Sigma(0, 2, 5).$$ 5

6. (*a*) The value of π can be calculated from the infinite series

$$\pi = 4 - 4/3 + 4/5 - 4/7 + 4/9 - 4/11 + \ldots.$$

Write a C-program to find out the number of terms which have to be use before first getting the value 3.1415. 4

(*b*) What is meant by the storage class of a variable ? How many types of storage class specifications are available in C ? Explain each with example. 5

7. (*a*) Write a C- program to read *n* values from a data file and compute the average of these numbers and then store the result in an another data file. 4

(*b*) Explain the parity method for error detection. Determine the single-error correcting code for the BCD number 1001 (information bits) using even parity. 2 + 3

8. What is combinational circuit ? Design a switching circuit of a control unit for a chemical process in which temperature and pressure are the two variables to be controlled. The control is exercised by switching on or off a heater and by opening or closing a valve. The control rules are given below : 2 + 7

(*i*) If the temperature and pressure are in the normal range, switch off heater and close the valve.

(*ii*) If the temperature is normal, switch off the heater. Open the valve if the pressure is above normal and close it if it is below normal.

(*iii*) If the pressure is normal, close the valve. Turn on the heater if the temperature is below the normal and turn it off if the temperature is above normal.

(*iv*) If the pressure is above normal and the temperature is below normal open the valve, turn off the heater .

(*v*) If the temperature is above normal and the pressure is below normal, turn off the heater, close the valve.

(*vi*) If both temperature and pressure are above or below normal, ring an alarm and shut down the plant.

[*Internal Assessment* : 10 Marks]
