PG/IS/MTM-104/13

M.Sc. 1st Semester Examination, 2013

APPLIED MATHEMATICS WITH OCEANOLOGY AND COMPUTER PROGRAMMING

(*Advanced Programming in* C *and* MATLAB)

PAPER – MTM- 104

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

1. Answer any *five* questions from MATLAB : 1×5

(*a*) How two or more elements can be accessed in an array ?

(*b*) What do you mean by length of a matrix ?

(*c*) How one or more rows can be deleted from a matrix ?

(*d*) How can you change the display of a floating point number from the command window ?

(*e*) What is right division ?

(*f*) Express $\frac{(-1)^n x^{n+2m}}{m!(n+m)!}$.

(*g*) Express $\frac{e^{|x|\log_2 (y^2+5y+7)|}}{|\log_{10} (\lfloor y^3 \rfloor)|}$ in MATLAB.

2. Answer any *three* questions in MATLAB : 5 × 3

(*a*) Explain Relational and Logical operators with examples in MATLAB.

(*b*) (*i*) Find the product of the two polynomials

$2x^5 + 3x^4 + 4x^3 + 7x^2 + 6x + 5$ and $3x^4 - 8x^3 + 2x^2 - 5x + 7$

(*ii*) Given $x = [2, 7, 4, 8, 6, 10]$, what will be the values of y for the following relations

(*I*) $Y = x > 5$

(*II*) $Y = x$ (find $(x < 5)$)

(*III*) $Y =$ length (find $(x > 5)$)

(*c*) Explain two input function to read data from the keyboard.

(*d*) Write a script file to find the prime factors of a positive integer.

(*e*) Write a program to find the value of y from the following relation

$y(t) = 3t^2 - 2t + 6$ for $t < 0$

$= 4t^2 - 3t + 5$ for values of $t = -5$ to 5 at step size

$= 4t + 17$ for $t > 2$.

3. Answer any *five* questions from C language : 1×5

(*a*) What kind of information is represented by a pointer variable ?

(*b*) What is meant by opening a data file ? How is this accomplished ?

(*c*) What is the scope of register variables ?

(*d*) How is an enumeration defined ?

(*e*) What is the difference between fgets ( ) and gets ( ) ?

(*f*) What is the purpose of one's complement operator ?

4. Answer any *three* questions from C language : 5 × 3

(*a*) Write a program to arrange a list of numbers in ascending order using dynamic memory allocation.

(*b*) Write a program to copy the contents of a given source data file to a new destination file.

(*c*) What is a masking operation ? What is the purpose of each operand ? Which operand is the mask and how is it chosen ?

(*d*) Explain the C preprocessor and write one preprocessor directive for the following situation. If the symbolic constant BOOLEAN has been defined, define the symbolic constants TRUE and FALSE so that their values are 1 and 0 respectively, and negate the definitions of the symbolic constants YES and NO.

(*e*) (*i*) What is difference between malloc ( ) and calloc ( ) ? 1

(*ii*) Explain the following declaration
int (**pf*) (char * *a*, int * *b*). 1

(*iii*) What is difference between * *p* + + and *p* + + ? 1

(*iv*) What is the purpose of type def feature ? How is this feature used in structure declaration ? 2

[*Internal Assessment* – 10 Marks]