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PG CBCS
M.SC. Semester-I Examination, 2022
DEPARTMENT OF MATHEMATICS
PAPER: MTM 104
(ADVANCED PROGRAMMING IN C AND MATLAB)

Full Marks: 40 **Time: 2 Hours**

The figures in the right-hand margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

1. **Answer any <u>FOUR</u> questions from the following:** **4×2=08**
   a) What is pre-processor?
   b) Explain the left and right division in MATLAB
   c) What function is used in MATLAB to find the product of two polynomials? Illustrate this using following two functions $2x^5 + 4x^3 + 7x^2 + 6x + 5$ and $3x^4 - 8x^3 - 5x + 7$.
   d) What is enumeration?
   e) What is self-referential structure?
   f) Explain different types of bitwise operators.

2. **Answer any <u>FOUR</u> questions from the following:** **4×4=16**
   a) What is call by value & call by reference? Discuss with suitable example.
   b) Explain the relational and logical operations in MATLAB with examples.
   c) Explain the relational and logical operations in MATLAB with examples.
   d) The exponential power of x is approximately by the following infinite series $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots$ Write a program in MATLAB to find out how many terms will be sufficient in the right-hand side of the given expression to ensure that the result is within the 5% error of the exact value.
   e) Write a program in MATLAB to find the prime numbers between two specified numbers.
   f) How are more than one element accessed from an array? Write a program to find the value of a determinant. 2+2

P.T.O.

3. Answer any <u>TWO</u> questions from the following: **2×8=16**

a) Write a short note on following: 4X2=8

(i) fgetc()

(ii) fputs()

(iii) fprintf()

(iv) malloc()

b) (i) Describe the types of variables in MATLAB according to their scopes in two or more functions.

(ii) What are 'nargin' and'nargout' functions? To illustrate these, write a function to compute area of a square or volume of a cube depending on the number of input arguments. 4+4

c) (i) What are kind of information is represented by a pointer variable? What is relationship between the address of variable v and the corresponding pointer variable pv?

(ii) Write a program in C that will calculate the sum of every third integer, beginning with $i = 2$ for all values of i that are less than 100. Write the loop (1) using a *while* statement and (2) using a for statement. 3+5

d) (i) Write a program in C that will generate a table of values for the equation $y = 2e^{-0.1t}\sin(0.5t)$ where t varies between 0 and 60 . Allow the size of the t −increment to be entered as an input parameter.

(ii) In what way does an array differ from an ordinary variable. 5+3

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