

**PG (NEW) CBCS**  
**M.Sc. Semester-I Examination, 2018**  
**MATHEMATICS**  
**PAPER: MTM-104**  
(ADVANCED PROGRAMMING IN C AND MATLAB)

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

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| <b>1. Answer any four questions</b>                                                                                                                                                                                                                             | <b>4 × 2</b> |
| i. Write a program in MATLAB to find the sum of integers and fractional parts of a series of numbers.                                                                                                                                                           |              |
| ii. 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 $3x^4-8x^3-5x+7$ .                                                                                          |              |
| iii. What are the type of variables in MATLAB ? Explain each with example.                                                                                                                                                                                      |              |
| iv. Write down a short note on cell array.                                                                                                                                                                                                                      |              |
| v. Summarize the rules of assigning numerical values to enumeration constants. What default values are assigned to enumeration constants.                                                                                                                       |              |
| vi. What is the difference between <b>if</b> and <b>#if</b> in C?                                                                                                                                                                                               |              |
| vii. Discuss call by reference with suitable example.                                                                                                                                                                                                           |              |
| viii. Give an example using <b>continue</b> and <b>return</b> statement.                                                                                                                                                                                        |              |
| <b>2. Answer any four questions</b>                                                                                                                                                                                                                             | <b>4 × 4</b> |
| i. Write a program in MATLAB to add two arrays or two matrices.                                                                                                                                                                                                 |              |
| ii. “Division by a matrix is equivalent to multiplication by its inverse” – Explain it in MATLAB with example.                                                                                                                                                  |              |
| iii. How is multidimensional array defined in terms of an array of pointers? What does each pointer represent? How elements can be accessed in this case?                                                                                                       |              |
| iv. What is meant by low level programming? Suppose that v is signed 16 bit integer quantity whose hexadecimal value is 0x369c. Evaluate each of the following shift expressions (Utilize the original value of v in each expression)<br>$v << 4$<br>$v >> 4$ . |              |
| v. Write a C program to find factorial of a number using recursion.                                                                                                                                                                                             |              |
| vi. Write a short notes on following:<br>a. malloc()<br>b. free()                                                                                                                                                                                               |              |
| <b>3. Answer any two questions</b>                                                                                                                                                                                                                              | <b>2 × 8</b> |
| i. What is the function of feval()? Write a function in MATLAB to find a root of $f(x) = 0$ by Newton Raphson method checking for divergence to be modified so that error keeps on increasing for five continuous iterations.                                   | (2+6)        |
| ii. What is meant by opening a data file? How is this accomplished? Write a program in C to remove all the comments from a C source code. Note that C comments do not nest. A comment starts with /* and terminates with */                                     | (1+1+6)      |
| iii. Explain the different input function in MATLAB. Write a script in MATLAB to create a matrix of desired size from an array input using <b>scanf</b> function.                                                                                               | (2+6)        |
| iv. Write a program in C to sort a set of integers using bubble sort method with the help of pointers and functions.                                                                                                                                            | (8)          |

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**1. Answer any four questions** **4 × 2**

- ix. Write a program in MATLAB to find the sum of integers and fractional parts of a series of numbers.
- x. 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  $3x^4-8x^3-5x+7$ .
- xi. What are the type of variables in MATLAB ? Explain each with example.
- xii. Write down a short note on cell array.
- xiii. Summarize the rules of assigning numerical values to enumeration constants. What default values are assigned to enumeration constants.
- xiv. What is the difference between **if** and **#if** in C?
- xv. Discuss call by reference with suitable example.
- xvi. Give an example using **continue** and **return** statement.

**2. Answer any four questions** **4 × 4**

- vii. Write a program in MATLAB to add two arrays or two matrices.
- viii. “Division by a matrix is equivalent to multiplication by its inverse” – Explain it in MATLAB with example.
- ix. How is multidimensional array defined in terms of an array of pointers? What does each pointer represent? How elements can be accessed in this case?
- x. What is meant by low level programming? Suppose that v is signed 16 bit integer quantity whose hexadecimal value is 0x369c. Evaluate each of the following shift expressions (Utilize the original value of v in each expression)  
 $v << 4$   
 $v >> 4$ .
- xi. Write a C program to find factorial of a number using recursion.
- xii. Write a short notes on following:
  - a. `malloc()`
  - b. `free()`

**3. Answer any two questions** **2 × 8**

- v. What is the function of `feval()`? Write a function in MATLAB to find a root of  $f(x) = 0$  by Newton Raphson method checking for divergence to be modified so that error keeps on increasing for five continuous iterations. **(2+6)**
- vi. What is meant by opening a data file? How is this accomplished? Write a program in C to remove all the comments from a C source code. Note that C comments do not nest. A comment starts with `/*` and terminates with `*/`. **(1+1+6)**
- vii. Explain the different input function in MATLAB. Write a script in MATLAB to create a matrix of desired size from an array input using `scanf` function. **(2+6)**
- viii. Write a program in C to sort a set of integers using bubble sort method with the help of pointers and functions. **(8)**