

**M.Tech. IN ADVANCED INFORMATION
TECHNOLOGY – NETWORKING AND
TELECOMMUNICATION (MTECHTC)**

Term-End Examination

December, 2014

MINI-020 : PROGRAMMING METHODOLOGIES

Time : 3 hours

Maximum Marks : 100

Note :

- (i) *Section I is compulsory.*
- (ii) *In Section II, solve any five questions.*
- (iii) *Assume suitable data wherever required.*
- (iv) *Draw suitable sketches wherever required.*
- (v) *All programs are to be written in 'C' programming language.*

SECTION I

1. Compulsory question :

- (a) Write a 'C' program which will take a 24-bit bmp image (24 bits representing RED, GREEN, BLUE colours of a pixel) as input file and change the green bits to 0 and save it to another 24-bit bmp output file. The first 32 bytes of the input file should be unaltered as they are header bytes. 15
- (b) Write to program to calculate a sequence of 10 Fibonacci numbers tail recursively. 15

SECTION II

2. Write a 'C' program to implement a stack using an array using push and pop operations. 14
3. Write a program to compute the difference between two dates (dd/mm/yyyy) using structures to define the dates. 14
4. Write a 'C' program to read an array of a structure for storing the information of a student, his roll number, name, semester, and average marks. Sort the array in alphabetical order and print it. Also store the sorted names in a file. 14
5. Write a 'C' program to accept two alphabets and pass them to the function via pointers, which checks for the types of these alphabets. If both the alphabets are vowels, then the function returns their previous alphabets. If both the alphabets are consonants, then the function should return their successor alphabets. 14
6. Write a 'C' program to read a matrix and print the trace and normal of a matrix, (Trace is the sum of the main diagonal elements and normal is the square root of the sums of squares of all elements). 14

7. Write a 'C' program to accept the empcode, empname, basic_salary of the employees and compute their gross salary using the formula :

$$\text{Gross_salary} = \text{Basic_salary} + \text{DA} + \text{HRA}$$

(choose any DA and HRA).

If the Employee has completed more than 5 years in the organization, allocate him a bonus of ₹ 5,000.

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8. Write a 'C' program to implement a singly circular linked list, and perform basic operations to search, insert and delete a node.

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