Total No. of printed pages = 5

CT-3201/CM in CT/6th Sem/2013

COMPUTATIONAL METHODS IN CONSTRUCTION TECHNOLOGY

Full Marks – 100

Pass Marks – 30

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) What do you understand by the term 'computing'? State the different types of computing. 5

   (b) What are the different components of a computer? 5

   (c) Differentiate between low and high level languages with examples. 6

   (d) State the advantages of MATLAB over the other programming languages. 4

[Turn over

2. (a) Define algorithm. Explain with a suitable example. 5

(b) What do you understand by flow-chart ? State the six basic symbols commonly used in flow-chart. 5

(c) Design an algorithm and the corresponding flow-chart for adding the following values :

9, 8, 7, 6, 5, 4, 3, 2, 1, 0, –1. 10

3. (a) Write down the logical and relational operators in MATLAB for the following : 5

(i) less than

(ii) equal

(iii) greater than or equal to

(iv) not

(v) not equal.

(b) Explain what is displayed when you type the following MATLAB commands in sequence. 3×5=15

(i) >> A = [5 6 ; 7 8]

>> B = [3 6 ; 9 6]

>> A = = B

(ii) >> U = [1 1 ; 2 2]
>> V = [5 2 ; 1 1]
>> U < V

(iii) >> Z = 9 = = 10

(iv) >> P = [1 2 3 4 5]
>> Q = [6 7 8 9 10]
>> P (1) * Q (3)

(v) >> M = [–1 –1 0 ; 0 0 0 ; 1 –1 0]
>> format +
>> disp (M).

4. (a) Suppose

$$M = \begin{pmatrix} -2 & 0 & 1 \\ 0 & 1 & 0 \\ -1 & 1 & 0 \\ 1 & 0 & 1 \end{pmatrix}; \quad N = \begin{pmatrix} 0 & -1 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ -1 & 2 & -1 & 1 \end{pmatrix}$$

Which is MN ? NM ? What about M^{-1} ? 6

(b) What are the different types of loop control statements available in MATLAB ? Describe each with example. 12

(c) Write a script file in MATLAB m-file to display your roll number. 2

5. (a) Write down the meaning of the following MATLAB commands : 6

(i) clc (ii) clf (iii) clg

(iv) who (v) disp (vi) clock

(b) Write a function in MATLAB to find the area and volume of a circle. 6

(c) Write a script that plots sin (x) and cos (x) for x between 0 and 360° (2π - radian) on one graph.
Also includes a legend identifying each line. 8

6. (a) Write a program in MATLAB to find the bending moment and shear force of a cantilever of length 'l' and udl of w/unit length. 10

(b) Compare between script file and function file of MATLAB with example. 10

7. (a) Write a program in MATLAB to calculate the section modulus of a rectangular section of width 'b' and depth 'd'. 10

(b) If a = [0.12345678 1.02345689], then what will be the output of the following MATLAB commands ? 10

(i) disp (a)

(ii) format long ;

disp (a)

(iii) format short e ;

disp (a)

(iv) format long e ;

disp (a).