Total No. of Questions : 8] [Total No. of Printed Pages : 3

Roll No. .....

MCA–504–B(O)

M. C. A. (Fifth Semester) EXAMINATION, June, 2008

(Old Course)

SIMULATION AND MODELING

(Elective—I)

[MCA—504–B (O)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Define the following terms :
Systems, Entities, Attributes and Activities
Name the entities, attributes and activities of super market system. 4, 4

(b) What do you mean by system simulation ? What are main drawbacks of simulation technique ? 6

(c) Describe in brief *four* guiding principles used in system simulation. 6

2. (a) Draw a flowchart showing the steps involved in the progress of simulation study. Explain each step in detail. 10

(b) Give the compression of simulation and analytical method. 4

(c) Discuss numerical computation technique for continuous model. 6

P. T. O.

3. (a) What is distributed log model ? Draw Cob-Web model for the following market and final whether the market is stable or unstable ? In case stable, find the price where market will settle : 10

$$Q = 12 \cdot 4 - 1 \cdot 2P$$

$$S = 1 \cdot 0 + 0 \cdot 9P_{-1}$$

$$Q = S$$

$$P_0 = 1 \cdot 0$$

(b) Discuss the structure of CSMP III language to be used for the simulation of continuous system. 10

4. (a) Describe the working of an operational amplifier in analog simulation. Also discuss the advantages and disadvantages of analog simulation over digital simulation. 10

(b) Discuss exponential growth model. How does modified exponential growth model differs from this model ? 10

5. (a) What is the role of random numbers in system simulation ? Discuss multiplicative congruence generator method for generating random numbers. 10

(b) What are the limitations of inverse transformation method ? How the drawbacks of this method are rectified in rejection method ? 10

6. (a) Discuss the methods commonly used in modelling the passage of time in a simulation program. 6

(b) Discuss the principle involved in digital simulation of discrete system taking the example of telephone system with 10 lines and 4 links. Consider both lost calls and delayed calls system. 14

7. (a) Describe the symbol and format of any *four* blocks used in GPSS. 6

(b) Draw block diagram and develop a GPSS code for the bank teller system with the following parameters : 14

(i) No. of tellers : 4

(ii) Customer Arrival Rate : 1 to 3 minutes uniformly distributed

(iii) Teller Procesing Rate : 1 to 5 minutes uniformly distributed

(iv) Time required for customer to enter in the line : 1 minute

(v) Termination condition : 8 hrs.

8. Write short notes on any *four* of the following :

(a) SNA

(b) Priorities and Parameters

(c) Monte-Carlo method

(d) Dynamo language

(e) Digital-Analog simulators

(f) Classification of simulation languages

Total No. of Questions : 8] [Total No. of Printed Pages : 2

MCA–505(D)

M. C. A. (Fifth Semester) EXAMINATION, Dec., 2006

ENTERPRISE RESOURCE PLANNING

(Elective—II)

[MCA—505(D)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Answer any *five* questions.

1. (a) What are business functions in an organization ? 5
   (b) What is productivity and range of its values ? Why it can't be less than one ? 5
   (c) What is the role of forecasting in planning ? 5
   (d) What is scheduling and shop floor control ? 5

2. (a) What are primary and supportive processes in value chain and what type of software are presently available for those processes ? 10
   (b) Draw a flow diagram for sales order fulfilment. 10

3. (a) What are the problems with traditional functional view of a system ? 10
   (b) What is integrated cross functional view ? 10

4. (a) Why information is considered as resource ? What are four M for production processes ? What is meta resource ? 10

P. T. O.

(b) What are important advantages of ERP ? 10

5. (a) What is evolution view of Management Information System ? 5

(b) What is hierarchical view of Management Information System ? 5

(c) What are structured and unstructured decisions ? 5

(d) Whether ERP provide support for unstructured decisions ? 5

6. (a) Explain process of Material Requirement Planning. 10

(b) What technologies are required for successful functioning of ERP ? 10

7. (a) What is inertia in change process ? What is BPR and how it helps in ERP ? 10

(b) Why many of initial ERP implementations failed ? What are different methods of implementing new software ? 10

8. Write short notes on any *two* of the following : 10 each

(i) End user involvement in ERP project

(ii) Strategic use of ERP

(iii) Evaluation of ERP software

(iv) Important modules of ERP packages

Total No. of Questions : 8] [Total No. of Printed Pages : 2

MCA–505(C)

M. C. A. (Fifth Semester) EXAMINATION, June, 2007

DATA WAREHOUSING AND MINING

(Elective – II)

[MCA – 505 (C)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Discuss the overall architecture of data warehouse. 10

   (b) Explain the following components of data warehousing : 10

   (i) Data warehouse DBMS

   (ii) Acquisition, cleanup and transformation tools

   (iii) Query and reporting tools

   (iv) Metadata

2. (a) Explain star schema. What are the problems with star schema design ? When snow flake schema is useful ? 10

   (b) Explian star join and star index. 10

3. (a) What are the classification rules and how are decision trees related to them ? 10

P. T. O.

(b) When does decision tree stop growing ? Why would a decision tree algorithm prevent the tree form growing if there weren't enough data ? 10

4. (a) Explain the need of OLAP. Explain various OLAP tools. 10

(b) Differentiate between MOLAP and ROLAP. 10

5. (a) When is Association Rule analysis useful ? What is the basic process of mining association rules ? 10

(b) What is Clustering ? Explain Agglomeration method for cluster detection. 10

6. (a) What do you mean by nearest neighbour ? What is the difference between nearest neighbour and cluster ? How is clustering different from classification ? 10

(b) Explain hierarchical and non-hierarchical clustering. 10

7. (a) Describe neural network and genetic algorithm as technique for data mining. 10

(b) What are the five types of knowledge produced from data mining ? 10

8. Write short notes on any *four* of the following : 20

(i) Architecture of data mining

(ii) Data cubes

(iii) Spatial databases

(iv) Processing of DLAP queries

(v) Operational databases

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–505(B)

M. C. A. (Fifth Semester) EXAMINATION, June, 2007

DESIGN ANALYSIS AND ALGORITHM

(Elective–II)

[MCA–505(B)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) How can we modify almost any algorithm to have a good best case running time ? 6

   (b) List the following functions from lowest order to highest order : 8

   $$2^n, n \log n, \ln(n), \lfloor n, n^3, n - n^3 + 7n^5$$

   Give the justification.

   (c) How to produce a complete analysis of the computing time of an algorithm ? 6

2. (a) Distinguish between divide and conquer, greedy and branch and bound techniques of algorithm design. 6

   (b) What are the drawbacks of sequential search algorithm ? How they are minimized or removed in binary search algorithm ? 6

   (c) What are the principles of greedy technique ? Discuss *one* algorithm with example based on this technique. 8

P. T. O.

3. (a) Write quick sort algorithm and do its average behaviour analysis. Complexity of your algorithm must be approximately $1 \cdot 4 (n + 1) \log (n)$ for n keys in the list. Justify your claim. 10

(b) Write an algorithm to find both smallest and largest element in a list of n entries. Find the complexity of your algorithm. 10

4. (a) Suppose an array of numbers to be sorted by heapsort initially contains the following sequence of numbers :

7, 9, 24, 13, 31, 8, 82, 18, 44, 5, 63, 29

Show how they would be arranged after the heap construction ? Find the key comparison done in putting these keys in a heap. 10

(b) What is the 8-queen problem ? What is its memory requirement ? 10

5. (a) Write an algorithm using greedy technique to generate shortest paths. Use this algorithm to obtain in increasing order the length of the shortest paths from the vertex a to all remaining vertices in the following diagraph. 10

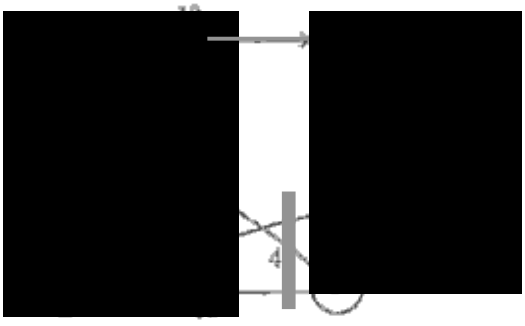

Fig. 1

(b) What is the Boyes-Moore algorithm for string matching ? Analysis this process. 10

6. (a) How does Strassen's matrix multiplication achieve improvement over conventional divide and conquer technique of matrix multiplication ? Determine time complexity of Strassen's matrix multiplication. 10

   (b) Outline breadth first and depth first search strategies for traversing diagraph. Use these strategies in given diagraph to find the order of traverse. 10

Fig. 2

7. (a) Write any formal parallel sorting algorithm. Analyse your algorithm for both, its speed and its cost. 10

   (b) Explain the performance measures parameters of parallel algorithm. 5

   (c) How many programming languages do not permit the use of recursion ? How the recursion of algorithm can be removed ? 5

8. Write short notes on any *four* of the following : 5 each

   (i) Asymptotic Behaviour of functions

   (ii) Branch and bound techniques

   (iii) Binary Fan-in Technique

   (iv) Horner's method

   (v) Merge sort and Quick sort

   (vi) Models of parallel computers

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–505(A)

M. C. A. (Fifth Semester) EXAMINATION, June, 2007

PARALLEL COMPUTING

(Elective – II)

[MCA – 505(A)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Prove that if (1/k)th of the time spent executing an algorithm involves operations that must be performed sequentially, then an upper limit on the speed up achievable by executing the algorithm on parallel processors is *k'*.

   (b) Show how to perform the perfect shuffle network's exchange operation on a de Bruijn network.

2. (a) Devise an O ($\log^2 n$) PRAM algorithm to sort a list of n distinct elements.

   (b) Why is it unrealistic to expect to solve an NP-Complete problem on the PRAM in polylogarithmic time, using a polynomial number of processors.

P. T. O.

3. (a) What are the advantages and disadvantages of moving from the UMA multiprocessor model to the NUMA multiprocessor modle ?

   (b) Devise rules for embedding a ring into a 3-D mesh with dilation 1.

4. (a) Is it possible for the average speed up exhibited by a parallel algorithm to be superlinear ?

   (b) What is the lower bound on the complexity of a parallel algorithm to find the sum of $n = l^3$ integers on a processor array that is organised as a 3-D mesh ? Assume that initial value are distributed evenly among the processing elements.

5. (a) Determine the processor efficiency of the hypercube SIMO matrix multiplication algorithm as a function of the matrix dimension n

   (b) Devise a parallel FFT algorithm suitable for implementation on a UMA multi-processor.

6. (a) Describe a way to reduce the communication overhead of the row-broadcast step of the parallel Gaussian elimination algorithm by overlapping some of the communication with computation. 14

   (b) Prove or disprove : All sequences containing fewer than four elements are biotonic sequences. 6

7. (a) Given an $n \times n$ 2-D mesh SIMD model containing a sorted list of n^2 items and $n \log n$ items to search for. What is the time needed to complete all $n \log n$ searches ?

   (b) Why is the number of trees in Sollin's algorithm reduced by at least a factor of 2 every iteration ?

8. Write short notes on any *four* of the following : 5 each

(i) Asynchronous algorithm

(ii) MIMD algorithms

(iii) Lower bounds on sorting

(iv) Odd-even reduction

(v) Processor array algorithms

(vi) Prefix-sum algorithm

Total No. of Questions : 5] [Total No. of Printed Pages : 3

MCA-504-E(N)

M. C. A. (Fifth Semester)
EXAMINATION, Nov.-Dec., 2007

(New Scheme)

.NET TECHNOLOGY

(Elective – II)

[MCA – 504–E (N)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt all questions. All questions carry equal marks.

Unit – I

1. (a) Describe .NET Framework with their components (CTS, CLS, CLR). 10

   (b) What do you mean by .NET Security Model ? 10

Or

   (a) Write down Microsoft .NET versions released upto 2007 with version name, version number, release date. 10

   (b) Explain Assembly with their nature and roles. 10

Unit – II

2. (a) Explain VB .NET Development Environment with their new features. 10

P. T. O.

(b) Explain the following with VB .NET program : 10

(i) Short circuit operators

(ii) Option keywords

Or

(a) Explain the syntax of loop statement in VB .NET programming with program. 10

(b) How to use function, procedure and module in VB .NET ? 10

Unit–III

3. (a) How to use Exception Handling in VB .NET ? Write a simple program with exception handling. 10

(b) Write a program in VB .NET for complex structure with data member real, image and appropriate member function. 10

Or

(a) Write down the list of collection object provided by .NET. Write a program to implement stack. 10

(b) Write short notes on any *two* of the following : 5 each

(i) Types, structure and enumeration

(ii) Boxing

(iii) Inheritance modifier

Unit–IV

4. (a) Explain class design pattern in brief. 10

(b) Write namespaces and their respective classes which are used for Data processing and I/O. 10

Or

(a) Write down members of String class and String builder class. 10

(b) Write short notes on the following : 5 each

(i) Adapter

(ii) Delegate

Unit–V

5. (a) Write down the features of ASP .NET and C # .NET. 10

(b) Write a VB .NET program to create and control MDI form and child form using menu. 10

Or

(a) Write a VB .NET program for simple calculator using the method that handle the events of all controls (Control Array Concept). 10

(b) Explain the following in reference to user interface in VB .NET : 10

(i) Group control in VB .NET

(ii) Menu control, Dialog controls

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–504(B)

M. C. A. (Fifth Semester) EXAMINATION, Dec., 2006

SIMULATION AND MODELLING

(Elective – I)

[MCA—504(B)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. Differentiate between the following :
   (i) Simulation *vs.* Analytic method
   (ii) Analog *vs.* Digital simulation
   (iii) Static *vs.* Dynamic systems
   (iv) Random numbers *vs.* Pseudo random numbers

2. (a) What do you understand by Modelling ? What are the principles used in modelling ? Describe any *one* model in detail.
   (b) Draw the cobweb model for the following unstable conditions :

$$Q = 12 \cdot 4 - 1 \cdot 2\,P$$

$$S = -2 \cdot 4 - 1 \cdot 2\,P_{-1}$$

P. T. O.

3. (a) Solve the following equations :

$$3\dddot{x} + 15\ddot{x} + 50\dot{x} + 200x = 10$$

$$\dddot{x} = \ddot{x} = \dot{x} = x = 0 \text{ at } t = 0$$

(b) What do you mean by discrete distributions ? How one can generate it ? Explain with the help of an example.

4. (a) Calculate the probability of there being n arrivals ($n = 0, 1 \ldots 10$) in an interval of 10 seconds when arrivals have a Poisson distribution with a mean value of 0·4.

(b) Give *three* examples of Poisson distribution and normal distribution where you prefer which distribution and why ?

(c) What do you mean by significant event simulation ? Explain with the help of an example.

5. (a) Name three or four of the principle entities, attributes and activities to be considered if you were to simulate the operation of a cafeteria.

(b) What are the desirable properties of random numbers ? Discuss the frequency and auto-correlation test.

6. Draw the block diagram for the simulation of any *one* system which uses communication techniques using GPSS. How standard numerical attribute increase the flexibility of GPSS model ?

7. Illustrate the principles involved in the digital simulation of discrete system taking *one* example of telephone system including all the cases.

8. Write short notes on any *four* of the following :
   (a) CSMP III language
   (b) Dynamo language
   (c) Rejection method
   (d) Monte-Carlo technique
   (e) Stochastic variables
   (f) Classification of simulation languages

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–504(B)

M. C. A. (Fifth Semester)
EXAMINATION, May/June, 2006
SIMULATION AND MODELLING
(Elective—I)

[MCA—504 (B)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) What is simulation ? Discuss the pros and cons of simulation technique. 5

   (b) What do you mean by system modelling ? What are the steps used in modelling ? Explain with the help of *one* example. 10

   (c) Describe in brief four guiding principles used in system simulation. 5

2. (a) Draw a flowchart to show the steps involved in the progress of simulation study. Explain each step. 10

   (b) What principle is used in Monte-Carlo method ? Describe main steps employed in the method taking *one* example. 10

P. T. O.

3. (a) What do you mean by random numbers ? What are the different methods of generating random numbers ? Discuss *one* method in detail. 1, 2, 7

   (b) What is analog simulation ? What are its advantages and disadvantages over the digital simulation ? 4, 6

4. (a) Differentiate between distributed lag model and Cobweb model. 5

   (b) Draw Cobweb model for the following market :

$$D = 10 \cdot 0 - 1 \cdot 2\,P$$

$$S = 7 \cdot 0 - 0 \cdot 7\,P_{-1}$$

$$P_0 = 0 \cdot 5$$

   Find the status of the market. 10

   (c) Give the two situations where rejection method is feasible and why. 5

5. (a) Discuss modified exponential growth model. Indicate the advantages of logistic curves taking *one* example. 5, 5

   (b) Discuss the structure of CSMP III language to be used for continuous system simulation. Describe *four* functional blocks used in this language. 6, 4

6. Discuss GPSS and draw block diagram of simulation of super market model using GPSS. Also create the coding for complete model (make suitable assumptions). 5, 8, 7

7. (a) Illustrate the principles involved in the digital simulation of discrete system taking *one* example of telephone system including all the cases. 12

   (b) What are the methods commonly used in modelling the passage of time in simulation ? Discuss any *one* method. 3, 5

8. Write short notes on any *four* of the following : 5 each

(a) SNA

(b) Continuous *vs* Discrete system modelling

(c) Simulation languages

(d) Simulation *vs* Analytical method

(e) System dynamics

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–504(B)

M. C. A. (Fifth Semester) EXAMINATION, Dec., 2005

SIMULATION AND MODELLING

(Elective – I)

[MCA – 504(B)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Name the main principal entities, attributes and activities to be considered if you were to simulate the operation of a cafeteria. 10

   (b) What are the various factors which force one to use the simulation ? 10

2. (a) Use a Cobweb model to investigate a market in which the supply and demand functions are :

$$D = \frac{17 \cdot 91}{p^{1/2}} - 4 \cdot 66$$

$$9S = 5 \cdot 0 (P_{-1} - 1)$$

   Assume the market is always cleared. 10

   (b) What are the different types of system study ? Explain each of them with the help of an example. 10

P. T. O.

3. (a) What do you understand by System Dynamics Diagrams ? Explain with the help of an example. 10

(b) Differentiate between the following : 10

(i) Random Numbers and Pseudo Random Numbers

(ii) Discrete Probability and Continuous Probability function

4. (a) Calculate the probability of there being n arrivals ($n = 0, 1, ..., 10$) in an interval of 10 seconds when the arrivals have a Poisson distribution with a mean value of 0·4. 10

(b) Explain the following terms with the help of an example : 10

(i) Significant event simulation

(ii) Trace driven simulation

5. (a) Give the block diagram symbols of GPSS for the following : 5

(i) Seize

(ii) Terminate

(iii) Queue

(iv) Unlink

(v) Leave

(b) Draw the block diagram for the simulation of a Telephone system using GPSS. Also create the coding for the complete model. 15

6. (a) Solve the following equation :

$$3\dddot{x} + 15\ddot{x} + 50\dot{x} + 200x = 10$$

$$\dddot{x} = \ddot{x} = \dot{x} = x = 0 \text{ at } t = 0$$

Derive a CSMP III program for the above equation. 10

(b) Differentiate between the following : 10

(i) Exponential and modified exponential growth model

(ii) Simulation *vs.* Analytical method

7. (a) Define the following terms with the example :

(i) Endogenous

(ii) Exogenous

(b) In general, what are the statistics required by most simulation programming systems.

(c) Differentiate between simultaneous and conditional events. 20

8. Write short notes on any *four* of the following : 5 each

(a) Dynamo Language

(b) CSSLS

(c) Monte-Carlo method

(d) Rejection method

(e) Classification of simulation language

(f) System modelling

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MCA–505(D)

M. C. A. (Fifth Semester) EXAMINATION, Dec., 2005

ENTERPRISE RESOURCE PLANNING (ERP)

(Elective – II)

[MCA – 505(D)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Explain various Business functions in an organization.
   (b) What are the various factors influencing productivity ?

2. Explain the problems of traditional business functions which forces for integrated process view, taking example of any *one* business organisation.

3. (a) Explain Information Technology plan for ERP.
   (b) Discuss the stage in the growth cycle of business and the role of Management Information System (MIS) in each stage.

4. (a) Explain the benefits of EDI process.
   (b) What is Executive Information System (EIS) ? What kind of decisions EIS would support ?

P. T. O.

5. (a) What is MRP ? Explain three inputs of MRP.
   (b) Explain data warehouse and Data Mining Techniques.

6. (a) Describe Pre-implementation issues of ERP.
   (b) What are the different ways of Performance Measurement of ERP implementation in an organisation ?

7. (a) How can ERP improve a company's business performance ?
   (b) What are the hidden costs of ERP ?

8. Write short notes on any *four* of the following :
   (i) Motivation for ERP
   (ii) Finance Module of ERP
   (iii) Business Process Re-engineering (BPR)
   (iv) Post-implementation issues of ERP
   (v) Client-Server Architecture
   (vi) ERP Project Management

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–504(A)

M. C. A. (Fifth Semester) EXAMINATION, Dec., 2005

COMPILER DESIGN

(Elective – I)

[MCA – 504(A)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Explain briefly the four important phases of compilation. Give the use of symbol table in compilation. 10

   (b) What is LEX ? Discuss its usage in lexical analysis. 10

2. (a) Define a regular expression. Write the algorithm for converting a regular expression into NFA. 10

   (b) What are ambiguous grammars ? How can these ambiguities be eliminated ? Explain with suitable illustrations. 10

3. (a) Discuss the algorithm for converting NFA into DFA. 10

   (b) Distinguish between top-down parsing and bottom-up parsing techniques. 10

P. T. O.

4. (a) The grammar

$$S \rightarrow a\,Sa \mid aa$$

generates all even length strings of *a*'s except for the empty string.

(i) Construct a recursive-descent parser with backtracking for this grammar that tries the alternative *asa* before *aa*. Show that the procedure for S succeeds on 2, 4 or 8 *a*'s but fails on 6 *a*'s.

(ii) What language does your parser recognize ? 10

(b) Define handle. Why are handles needed in bottom-up parsing ? How can you identify an handle in operator precedence parsing algorithm ? Give an example. 10

5. Consider the following grammar :

$$E \rightarrow E + E$$

$$E \rightarrow E * E$$

$$E \rightarrow (E)$$

$$E \rightarrow id$$

Parse the following string and draw the parse tree :

$$id + id * id$$

using :

(a) Bottom up Parsing with stack

(b) Predictive Parsing 20

6. (a) What is code optimization ? Why is it needed ? Explain briefly the loop optimization and folding processes. 10

(b) How can left recursions be eliminated in top-down parsing ? Explain recursive descent parsing with illustrations. 10

7. (a) Write an algorithm for calculation of LEADING and TRAILING sets. Where do you require the calculation of these sets ? Consider the following grammar : 10

$$S \rightarrow a \mid \wedge \mid (T)$$

$$T \rightarrow T, S \mid S$$

Compute LEADING and TRAILING for above grammar.

(b) Discuss error detection and recovery techniques for semantic errors with illustrations. 10

8. Write short notes on the following :

(a) YACC

(b) LL (1) Grammar

(c) Memory allocation in compilation process

(d) First and follow operations

Total No. of Questions : 8] [Total No. of Printed Pages : 3

MCA–504(B)

M. C. A. (Fifth Semester) EXAMINATION, Dec., 2005

SIMULATION AND MODELLING

(Elective—I)

[MCA—504(B)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Name the main principal entities, attributes and activities to be considered if you were to simulate the operation of a cafeteria. 10

   (b) What are the various factors which force one to use the simulation ? 10

2. (a) Use a Cobweb model to investigate a market in which the supply and demand functions are :

$$D = \frac{17 \cdot 91}{p^{1/2}} - 4 \cdot 56$$

$$9 S = 5 \cdot 0 (P_{-1} - 1)$$

   Assume the market is always cleared. 10

   (b) What are the different types of system study ? Explain each of them with the help of an example. 10

P. T. O.

3. (a) What do you understand by System Dynamics Diagrams ? Explain with the help of an example. 10

(b) Differentiate between the following : 10

(i) Random Numbers and Pseudo Random Numbers

(ii) Discrete Probability and Continuous Probability function

4. (a) Calculate the probability of there being n arrivals ($n = 0, 1, ..., 10$) in an interval of 10 seconds when the arrivals have a Poisson distribution with a mean value of 0·4. 10

(b) Explain the following terms with the help of an example : 10

(i) Significant event simulation

(ii) Trace driven simulation

5. (a) Give the block diagram symbols of GPSS for the following : 5

(i) Seize

(ii) Terminate

(iii) Queue

(iv) Unlink

(v) Leave

(b) Draw the block diagram for the simulation of a Telephone system using GPSS. Also create the coding for the complete model. 15

6. (a) Solve the following equation :

$$3\dddot{x} + 15\ddot{x} + 50\dot{x} + 200x = 10$$

$$\dddot{x} = \ddot{x} = \dot{x} = x = 0 \text{ at } t = 0$$

Derive a CSMP III program for the above equation.

10

(b) Differentiate between the following : 10

(i) Exponential and modified exponential growth model

(ii) Simulation *vs.* Analytical method

7. (a) Define the following terms with the example :

(i) Endogenous

(ii) Exogenous

(b) In general, what are the statistics required by most simulation programming systems.

(c) Differentiate between simultaneous and conditional events. 20

8. Write short notes on any *four* of the following : 5 each

(a) Dynamo Language

(b) CSSLS

(c) Monte-Carlo method

(d) Rejection method

(e) Classification of simulation language

(f) System modelling