NALANDA OPEN UNIVERSITY
Master of Computer Application
Part–III, Paper–XXI
(MCS-41 : Operating System)
Annual Examination, 2011

Time : 3 Hours. **Full Marks : 80**

Answer any five Questions.
All questions carry equal marks.

1. For the given five processes arriving in the order of the length of CPU time in millisecond :

Process	CPU time
P1	9
P2	5
P3	4
P4	3
P5	6

   Consider SJF, FCFS and RR scheduling algorithms for the above processes. Which algorithm will give minimum Average Turn around time and why ?

2. A system contains 10 units of resource R1. The resource requirement of 3 user processes P1, P2, P3 can be summarized as :

	P1	P2	P3
Max. Requirement	8	6	5
Current Allocation	4	1	4

   Is the current allocation state feasible and safe? Apply Banker's Algorithm to check it. If a new request of (2, 1, 0) arises, check whether it will be granted or not using Banker's Algorithm ?

3. Compare and contrast the architecture of WINDOWS OS with UNIX OS. Explain what causes the thrashing ? Suggest the mechanism to avoid the thrashing.

4. Discuss Lamport's Algorithm in distributed system. Estimate the cost of communication of Lamport's algorithm.

5. How is booting done in WINDOWS 2000 operating system ? Explain windows process and threads with the help of a suitable diagram.

6. What is a semaphore ? Give a solution to 'Readers - Writers' problem using semaphore. Explain the steps.

7. Explain different Disk scheduling algorithms with suitable diagrams for the given example. Starting cylinder is 100. In the direction of increasing cylinder number, cylinder request are :– **150, 180, 200, 100, 50, 55, 45, 60, 20**

8. With the help of diagrams, explain the concept of demand paging and demand segmentation. For a page Reference string as : 0, 1, 3, 7, 5, 4, 5, 0, 2, 5, 3, 8 and with three memory frames, calculate the no. of page faults using : **OPT & LRU** Page replacement algorithms.

9. Explain the implementation of RPC in a distributed system. Explain memory organization in UNIX. Draw appropriate diagrams.

10. Explain different types of Multiprocessor Interconnections? What is the significance of Time Consistency? Explain with an example.

● ● ●

NALANDA OPEN UNIVERSITY
Master of Computer Application
Part–III, Paper–XXII
(MCS-43 : Advanced Database Design)
Annual Examination, 2011

Time : 3 Hours.   **Full Marks : 80**

Answer any five Questions. All questions carry equal marks.

1. The ABC Bank offers five types of Accounts : loan, checking, savings, daily interest saving and money market. It operates a number of branches within the country. A client of the bank can have any number of accounts. Accounts can be self or a joint account. Draw an E-R diagram for the ABC bank identifying various entities, attributes and cardinality. Show meaningful relationships that exist among the entities. Translate the E-R diagram to schema Relational Model.

2. Explain the following protocols for concurrency control in transactions with the help of an illustration for each :—
   (a) Tree – protocol.   (b) Timestamp - Based Protocol**.**

3. With the help of a process diagram, explain the various tasks involved in the Knowledge Discovery in Databases (KDD) process. Explain the role of ODBC and JDBC with the help of an example.

4. What are multimedia databases (MMDBs) ? List some of the applications of MMDBs. Describe various contents of MMDBs. Also, mention the challenges in designing of MMDBs. Define Multi-valued dependencies and Join dependencies. Give an example of each.

5. State fourth and fifth normal form. Consider a relation R (A, B, C) with functional dependencies, (i) AB -> C; (ii) C -> A. Decompose the relation R into BCNF relations.

6. With the help of a diagram, explain the *reference* architecture of Distributed DBMS. How is this different from component Architecture of DDBMS ? Explain the following two ways to implement the object - oriented concepts in DBMS:
   (a) To extend the existing RDBMS to include object orientation.
   (b) To create a new DBMS that is exclusively devoted to OODBMS.

7. What is a (DW) Data Ware house? Explain the basic components of a DW. Consider a Supply Data of an organization having three dimensions as Supplier, Part and Project. Draw a star schema with supply as the fact table. Make suitable assumptions.

8. Explain the following in the context of ORACLE with examples :—
   Triggers,   Security,   Data Dictionary,   Indexing

9. With reference to special Databases and GIS explain the following :
   (a) Application of Geographic Databases.
   (b) Requirements of a GIS.
   (c) Operations on the data captured in GIS.

10. (a) Consider the following query :—
    SELECT Empld, EmpName, EmpAddress, DeptName, Designation,
    FROM Employee, Department
    WHERE Employee. DeptNo = Department.DeptNo
    AND Employee, Salary > 20000
    Create a query evaluation plan for the query given above. Make suitable assumptions about the relation and statistics.
    (b) Explain Cursors. Explain the role of cursors in Embedded SQL with the help of an example.

• • •

NALANDA OPEN UNIVERSITY
Master of Computer Application
Part–III, Paper–XXIV
(MCS-051 : Advanced Internet Technologies)
Annual Examination, 2011

Time : 3 Hours.   **Full Marks : 80**

Answer any five Questions. All questions carry equal marks.

1. What are the advantages of services over other common server extension mechanisms?

2. Explain different methods of service () method (of Servlet) to implement the request and response.

3. Explain web security with suitable examples. Explain the different procedure of Recovery after system failure.

4. What are the main functions of HTTP Servlet Response Interface? Explain the methods which are used to obtain cookies and querying from the request object.

5. Explain different types of JDBC drivers with their advantages and disadvantages. Create a custom JSP tag that accepts a name (first name and surname) and converts it as follows : —
   INPUT - brian mcduff
   OUTPUT - Brian McDuff

6. Write a MDB (Message Driven Bean) that calculates the monthly salary of an employee based on the attendance of the employee. Assume that you have EMP_ATT database available that contains the attendance of the employee.

7. Explain the steps of handling Database in JSP. What are various implicit objects used with JSP.

8. Discuss the advantages / disadvantages of EJB Architecture in terms of application management, security and inter operability. Explain the life cycle of a stateless session-bean and stateful session bean with diagram. Also discuss where we use which type of bean.

9. Why do we use DTD? Explain different components of DTD? Explain the advantages of XML over HTML.

10. Explain the various configuration properties of JMS based Message Driven Beans offered by EJB. What are basic characteristics of SGML?

● ● ●

NALANDA OPEN UNIVERSITY
Master of Computer Application
Part–III, Paper–XXV
(MCS-053 : Computer Graphics and Multimedia)
Annual Examination, 2011

Time : 3 Hours.   **Full Marks : 80**

Answer any five Questions. All questions carry equal marks.

1. What are the number of memory bits required for 8 - bit plane frame buffer for a 512 x 512 raster? Also calculate the refresh rate for the same raster (512 x 512), if Pixels are accessed at the rate of 250 nano seconds.

2. Differentiate between Random and Raster Scan display devices. Use DDA line generation algorithm to draw a line from (2, 2) to (8, 6).

3. Derive a general transformation matrix for 3-D rotation about x-axis. Perform a 45° rotation of a triangle A (1, 1), B (5, 1), C (3, 5) about an arbitrary point (3, 3).

4. Explain any one method of polygon .Representation with the help of an example. How many key frames does a 45 seconds animation film sequence with no duplications require if there are four in between frames for each pair of key frames?

5. What will happen if duplication is allowed? Why file Compression Techniques are beneficial in Computer Graphics ?

6. Write a procedure to implement the Bresenham line generation algorithm. What are the advantages of this algorithm over the DDA line generation algorithm ?

7. Differentiate between the following :
   (i)   Graphics and Animation
   (ii)   Drawing and painting
   (iii) Morphing and panning
   (iv)   Motion Specific animation and Motion Generalized animation

8. Explain all the four cases of Sutherland -Hodgman polygon clipping algorithm. Derive the 2-D transformation matrix for reflection about the line y= mx + c, where m and c are constants. Use this transformation matrix to reflect the triangle A (0, 0), B (4, 0) and C (4, 4) about the line y = 2x + 5.

9. Discuss different file formats used for multimedia applications. Explain the following with suitable diagram :—
   (i)   Ambient Reflection
   (ii)   Diffuse Reflection
   (iii) Specular Reflection

10. Explain z-buffer algorithm for visible surface detection. Explain the terms window and viewport in the context of clipping. Derive a general transformation matrix for window to viewport mapping.

● ● ●

NALANDA OPEN UNIVERSITY
Master of Computer Application
Part–III, Paper–XXVII
(MCSE-003 : Artificial Intelligence and Knowledge Management)
Annual Examination, 2011

Time : 3 Hours.   **Full Marks : 80**

Answer any five Questions. All questions carry equal marks.

1. (a) Mention three areas in which computers are better than human beings.
    (b) Explain briefly the following definition of Artificial Intelligence (A.I) given by Eline Rich by explaining the underlined technical terms involved in the definition:–
    "Artificial Intelligence is the study of techniques for solving *exponentially hard problems in polynomial time exploiting knowledge* **about the problem domain".**

2. Explain types of knowledge with suitable examples for each. Explain the difference between Prenex normal form and Skolem standard form.

3. (a) For each of the following sentences, tell whether it is a proposition/statement or not:–
        (i) The sun rises in the West.
        (ii) Please, give me a glass of water.
    (b) Transform the following into conjunctive normal form:
        (i) $(A \rightarrow B) \rightarrow R$ (ii) **(~A n B)v(A n~B)   (where n stands for AND operator).**

4. Define the following concepts, each with a suitable example:
    (i)   Sound Argument.   (ii)   Interpretation of a formula.
    (iii) Consistent formula.   (iv)   Disjunctive Normal Form.

5. Enumerate five characteristics of the programming language LISP. Define a function in LISP language that reads three numbers and returns the sum of the cubes of these numbers.

6. Using resolution method, solve the following logic problem.
    (i)   Some patients like all doctors.
    (ii) No patient likes any quake.
    (iii) Therefore, no doctor is a quake.

7. (a) Draw a Semantic Network for the representation of the following sentence :
        Albert struck Lucy in the garden with a sharp knife last month.
    (b) Construct Truth Table for the following formula:
        (~ (~P v Q) n (~Q v P)), Where P and Q are statement symbols.

8. (a) Transform the following into Disjunctive Normal Form:
        (P v Q) $\rightarrow$ R, Where **P, Q** and **R** are statement symbols.
    (b) Explain the terms Validity and Inconsistency of Propositions with examples.

9. Write short notes on : —
    (i)   Relation on Fuzzy sets.   (ii)   Operations on fuzzy sets.
    (iii) Non-monotonic Reasoning system. (iv)   Default Reasoning system.

10. (a) Translate the following statements into First Order Predicate Logic (FOPL):
        (i)   Everyone who saves money earns interest
        (ii) If there is no interest then nobody saves money
    (b) Write a recursive function in LISP that finds the factorial of n for a natural number n.
    (c) Represent the following statement in   PROLOG:
        Rita reads a book.

• • •

NALANDA OPEN UNIVERSITY
Master of Computer Application
Part–III, Paper–XXVIII
(MCSE-004 : Numerical and Statistical Computing)
Annual Examination, 2011

Time : 3 Hours.   **Full Marks : 80**

Answer any five Questions. All questions carry equal marks.

1. (a) Define,   (i) Floating Point,   (ii) Absolute error,
                     (iii) Relative error,   (iv) Truncation error.
    (b) Find the smallest positive root of $x^3 - 2x - 5 = 0$ correct upto 2 decimal places with the help of Bisection method.

2. (a) Find the smallest positive root of $x^7 + 9x^5 - 13x - 17 = 0$ with the help of Newton-Raphson method.
    (b) Use secant method to find the roots of the equation $f(x) = 0.5e^x - 5x + 2$.

3. Solve the following linear system of equations,
    $$x_1 + x_2 + x_3 = 3$$
    $$4x_1 + 3x_2 + 4x_3 = 8$$
    $$9x_1 + 3x_2 + 4x_3 = 7$$, using the Gauss elimination method.

4. Solve the following linear system of equations,
    $$2x + y + z = 5$$
    $$x + 3y + 2z = 4$$
    $$-x + y + 6z = 4$$, using the Gauss Seidel method.

5. (a) Evaluate the Integral $\int_0^6 (x^2 + x + 2)dx$ using Trapezoidal rule with $h = 1.0$.

    (b) Evaluate the Integral $I = \int_0^1 \frac{dx}{1 + x}$ using Gauss-Legendre three point formula.

6. Solve the initial value problem $u' = -2tu^2$ with $u(0) = 1$ and $h = 0.2$ on the Interval [0, 1] use the fourth order classical Runge-Kutta method.

7. Define Binomial distribution and Poisson distribution with examples.

8. In partially destroyed laboratory record of an analysis of correlation data, the following results only are legible.
    Variance of $x = 9$
    Regression equation $8x - 10y + 66 = 0$
                          $40x - 18y - 214 = 0$
    What were,   (i)   The mean values of x and y.
                      (ii) The correlation coefficient between x and y.
                      (iii) The standard deviation of y.

9. What is the accuracy of the following numbers ?
    (a) 95.763   (b) 0.008472   (c) 0.0456000
    (d) 36   (e) 3600.00

10. Given the following system of linear equations, determine the value of each of the variables using the *LU* decomposition method.
    $$6x_1 - 2x_2 = 14$$
    $$9x_1 - x_2 + x_3 = 21$$
    $$3x_1 - 7x_2 + 5x_3 = 9$$

● ● ●

NALANDA OPEN UNIVERSITY
Master of Computer Application
Part–III, Paper–XXIX
(Application Development with net Framework)
Annual Examination, 2011

Time : 3 Hours.   **Full Marks : 80**

Answer any five Questions. All questions carry equal marks.

1. What is .net Framework. How you build components in the .NET Framework. Explain giving suitable examples.

2. Explain various features of ASP.net 2.0. with suitable examples.

3. What is ADO.net. Explain various statements used in ADO.net

4. Design a Form and code in VB.net to store details of student in a database table.

5. Explain following terms:
    (a) Data binding controls
    (b) Personalization
    (c) Web Services
    (d) Garbage Collection

6. Explain different types of Server Controls with suitable examples.

7. (a) Give any 5 String-handling functions.
    (b) Explain 'Structured Exception Handling' with example.

8. (a) What is the difference between 'Sub Procedures' and 'Functions.
    (b) What is user control. Explain process of creating user control.

9. (a) Explain the life cycle of an ASP .net page.
    (b) What is Cookies? How does the cookies work in ASP.net

10. Design a form in ASP.net to Search Details of Given Customer from database.

● ● ●