M.Sc. IT (Part II) Examination, 2009

Operating Systems

Attempt any five questions. All questions carry equal marks.

1. (a) What is an operating system? Write down different goals of operating system.

   (b) Give in brief, the architecture of windows 2000.

2. Write short note on following:

   (a) Kernal based 0.5

   (b) Real time systems

   (c) Resource allocator

   (d) Virtual Machine 0.5

   (e) Process in Unix

3. (a) What do you understand by process scheduling with note on different types of process scheduling.

   (b) Give different scheduling algorithms in detail. Explain with example.

4. Explain following - (any two)

   (i)   Interprocess Communication

   (ii)   Critical Section Problem

   (iii)   Monitors & Semaphores

   (iv)   Structure of concurrent system

5. (a) What do you understand by logical and physical address?

   (b) Explain in brief different page replacement algorithm, Give example.

6. What is virtual memory. Explain paging and demand paging algoriyhm of memory management using virtual memory technique.

7. (a) Give the advantage and disadvantage of distributed 0.5 over centralized system.

(b) Explain in brief different security policies and encryption techniques in distributed system.

8. (a) Explain filter and pipe in Linux.

(b) Give different networking commands in Linux.

(c) Write a shell script in Linux to find whether hello.c file is exist in current directory. If yes remove these files, if not display our error message in a file named "result".

M.Sc. IT (Part II) Examination, 2009

Object Oriented Concepts and C++

Attempt any five questions. All questions carry equal marks.

1. What is object oriented programming? Explain the various features of object oriented paradigm.

2. Explain the following in C++ with example:

   (a) Friend function

   (b) Function overloading

   (c) Unary operators

   (d) Constructors

3. What is inheritance? Ecplain each type of inheritance with suitable example.

4. What is painter? Explain base class and derived class painters with example.

5. What is late binding? How can achieve run time polymorphism with virtual function.

6. Explain class template and function templates with example.

7. Write a program in C++ that convert infix to postfix notation.

8. Write an algorithm for bubble sort.

9. Explain shortest path algorithm of Kruskal and Prime.

10. Write a program in C++ for binary search.

M.Sc. IT (Part II) Examination, 2009

Computer Oriented Numerical Methods

Attempt any five questions. All questions carry equal marks.

1. (a) Define a matrix. Also give one example of each type:

   (i)   Diagonal matrix

   (ii)   Symmetric matrix

   (iii)   Upper triangular matrix

   (iv)   Lower triangular matrix

   (b) Find the adjoint of the matrix:

   $$A = \begin{bmatrix} 3 & 7 & -2 \\ 2 & 3 & 1 \\ 5 & 1 & 6 \end{bmatrix} \text{ if it exists}$$

   (c)

   $$\text{if } A = \begin{bmatrix} 3 & 7 & -2 \\ 2 & 3 & 1 \\ 4 & 5 & 9 \end{bmatrix}$$

   Find the (i) transpose of A (ii) trance of A.

2. (a) Given that one of the roots of the non linear equation $\cos(x) - xe^x = 0$ lies between 0.5 & 1.0 using false position method, find the root correct to three decimal place.

   (b) Derive the Newton-Raphson method to solve a system of non linear equation using Taylor's expansion & solve the root of the equation x2 - 3x + 2 in the vicinity of x=0.

   (c) Find a real root of the equation $f(x) = e^x - 4x = 0$ correct to three decimal places by the method of successive approximation taking initial approximation as 2.1

3. (a) What is Horner's rule & hence solve $f(x) = x^3 - 4x^2 + x = 6$ at x=2.

   (b) Find the root of the equation $x^2 - 4x - 10 = 0$ using Bisection method correct to three decimal digits.

4. (a) Apply Gauss-Elimination method to solve the equations

2x + 8y + 2z = 14

x + 6y - z = 13

2x - y + 2z = 5

(b) Write an algorithm for finding the solution of a system of linear equation using 'Gauss-Jordan method'.

5. (a) Solve the following the system of equation

10x + y + 2z = 44

2x + 10y + z = 51

x + 2y + 10z = 61

using Gauss-Seidal method of iteration correct to three significant digits.

(b) Using Jacobi's iteration method solve the system of equations

20x + y - 2z = 17

3x + 20y - z = -18

2x - 3y + 20z = 25

6. (a) Prove that

   (i) $(E^{½} + E^{-½})(1 + \Delta)^{½} = 2 + \Delta$

   (ii) $\Delta \left[\dfrac{1}{f(x)} \right] = \dfrac{\Delta f(x)}{f(x)f(x+1)}$

(b) Given the table of values as:

X	0	1	2	3
Y(x)	0	2	8	27

Find Y(2.5) using Lagrange's interpolation.

(c) The table gives the distance (in nautical miles) and height (in feet)

X=Height	100	150	200	250	300	350	400

Y(x)=Dist.	10.63	13.03	15.04	16.81	18.42	19.90	21.27

Find the values of y when (i) x=218 ft (ii) x=410 ft. Using Newton Forward and Backward difference interpolation formula.

7. (a) Interpolate by means of Gauss's backward formula, the population of a town for the year 1974, Given that

Year	1939	1949	1959	1969	1979	1989
Population	12	15	20	27	39	52

(b) Find the missing values in the table

X	45	50	55	60	65
Y	3.0	-	2.0	-	-2.4

8. (a) The velocity v (km/min) of a scooter which starts from rest id given at fixed interval of time (min.) as follows:

t	2	4	6	8	10	12	14	16	18	20
V	10	18	25	29	32	20	11	5	2	0

Estimate approximately, the distance covered in 20 minutes.

(b) Using Ranga-Kutta method of fourth order, solve-

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$$

with y(0) = 1 at x=0.2, 0.4

(c) Evaluate $\int_0^6 \frac{dx}{1+x^2}$

by using (i) Trapezoidal Rule (ii) Weddle's Rule and compare the result with actual value.

9. (a) State and prove Weddle's Rule

(b) Given $\frac{dy}{dx} = \frac{y-x}{y+x}$

with initial condition as y=1, at x=0; find y for x=0.1 by Euler's method

10. (a) Find f'(10) from the data

X	3	5	11	27	34
Y	-13	23	899	17315	35606

(b) Use Simpson's 1/3rd rule, find $\int_0^{0.6} e^{-x^2}\, dx$, by taking seven ordinates.

M.Sc. IT (Part II) Examination, 2009

Programming in Java

Attempt any five questions. All questions carry equal marks.

1. (a) Why Java is called an object oriented programming language? Discuss in detail.

   (b) How Java is differ from C++? Discuss.

2. (a) Java offers various types of data types, explain each in detail.

   (b) Write a program in Java to compute the transpose of a matrix.

3. Write short note on the following:

   (a) Constructors

   (b) Inheritance

   (c) Exception Handling

   (d) AWT

4. (a) Write a program to accept String and print it in reverse order and convert each character to its lower/upper character depending upon the input.

   e.g. Input: The Success lies in the Soul

   Output: LUOs EHT NI SEIL SSECCUs EHt

   (b) How the frame windows handled in Java?

5. (a) What is multi threading? Explain, with example each, how threads are created using:

   (i)   Thread Class

   (ii)   Runnable Interface

6. (a) What do you understand by JDBC? Write a sample code using JDBC.

   (b) Discuss the Java beans, Also explain the beans architecture.

7. (a) Explain the Java RMI architecture with the help of a diagram.

(b) Write a program in Java that reads characters from a file and count them until it encounters end of file. Make necessary assumptions, if any.

8. Differentiate between:

   (a) Interfaces and Packages

   (b) Distributed and Non-distributed programs

   (c) JDBC and ODBC

   (d) Overloading and Overriding

9. (a) What is a layout manager? Explain three layouts available in Java. Also write a code with explaination, to change the default layout of an applet to another layout.

   (b) What is an Applet? Write three advantages of applet programming. Also explain two differences between an applet and a servlet.

M.Sc. IT (Part II) Examination, 2009

Software Engineering

Attempt any five questions. All questions carry equal marks.

1. (a) What is a system? Discuss various characteristics of a system.

    (b) Discuss problems that occur while developing a system and suggest possible solutions.

2. (a) What are software matrices? What is the role of matrices in project and process management?

    (b) Explain McCabe's Cyclometic Complexion.

3. (a) Explain the concept of SDLC. Briefly describe the life cycle.

    (b) Explain waterfall model. Compare between classical and interactive waterfall model.

4. (a) What is COCOMO? How it can used to estimate two size of the software and subsequently the development time? Differentiate between the COCOMO-I and COCOMO-II models.

    (b) What do you mean by software quality assurance? What are the major activities of software quality assurance.

5. Describe the main activities in the software design process and output of these activities. Using an entity relation diagram, show possible relationship between the outputs of these activities.

6. Explain the following:

    (a) User interface design

    (b) Software quality factors

7. (a) What is system testing? Elaborate the steps used in system testing that lead to the user acceptance of the system.

    (b) What are testing level matrices? Explain.

8. (a) What is re-engineering? Differentiate between re-engineering and new development.

(b) What is clean room approach? Explain.

9. Explain the following:

   (a) Functional Testing

   (b) Structural Testing

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

   (a) Software reliability

   (b) Software repair

   (c) Limitations of reliability models.

M.Sc. IT (Part II) Examination, 2009

Artificial Intelligence

Attempt any five questions. All questions carry equal marks.

1. (a) What do you mean by AI? What are its applications?

   (b) What is the difference between declarative and procedural knowledge?

2. (a) What is logic programming language? Explain in detail CUT and NEGATION facility in PROLOG.

   (b) Write a program in PROLOG to append and reverse a list array.

3. (a) What do you mean by FOPL? What are its syntax and semantics?

   (b) Convert the following expression into clausal form:

   $\exists X \forall Y (\forall Z P (f(X), Y, Z) \rightarrow (\exists U Q (X, U) \& \exists V R(Y, V)))$

4. Define Fuzzy system. Using resolution method, solve the following logic problem:

   (a) Some patients like all doctors

   (b) No patient like any quake

   (c) Therefore no doctor is a quake.

5. (a) Define Horn's clause. What are its implications?

   (b) What do you mean by truth maintenance system? Explain it with a suitable example.

6. (a) What are possible reasons for using heuristics? Differentiate between heuristic search and heuristic function.

   (b) Differentiate between uninformed (blind search) and informed (directed) search?

7. (a) Explain the principle of means end analysis approach to problem solving.

   (b) Among the semantic net and frame which structure is mostly used and why?

8. (a) What is the best first search procedure? Mention the heuristic function of this procedure.

(c) What is hill climbing approach with reference to heuristic search? How does it very from Generate and Test method?

9. (a) What do you mean by matching in AI? What are various measures for matching?

10. (a) What is an Expert System? How do you distinguish it from knowledge base system?

(b) List the difference between foeward reasoning and backward reasoning? What are the factors that influence to use any one of the two?

M.Sc. IT (Part II) Examination, 2009

Cyber Law, Internet Security

Attempt any five questions. All questions carry equal marks.

1. (a) To provide full security to a data center, what are the constraints, that should be taken care while designing network security.

    (b) How the concept of encryption-decryption takes place at different locations, what are the basic infrastructure needed.

2. (a) What is digital signature? Explain the use of digital signature in e-commerce.

    (b) Describe in detail all mathematical steps of RSA algorithm.

3. (a) Explain the security barriers in order to implement an e-commerce application over a open web.

    (b) Explain the security measures to be considered for any B2B e-commerce system.

4. Define the following terms:

    (a) Public key infrastructure

    (b) Substitution Cipher

    (c) Authentication Methods

    (d) Logic Bomb

5. (a) What is cryptography? Describe various methods for cryptography.

    (b) Explain the Euclidian algorithm, also discuss its application area.

6. Write a brief note on the following:

    (a) Trojan Horse

    (b) Electronic Mail Security

    (c) Kerberos

    (d) Smart Card

7. (a) Discuss the cyber law prevailing in India, what areas has been covered by Indian cyber law?

   (b) Suppose you have been appointed as administrator for login administration, draw a guide line for username and password.

8. (a) Discuss the potential areas wherecyber crime can happen in a e-commerce organization.

   (b) Formulate strategy to combat cyber crimes, also draw the requirement for infrastructure and professionals.

9. Differentiate between:

   (a) Firewall and Spyware

   (b) Spoofing and Phishing

   (c) Trademark and Copyright

   (d) DNS and IDS