

M.Sc. IT (Part II) Examination, 2011

Operating Systems

Part A (Marks: 10)

1. Define operating system.
2. What is CPU scheduling?
3. Differentiate between I/O bound process and CPU bound process.
4. What is process control block?
5. Define paging.
6. What are the objectives of scheduling?
7. Differentiate between a process and a program.
8. What do you mean by critical section?
9. Define short term scheduler and long term scheduler.
10. What is segmentation?

Part B (Marks: 10)

1. Describe process life cycle with the help of a process state diagram.
2. Differentiate between multiprogramming OS and multiprocessor OS.
3. What are the various criteria for measuring the performance of scheduling mechanisms?
4. Define paging. How is it different from demand paging?
5. What are the various informations that a process block contains.

Part C (Marks: 60)

[Any Three]

1. (a) What is operating system? Discuss the factors required to design an operating system.

- (b) What are different types of Operating System? Explain them with an example.
2. (a) Discuss various methods used for deadlock avoidance. Are all unsafe state results in deadlock?
 - (b) Discuss the solutions to recover from deadlock situation.
 3. (a) Explain memory management. Describe various methods of memory management.
 - (b) What are the various algorithms for page replacement? Explain each of them with examples.
 4. Write short notes on the following:
 - (a) Semaphores with usages and drawbacks.
 - (b) Swapping
 - (c) Virtual Memory
 - (d) Variables in Linux
 - (e) Architecture of Distributed System
 5. (a) Explain the Linux architecture
 - (b) What are the various types of files in Linux?
 - (c) What are the basic commands in Linux?

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Object Oriented Concepts and C++

Part A (Marks: 10)

1. What is the difference between procedural programming and object oriented programming?
2. What do you understand by function overloading?
3. Explain the visibility modes in C++.
4. What is the difference between binary search and linear search with example.
5. What are empty classes?
6. What do you understand by virtual function? Why we use it?
7. Explain copy constructor in detail.
8. What is class template in C++?
9. Explain stream classes in C++.
10. What is inline function and explain its advantages.

Part B (Marks: 10)

1. Write short notes on:
 - (i) DFS
 - (ii) Inorder traverse
2. Explain merits and demerits of friend function with example.
3. What are the differences between inherits a class with protected and private visibility mode?
4. What is a class template? Explain the syntax of a class template with suitable example.
5. Overload the following operators:
 - (i) >>

(ii) []

(iii) ->

Part C (Marks: 60)

[Any Three]

1. What are abstract classes? Write a program having student as an abstract class and create many derived classes, such as engineering, science, medical etc., from the student class. Create their objects and process them.
2. Write short notes on:
 - (i) Quick sort
 - (ii) Priority queue
 - (iii) AVL tree
 - (iv) Sparse matrix
3. Describe different methods of opening a file. Write a program to open a file named "aa.txt" and write your name and other details into that file.
4. What is friend class? Write a program to create a friend class that granting friendship to another class and two classes having common friend.

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Computer Oriented Numerical Methods

Part A (Marks: 10)

1. Define symmetric and skew symmetric matrix with example.
2. What is transpose of given matrix:

$$A = \begin{bmatrix} 1 & -5 & 1 \\ -2 & 4 & 3 \\ 3 & 6 & 4 \end{bmatrix}$$

3. Write formula of Simpson $\frac{3}{8}$ rule.

4. If $A = \begin{bmatrix} 8 & 2 & 1 \\ 3 & 4 & 6 \end{bmatrix}$

find $3A$

5. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

find $A + B$

6. What is input error?
7. What are inherent errors and truncation errors?
8. Evaluate:

(i) $\Delta \log x$

(ii) Δe^x

9. Evaluate:

$E^2 \sin x$

10. Evaluate:

$(E-1)(E-2)e^x$

Part B (Marks: 10)

1. Prove that:

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

2. If $A = \begin{bmatrix} 2 & 3 & 1 \\ 5 & 6 & 3 \\ 1 & 1 & 3 \end{bmatrix}$ $B = \begin{bmatrix} -1 & 3 \\ -3 & 4 \\ 5 & 0 \end{bmatrix}$

find $A \times B$.

3. Explain Gauss Jordan Method.

4. Evaluate:

$$\int_0^6 \frac{dx}{1+x^2} \text{ by using Simpson } \frac{1}{3} \text{rd rule.}$$

5. Find the 2nd degree polynomial passes through (0, 1)(1, 3)(2, 7)(3, 3). Find the polynomial.

Part C (Marks: 60)

[Any Three]

1. (a) Find the root of the equation $xe^x - \cos x = 0$ by using Regula Falsi method.

(b) Explain the geometrical interpretation and rate of convergence of Regula-Falsi method.

2. (a) Compute four iterations of equation $x^3 - 4x - 9 = 0$, using bisection method and explain its rate of convergence.

(b) Using Horner's method, find the root of $x^3 + 9x^2 - 18 = 0$ correct to two decimal places.

3. (a) From the table estimate the number of students who obtained marks between 40 and 45:

Marks	No. of Students
30-40	31
40-50	42
50-60	51
60-70	35

(b) Write notes on the following:

(i) Forward difference

(ii) Central difference

4. (a) Solve the following system by Gauss Jordan method:

$$2x + y + z = 10$$

$$3x + 2y + 3z = 18$$

$$x + 4y + 9z = 16$$

(b) Solve the following system by Gauss Seidel iteration method:

$$27x + 6y - z = 85$$

$$6x + 15y + 2z = 72$$

$$x + y + 54z = 110$$

5. (a) Using Euler's modified method obtain a solution of the equation:

$$\frac{dy}{dx} = x + \sqrt{y}$$

With initial condition $y = 1$ at $x = 0$ for the range $0 \leq x \leq .6$ in step of $.2$.

(b) Solve the equation $\frac{dy}{dx} = x + y$ with initial conditions $y(0) = 1$ by Runge Kutta fourth rule from $x = 0$ to $x = .2$ with $G = .1$.

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Software Engineering

Part A (Marks: 10)

1. What is software engineering?
2. Define software complexity.
3. Define software reliability.
4. What do you understand by software portability?
5. What is the prime objective of design phase?
6. What do you understand by problem partitioning?
7. Define abstraction.
8. What is unit testing?
9. Define integration testing.
10. Define software reliability.

Part B (Marks: 10)

1. Write a short note on software life cycle curve.
2. Enlist the software quality factors described by Me Call-FURPS.
3. Describe and distinguish between the top-down and bottom-up design strategy.
4. What do you understand by verification and validation.
5. Enlist the test plan activities during testing.

Part C (Marks: 60)

[Any Three]

1. Write a detailed note on software matrix. Discuss the use and importance of software matrix.

OR

Describe waterfall model. What are the limitations of waterfall model?

2. What do you understand by the software quality? Describe software quality factors.

OR

What are the important factors in estimating the cost of a project? How cocomo model is useful in cost estimation?

3. Write a detailed note on design principles. Describe the design tools and techniques. Hence describe object oriented approach to software design.

OR

Write short notes on any two of the following:

- (a) Software re-engineering
- (b) Activities for monitoring and control of software project.
- (c) Software errors and psychology of testing.
- (d) Test case generation execution and analysis.

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Programming in Java

Part A (Marks: 10)

1. What are wrapped class?
2. What is clipping?
3. What class is the top of the AWT event hierarchy?
4. What is the range of char type?
5. What is the purpose of finalization?
6. Which containers may have a Menu Bar?
7. What is an abstract method?
8. Is `==` a valid Java operator?
9. What is the purpose of the file class?
10. Can an exception be rethrown?

Part B (Marks: 10)

1. Give the difference between Class and Object.
2. Give the difference between C++ and Java.
3. What is the difference between choice and list?
4. How it is possible for two string object with identical value not to be equal under the `==` operator?
5. What is an I/O filter?

Part C (Marks: 60)

[Any Three]

1. (a) What is Java bean? Give its advantage and disadvantage. What are the different types of EJBs available?

- (b) Explain the architecture of JDBC.
2. (a) What is RMI? What is the difference between Naming.bind and Naming.rebind method?
- (b) Write a short code to invoke a remote method using Java RMI.
3. Write short notes on the following:
- (a) Multithreading
 - (b) CORBA
 - (c) AWT
 - (d) Package and Interface

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Artificail Intelligence

Part A (Marks: 10)

1. Define AI.
2. Write different methods of knowledge representation.
3. What is cut in Prolog?
4. Explain Bayes theorem.
5. Define Heuristic.
6. What is AND-OR graph?
7. Give structure of a rule.
8. Explain Rule order and Goal order.
9. Explain utility of indexing in AI.
10. Explain circumscription.

Part B (Marks: 10)

1. Write different methods for knowledge acquisition.
2. Explain input and output in Prolog.
3. Give application of Fuzzy logic in AI.
4. What are non-deductive inference method?
5. What is resolution?

Part C (Marks: 60)

1. Explain knowledge acquisition and knowledge representation in detail.

OR

What is FOPL? Write its syntax and semantics. Also write steps to convert FOPL to clausal form.

2. Differentiate between monotonic and men-monotonic system. Also explain truth maintenance system in detail.

OR

What is probabilistic reasoning? Explain dumpster shafer theory in detail. Explain it with an example.

3. What is matching? Explain different matching techniques.

OR

Define expert system. Explain architecture of expert system in detail.

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Cyber Law, Internet Security

Part A (Marks: 10)

1. What do you understand by network security?
2. What is cyberspace?
3. What is the role of compression function in hash function?
4. What is the characteristic of firewall?
5. What is message authentication?
6. Define cryptanalysis.
7. What is difference between block cipher and stream cipher?
8. What do you mean by replay attack?
9. Explain advantage of digital signature.
10. What means of virus?

Part B (Marks: 10)

1. Explain encryption and decryption.
2. Give the benefits of IP security.
3. Describe RSA.
4. Explain key recovery attack on block ciphers.
5. What do you mean by fraud prevention?

Part C (Marks: 60)

[Any Three]

1. What do you mean by cryptography? Define approaches and phase in cryptography development.

2. What is cyber law? What are the various national law and international law in cyber space.
3. Explain the classification of authentication function in detail.
4. (a) What is proxy firewall?
(b) Describe the principles of asymmetric cryptosystem.

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Software Testing and Quality Assurance

Part A (Marks: 10)

1. Why testing is required?
2. What if the software is so buggy it can't really be tested at all?
3. What is syntax testing?
4. What is validation?
5. List the various levels of testing.
6. Who are the three stake holders in testing?
7. Define the term Branch Coverage.
8. List various types of testing available.
9. Why test plan is essential?
10. How is testing affected by object oriented design?

Part B (Marks: 10)

1. Explain the black box testing with suitable example.
2. Explain the regression testing with suitable example.
3. Differentiate between finite state testing and logic based testing.
4. Explain the concept of test plan.
5. What are the main things we have to keep in mind while writing the test cases.

Part C (Marks: 60)

1. (a) How we can write functional and integration test cases? Explain with format by giving examples.

(b) Discuss in detail the concept of Object Oriented Testing.

2. (a) During the start of the project how will the company come to the conclusion that tool is required for testing or not?
(b) What is scalability testing? What are the phases of the scalability testing?
3. (a) Why is it often hard for organizations to get serious about quality assurance?
(b) How can QA processes be implemented without reducing productivity?