M.Sc. IT (Part II) Examination, 2014

Operating Systems

Part A (Marks: 10)

1. Define CPU scheduling.
2. Define deadlock.
3. Differentiate between tightly coupled systems and loosely coupled systems.
4. What are batch systems?
5. What is process control block?
6. What is a thread?
7. What is use of fork and exec system calls?
8. What is resource allocation graph?
9. Define busy waiting and spin lock.
10. What is critical section problem?

Part B (Marks: 10)

1. Describe functions, advantages, disadvantages of batch processing and multiprocessor systems.
2. Write a shell program to input three numbers from keyboard and determine largest among them.
3. Explained layered and exokernvel architecture of OS with the help of neat diagrams.
4. Explain virtual memory concept with help of diagram where needed.
5. Differentiate between best fit and worst fit concept.

Part C (Marks: 60)

1. (a) Explain about contiguous memory allocation

   (b) Consider the following page reference string

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

OR

How many page faults would occur for the following replacement algorithm, assuring five frames taking into consideration that all frames are initially empty, use following replacement algo:

(a) LRU replacement

(b) FIFO replacement

(c) Optimal replacement

2. Give the basic concepts of paging.

OR

Consider the following snapshot of system

Process	Allocation	Max	Available
	A B C D	A B C D	A B C D
P0	0 0 1 2	0 0 1 2	1 5 2 0
P1	1 0 0 0	1 7 5 0	
P2	1 3 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 2	
P4	0 0 1 4	0 6 5 6	

Answer the following questions using bankers algorithm.

(a) What is content of the matrix need in system in safe state.

(b) If a request from process P1 arrives for (0, 4, 2, 0), can the request be granted immediatly.

3. Explain various disk scheduling techniques.

OR

Write short note on:

(a) I/O Data Transfer Scheme

(b) RAID with its various

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Object Oriented Concepts and C++

Part A (Marks: 10)

1. What are arithmetic operators in C++?
2. What is the use of friend function in C++?
3. What is type casting?
4. Define class structure.
5. Define the use of scope resolution operator.
6. What is data binding?
7. What is data abstraction?
8. Difference between array and link list.
9. What are private and protected members of a class?
10. What is polymorphism?

Part B (Marks: 10)

1. What is operator overloading? Write a program in C++ to explain the concept of operator overloading.
2. What is binary tree? Explain the traversing in binary search tree.
3. Explain doubly and circular link list. Write an algorithm to insert an element in link list.
4. Explain access specifier in C++.
5. Differentiate between constructor and destructor.

Part C (Marks: 60)

1. (a) Explain virtual function in detail.

   (b) Write a C++ program to overload unary operator.

OR

(a) What is sorting? Explain binary sort in brief.

(b) What are abstract classes? What is the advantage of it?

2. (a) Explain Kruskal algorithm

   (b) What are the templates in C++? Explain template class with a suitable example.

OR

(a) Apply bubble sort on given series:

```
4  10  5  1  14  17  22  3  8  11  9
```

(b) What is priority based queue? Explain.

3. (a) Explain prims algorithm with a suitable example.

   (b) What is heap? Explain heap sort.

OR

Write short note on (any two):

(a) Pointer to class

(b) Sparse table

(c) BFS

(d) Postfix, Prefix and Infix

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Computer Oriented Numerical Methods

Part A (Marks: 10)

1. Write formula of Runga Kutta 2nd and 4th order.
2. What is average operator?
3. Compute value of $\Delta \sin x + \Delta^2 \cos x$.
4. if $A = \begin{bmatrix} 5 & 2 \\ 0 & -1 \end{bmatrix}$ find A^2.
5. Explain significant digit.
6. What is fractional polynomial and reciprocal polynomial?
7. Write formula of Gauss backward formula.
8. Write formula of Newton Divided Difference for uneual interval.
9. Prove $I + \Delta = \Delta + I$
10. Define upper and lower triangular matrix.

Part B (Marks: 10)

1. Round off the number 75462 to four significant digits and then calculate the absolute error and percentage error.
2. Prove that $\Delta = \frac{1}{2}\delta^2 + \delta\sqrt{1 + \frac{\delta^2}{4}}$
3. Given $U_0 = 580$, $U_1 = 556$, $U_2 = 520$, $U_4 = 384$, find U_3.
4. Use Euler method to solve

   $\frac{dy}{dx} = \frac{y^2 - x}{y^2 + x}$, x = 0, y = 0

   Compute y(.1)
5. $A = \begin{bmatrix} 2 & 5 & 2 \\ 3 & 6 & 1 \\ 0 & -1 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 2 & 8 \\ 0 & 0 & 2 \\ 1 & 1 & 0 \end{bmatrix}$

Find 2A + 3B.

Part C (Marks: 60)

1. (a) By using Newton Raphson method, find the root of $x^4 - x - 10 = 0$ which is nearer to x = 2 correct upto three places of decimals.

   (b) Using method of false position, find the real root of the equation $x^3 - 2x - 5 = 0$.

   OR

   (a) Find a root of the equation $x^3 - 4x - 9 = 0$ using bisection method.

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

2. (a) Apply Gauss Jordan method to find x, y, z

   $x + 2y + z = 8$

   $2x + 3y + 4z = 20$

   $4x + 3y + 2z = 16$

   (b) Solve the following using Gauss Jordan seidel equation method

   $27x + 6y - z = 85$

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

   $x + y + 54z = 110$

   OR

   (a) Solve the following system of equation using Cramer rule

   $2x - y + 3z = 8$

   $-x + 2y + z = 4$

   $3x + y - 4z = 0$

   (b) Define the following:

   (i) Trace of matrix

   (ii) Gauss Elimination Method

(iii) Any five types of matrix including symmetric and skew symmetric matrix.

(iv) Trapezodial and weddle rule.

3. (a) Use Euler modified method with one step of solve.

$\frac{dy}{dx} = x^2$+ y with y(0) = .94

Find y(0) to five significance figures with y(.1) = .94

(b) Use Simpson's $\frac{1}{3}$ rule to evaluate the following: $\int_0^1 \frac{dx}{1+x^2}$

OR

(a) The observed values of a function are respectively 168, 120, 72, and 63 at the four positions 3, 7 9, and 10 of the idependent variable what is the best estimate you can give for the value of the function at the position of 6 of the idependent variable.

(b) From the following table find 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
70 - 80	31

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Software Engineering

Part A (Marks: 10)

1. What is software?
2. What is software engineering?
3. What is software testing?
4. What is the difference between fault and error?
5. What is formal technical review?
6. Write the name of any two umbrella activity.
7. What is user interface?
8. What is software model?
9. What is the difference between analysis and design?
10. What is baseline?

Part B (Marks: 10)

1. Explain function point analysis.
2. Write the steps of system development life cycle.
3. Explain object oriented software design.
4. What is clean room approach?
5. Write the software quality factor.

Part C (Marks: 60)

1. (a) Explain waterfall life cylce model and its advantage and disadvantage.

   (b) Describe spiral model in software life cycle.

OR

(a) Explain the various types of relaibility model.

(b) List the limitations of relaibility model.

2. Explain functional and structural testing in detail.

OR

(a) Discuss two coding standards for rense of code.

(b) Explain LOC based and FP based decomposition technique.

3. Write technical note on any two:

(a) Black box testing

(b) Prototype model

(c) Software Metrics

(d) Product Scheduling

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Programming In Java

Part A (Marks: 10)

1. What is meant by object oriented programming?
2. What is a class?
3. What is an object?
4. What are the core OOPs concepts?
5. What are the usage of Java packages?
6. What are the collections API?
7. What is a constructor?
8. In Java how to make an object completely encapsulated?
9. What is finalized() method?
10. What is the difference between Array and Vector?

Part B (Marks: 10)

1. Why Java does not support pointers?
2. Explain working of Java Virtual Machine (JVM).
3. What is the difference between abstract class and interface.
4. Explain how excaption handling is done in Java with the help of an example.
5. If a class is located in a package. What do you need to change in the OS environment to be able to use it?

Part C (Marks: 60)

1. (a) List and explain object oriented concepts in details.

   (b) Discuss any two types of stream.

OR

(a) What is inheritance? Explain its advantage. Also explain how a subclass is derived from a super class in Java.

(b) Write note on recursion.

2. (a) Write a program in Java which reads the content of a given file and write it to the console.

(b) Explain advantages and disadvantages of garbage collection.

OR

(a) List four differences between a Java application program and Java applet program with an example of each type of program.

(b) What is an event? Explain different components of an event.

3. (a) Explain architecture of IDBS. What are the different types of statement available in JDBC.

(b) Define RMI. Explain client server application using RMI.

OR

(a) What is applet? Write a program to explain how parameters are passed in as applet program.

(b) Write short note on (any two)

(i) Beans serialization

(ii) CORBA

(iii) CGI Structure

(iv) Multithreaded programming.

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Artificial Intelligence

Part A (Marks: 10)

1. Which systems are called knowledge based systems?
2. What is clausal form?
3. What is non productive system?
4. What do you understand by knowledge validation?
5. What is difference between knowledge and information?
6. What is atom in prolog?
7. Compare between human and computer intelligence.
8. Explain backward chaining.
9. Explain unification.
10. What is called Fuzzy logic?

Part B (Marks: 10)

1. Explain the factor of knowledge acquisition.
2. Explain matching.
3. Show that (P $\rightarrow$ Q) is equivalent to 7PVQ.
4. Explain facts. How can we represent the fact in prolog.
5. Transform the following FOPL statement into equivalent conceptual graph.

   "X, Y MARRIED (X, Y) ® MARRIED (Y, X).

Part C (Marks: 60)

1. What are the salient features of hebbian learning? How is different than competitive learning?

OR

Write a prolog program to find length of an input list.

2. Express the following sentences involving predicates in symbolic form:

   (i) All students are clever.

   (ii) Some students are not successful.

   (iii) Every successful student is clever.

   (iv) There are some successful students who are not clever.

OR

Write short note on:

(i) Closed world assumption

(ii) Decision Theory

(iii) Ad-Hoc Method

(iv) And-Or Graph

3. Explain following matching technique:

   (a) Indexing

   (b) Matching with variable

   (c) Complex Matching Variable

OR

What are various knowledge reprentatives techniques used in expert system.

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Cyber Law, Internet Security

Part A (Marks: 10)

1. Define the term cyber crime.
2. What is encryption?
3. What is a computer virus?
4. What is website defacement?
5. What is pishing?
6. What is spamming?
7. What is E-commerce?
8. What is cryptography?
9. What is an identity theft?
10. What is spyware?

Part B (Marks: 10)

1. What do you understand by information security?
2. Define the substitution Cipher method.
3. What is the concept of a firewall?
4. What is software piracy?
5. What is E-mail bombing?

Part C (Marks: 60)

1. Discuss in detail the issues related to network security and the network security services.

OR

Describe in detail the categories of cyber crime and the international model law on E-commerce.

2. Discuss the terms of service agreement for website owners. How would you design a private policy for an E-commerce site.

OR

Discuss in detail the Fermat and Euler Theorems. Also elaborate their usage and application.

3. What is the importance of cryptography? Discuss the historical growth of crypt analysis. Also illustrate the application areas for cryptography.

OR

What is public key cryptography? Discuss the key generation in RSA public key crypto system. Describe in detail the working of RSA algorithm.

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Software Testing & Quality Assurance

Part A (Marks: 10)

1. What is the compnent testing?
2. Why use release testing?
3. How many types of testing phases?
4. What is white box testing?
5. What is the incremental integration testing?
6. How you can do equivalence partitioning?
7. What is the mean of clean room software development?
8. What is the role of test manager in test automation?
9. What is the use of Grey Box testing?
10. Write about test schedule.

Part B (Marks: 10)

1. What is the multiple condition coverage?
2. Write the steps of test case design.
3. Define the document production process including quality check.
4. What is the relationship between internal and external software attributes.
5. What is quality management?

Part C (Marks: 60)

1. Difference between logic based testing and domain testing. Explain with example.

OR

Write short note on the following:

(a) Error Guessing

(b) GUI testing

(c) Object Oriented Testing

2. Write about the quality assurance and standards with example.

OR

Describe the performance testing with example.

3. Describe the planning verification and validation with diagram.

OR

(a) What is structural testing?

(b) Why we use Web Enabled Application?