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PGIS-N-1046 B-17
M.Sc. Ist Semester Degree Examination
COMPUTER SCIENCE
(Operating System Principles)
Paper : SCT 1.1
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- i) *Section A is compulsory.*
- ii) *Answer any Five questions from Section B.*

Section - A

1. Answer the following questions.

(10×2=20)

- a) Define clustered operating system.
- b) What is fragmentation?
- c) Give an importance of virtual machine.
- d) What is symmetric multi-processing?
- e) Define multi-threading.
- f) What is Inter process communication?
- g) What is the need of swapping?
- h) When the paging is required?
- i) Define mounting.
- j) What is LRU?

Section - B

2. a) List and explain the functions of operating system. (6)
- b) What is memory management? Explain partitioned memory management. (6)

3. a) Describe different disk scheduling algorithms. (6)
b) Explain the features of RTOS. (6)
4. a) Explain the execution process of operating system. (6)
b) Discuss the different types of threads. (6)
5. a) Explain CPU scheduler with example. (6)
b) What is concurrency control? How does concurrency resolved? (6)
6. a) Explain deadlock prevention methods with example. (6)
b) Define segmentation. Write different problems occurred during segmentation process. (6)
7. a) What is disk management? Describe different disk scheduling algorithms. (6)
b) List and explain the program and system threats. (6)
8. Write notes on any **two** of the following. (2×6=12)
 - a) Process states
 - b) Thrashing
 - c) File Access methods
 - d) System calls



PGIS-O-1045 B-17
M.Sc. Ist Semester Degree Examination
COMPUTER SCIENCE
(Operating System Principles)
Paper : SCT 1.1
(Old)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- i) *Section A is compulsory.*
- ii) *Answer any Five questions from Section B.*

Section - A

1. Answer the following questions. (10×2=20)
- a) Justify the need for the operating system.
 - b) What is interprocess communication?
 - c) What is deadlock?
 - d) Define Paging
 - e) What are the various states of a processes?
 - f) List the salient features of linux operating system.
 - g) What is the main advantage of multiprogramming?
 - h) Which disk scheduling algorithm would be best to optimize the performance of a RAM?
 - i) State the goals and principles of protection.
 - j) What is semaphore?

Section - B

2. a) Explain the important services rendered by an operating system. (6)
- b) Discuss in detail the concept of virtual machines with neat diagram. (6)

3. a) Explain any two CPU scheduling algorithms with suitable examples. (6)
b) Describe briefly the time sharing system. (6)
4. a) Discuss how deadlock problem can be solved using bankers algorithm. (6)
b) Explain contiguous memory allocations with a suitable diagram. (6)
5. a) Discuss the structure of page tables with appropriate example. (6)
b) Explain various methods of allocating disk space. (6)
6. a) What is file protection? Explain various techniques used for file protection. (6)
b) Discuss the disk management techniques used in operating systems. (6)
7. a) Distinguish between preemptive and non-preemptive scheduling. (6)
b) Discuss the file system used in linux operating system. (6)
8. Write notes on any **two** of the following. (2×6=12)
 - a) System boot
 - b) Thrashing
 - c) RAID
 - d) Distributed operating system



PGIS-N-1043 B-17
M.Sc. Ist Semester Degree Examination
COMPUTER SCIENCE
(Programming in VB.Net)
Paper : HCT 1.3
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- i) *Section A is compulsory.*
- ii) *Answer any Five questions from Section B.*

Section - A

1. Answer the following questions. (10×2=20)
- a) What is .NET CLR?
 - b) What are the different types of projects in VB.NET?
 - c) Describe the solution Explorer.
 - d) Define control Array.
 - e) Differentiate subroutine and function.
 - f) Write Msg Box function.
 - g) How to use color Dialog to set color of text in textbook.
 - h) Define showing and hiding forms..
 - i) What is ADO.NET?
 - j) What is the use of dataset?

Section - B

2. a) Explain the IDE components of VB.NET. (6)
- b) What is .NET? Describe it's features and Architecture. (6)
3. a) Mention the tabs used in VB.NET? Explain format tab. (6)
- b) What is inheritance? Write a program to demonstrate simple inheritance. (6)

4. a) Define array? Explain the creating and using array. (6)
b) Write a function for demonstrations of passing unknown number arguments. (6)
5. a) Explain the collection classes with example. (6)
b) Describe the different loop statements with an example. (6)
6. a) Write the properties, methods and events of combo Box control. (6)
b) Explain the different properties, events and methods of tree view control. (6)
7. a) Design and write VB.NET Application to store student information such as rno, name, address and contact into MS Access database. (6)
b) Explain the different classes and their functions used for accessing database. (6)
8. Write notes on any two of the following. (2×6=12)
 - a) Common type system
 - b) Scope and life time variables
 - c) Open file Dialog and save file Dialog
 - d) Overview of ADO.NET



PGIS-O-1044 B-17
M.Sc. I Semester Degree Examination
COMPUTER SCIENCE
Data Structures Using C and C++
Paper : HCT 1.3
(Old)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- i) *Section 'A' is compulsory.*
- ii) *Answer any Five questions from Section B.*

Section - A

1. Answer the following questions. (10×2=20)

- a) Write any four features of OOPS.
- b) Enlist the operators that cannot be Overloaded
- c) What is an inheritance? Write types of an inheritance in C++.
- d) Describe the underflow and overflow conditions.
- e) Write the differences between single and circular linked lists.
- f) Write the types of queries
- g) Write the recursive function for Tower of Hanoi problem.
- h) What is binary search tree and write its applications.
- i) What is sorting? How selection sort is different from insertion sort.
- j) Write the two ways of representing graphs in memory.

Section - B

2. a) Explain the difference between structure and class in C++ with an example. (6+6)
- b) Briefly explain Overloading and overriding with an example.

3. a) What is an abstract class? Explain with suitable example. (6+6)
b) Explain the concept of 'this' pointer.
4. a) Write a program to illustrate the concept of parameterized constructor. (6+6)
b) Briefly explain access modifiers in C++.
5. a) With neat sketch explain basic operations performed on stack. (6+6)
b) What is Queue? Explain circular Queue
6. a) What is recursion? Write a recursive function for Fibonacci series. (6+6)
b) Discuss single linked list with its operations.
7. a) Explain the following. (6+6)
i) Binary tree
ii) B-Tree
iii) Complete Binary tree
b) Explain binary tree traversal with an example.
8. Write short notes on **two** of the following. (2×6=12)
a) Graphic
b) BFS
c) AVL tree
d) Heap algorithms



PGIS-O-1042 B-17
M.Sc. Ist Semester Degree Examination
COMPUTER SCIENCE
(Mathematical Foundation for Computer Science)
Paper : HCT 1.2 (Old Syllabus)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- i) *Section A is compulsory.*
- ii) *Answer any Five full questions from Section B.*

Section - A**1. Answer the following questions.****(10×2=20)**

- a) Define partition of a set. Give an example.
- b) Give an example of a relation which is symmetric and transitive.
- c) Define recurrence relation. Give an example.
- d) Construct the truth table for $P \vee \sim q$.
- e) Define Boolean Algebra.
- f) Define tree. Give an example.
- g) Define lattice. Give an example.
- h) Define directed graph and undirected graph.
- i) What is semantics?
- j) Define parity check code and distance between two codes.

Section - B

2. a) Prove : $\sim (p \leftrightarrow q) \cong [(p \wedge \sim q) \vee (q \wedge \sim p)]$. **(6)**
- b) Prove by mathematical induction that $1 + 3 + 5 + \dots + (2n-1) = n^2$. **(6)**

3. a) Define an equivalence relation. If R be a relation, the set of integers z defined by $R = \{(x, y) : x \in z, y \in z, (x - y) \text{ is divisible by } 6\}$. Then prove that R is an equivalence relation. (6)
- b) Consider the function $f : \mathbb{R} \rightarrow \mathbb{R}$ and $g : \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = x^2 + 3x + 1$ and $g(x) = 2x - 3$, respectively. Find the composition functions: (6)
- i) $f \circ g$ ii) $g \circ f$ iii) $f \circ f$
4. a) Solve the recurrence relation $a_n = a_{n-1} + 2a_{n-2}$, subjected to initial condition $a_0 = 2, a_1 = 7$. (6)
- b) State and prove De-Morgan's theorem for Boolean Algebra. (6)
5. a) Define Boolean lattice. In any Boolean algebra prove : $\overline{a \wedge b} = \bar{a} \wedge \bar{b}$. (6)
- b) For any graph G with six vertices, show that G or \bar{G} contains a triangle. (6)
6. a) State and prove pigeonhole principle. (6)
- b) Define group and subgroup. Show that if a, b are arbitrary elements of a group G , then $(ab)^2 = a^2 b^2$ if G is abelian. (6)
7. a) Obtain the grammar that generates the language $L = \{a^n b a^n : n \geq 1\}$. (6)
- b) Design finite state machine that adds two binary integers x and y . (6)
8. a) Find the distance between x and y if (6)
- i) $x = 110110$; $y = 000101$
- ii) $x = 001100$; $y = 010110$
- iii) $x = 111111$; $y = 000000$
- iv) $x = 01010$; $y = 100110$
- b) Define the minimum distance of an encoding function. Find the minimum distance of $e : B^2 \rightarrow B^5$ defined by $e(00) = 00000, e(10) = 00111, e(01) = 01110, e(11) = 11111$. (6)



PGIS-N-1041 B-17
M.Sc. Ist Semester Degree Examination
COMPUTER SCIENCE
(Object Oriented Programming Using C++)
Paper : HCT - 1.2
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to the Candidates :

1. Section A is Compulsory.
2. Answer any five questions from Section B.

SECTION-A

1. Answer the following questions. (10 × 2 = 20)

- a) List the principles of object oriented programming.
- b) State the different types of errors.
- c) Write different data types supported by C++.
- d) What are classes and objects.
- e) Can objects be arrayed? If yes, Give an example
- f) What is a friend function?
- g) Define inheritance.
- h) What is an abstract class?
- i) Mention the constructors of string class.
- j) What is an exception?

SECTION-B

2. a) What are the advantages of OOP paradigm? Explain. (6)
- b) Describe the structure of C++ program with an example. (6)

3. a) Explain the syntax of while loop, Write a program to find the sum of digits of a positive integer. (6)
- b) What are the advantages offered by functions? Explain. (6)
4. a) How do you pass object as arguments to functions? Give an example. (6)
- b) Write a C++ program to overload "+" operator to concatenate two strings. (6)
5. a) Write a program to opening and closing of file. (6)
- b) Explain the use of parameterised constructor with an example. (6)
6. a) What is hybrid inheritance? Write a program to illustrate hybrid inheritance. (6)
- b) Write a program for command line argument. (6)
7. a) Demonstrate how a single try blocks could be followed by multiple each blocks. (6)
- b) What is a class template? Illustrate a class template with parameters. (6)
8. Write notes on any **two** of the following. (2×6=12)
- a) Function overriding.
- b) Const, member functions.
- c) Random Access file.
- d) Function Template.



PGIS-O-1040 B-17
M.Sc. Ist Semester Degree Examination
COMPUTER SCIENCE
(Digital Logic and Computer Design)
Paper : HCT 1.1
(Old Syllabus)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- i) *Section A is compulsory.*
- ii) *Answer any Five questions from Section B.*

Section - A

1. Answer the following questions. (10×2=20)
- a) Convert $125.25_{(10)}$ into a equivalent Binary number.
 - b) Define maxterms.
 - c) Write the Boolean expression for X-NOR gate.
 - d) State why magnitude comparator is required?
 - e) What are the uses of ROM?
 - f) Define state equation.
 - g) What is a state diagram?
 - h) Represent $(-122)_{(10)}$ in a 8-bit register using sign 1's and 2's complement method.
 - i) What is an accumulator?
 - j) Compare vectored interrupt and non-vectored interrupt.

Section - B

2. a) Perform the subtraction of decimal numbers 1758-4866 by using 9's and 10's complement method. Check the answer by straight decimal subtraction. (6)
- b) What is excess-3 code? Write Binary codes for the decimal digits from 0 to 9. (6)

3. a) State and prove Demorgans theorems for three variables. (6)
b) Simplify the Boolean function $F = \Sigma (0, 1, 2, 8, 10, 11, 14, 15)$ by using the tabulation method. (6)
4. a) What is a multiplexer? Design 4 to 1 line multiplexer. (6)
b) What is flip flop? Explain the operations of Rs. flip flop. (6)
5. a) Design a shift register. Explain the serial transfer with a neat block diagram. (6)
b) Explain arithmetic micro operations with an example. (6)
6. a) Design a 4 bit combinational logic shifter. (6)
b) Explain the microprogram control for processor unit. (6)
7. a) What is Fetch and Execute cycle? Explain. (6)
b) Explain the different types of microprocessor instructions in brief. (6)
8. Write notes on any **two** of the following. (2×6=12)
a) Decoders
b) Binary counter
c) Status Register
d) 8086 Microprocessor



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PGIS-N-1039 B-17
M.Sc. Ist Semester Degree Examination
COMPUTER SCIENCE
(Digital Logic)
Paper : HCT 1.1
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates :

- i) *Section A is compulsory.*
- ii) *Answer any Five questions from Section B.*

Section - A

1. Answer the following questions. **(10×2=20)**
- a) Find 2's complement of Binary number 101011.
 - b) What does ASCII stands for?
 - c) Prove that $A.1 = A$.
 - d) Write four nondegenerate forms.
 - e) What is combinational circuit?
 - f) Implement AND gate by NAND gates.
 - g) What is Binary parallel Adder?
 - h) Why flip flops are required?
 - i) Define a term register?
 - j) Represent $(-101)_{10}$ in a 8 bit register using sign 1's and 2's complement method.

Section - B

2. a) Convert Binary number 1011.011 to equivalent Decimal number, octal, Hena decimal number system. **(6)**
- b) What is excers-3 code? Write excess-3 ccde for the decimal numbers 0 to 9. **(6)**
3. a) State and prove Demorgans theorems. **(6)**
- b) Explain X-OR and X-NOR gates. **(6)**

4. a) Simplify the following Boolean function F with don't care conditions by using K-map method. (6)

$$F = \bar{B}D + \bar{B}C + ABCD$$

$$d = \bar{A}BD + A\bar{B}\bar{C}\bar{D}$$

- b) Implement a full adder with two half adders and an OR gate. (6)
5. a) Design BCD to Excess-3 code converter. (6)
- b) Implement Boolean function $F = (A + B')(CD + E)$ with multilevel NAND gates. (6)
6. a) Implement the Boolean function $F(A,B,C,D) = \Sigma (0,2,4,6,8,10,11,13,15)$ with multiplexer. (6)
- b) Explain the operations of JK flip-flop. (6)
7. a) Design a shift register. Explain serial transfer with a neat diagram. (6)
- b) Explain conditional control statements with an example. (6)
8. Write notes on the following. (2×6=12)
- a) Binary storage
 - b) AND-OR-INVERT method
 - c) Decoders
 - d) Ripple counters

