

PGIS-274 B-19
M.C.A. I Semester (CBCS) Degree Examination
Computer Science
Digital Electronics
Paper : MCA IIT
(New)

Time : 3 Hours**Maximum Marks : 80****Instructions to Candidates:**

1. Answer any **five** questions.
2. All questions carry **equal** marks.

1. a) Perform the subtraction of Decimal numbers. 87682-93452 by using 10's and 9's complement method. (8)
- b) Convert 23567.125 into equivalent Binary, Octal & Hexadecimal number system. (8)
2. a) Reduce the following expression using Boolean algebra. (8)
 - i) $ABC(AB + \bar{C})(BC + AC)$ ii) $AB + (\bar{A}C) + A\bar{B}C(AB + C)$
 - b) Why NAND and NOR gates are called universal gates? Explain. (8)
3. a) Explain AND-OR-INVERT method. (8)
- b) Simplify the Boolean function F with the don't care conditions by using k-map method.

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

$$d = \bar{A}BD + A\bar{B}\bar{C}\bar{D}$$
 (8)
4. a) Implement full adder with two half adders and an OR gate. (8)
- b) Design BCD to excess-3 code converter. Explain. (8)
5. a) Design 3 to 8 line decoder. Explain. (8)
- b) Implement $F(A, B, C, D) = \sum(0, 2, 4, 6, 7, 8, 9, 10, 12, 14)$ with a multiplexer. (8)
6. a) Explain JK flip-flop with a logic diagram and truth table. (8)
- b) Design a counter which counts following binary sequence 1,3,5,7,9 and repeat with the help of RS flip-flop. (8)
7. a) What is a shift register? Explain in detail. (8)
- b) Explain arithmetic shifts microoperations with an example. (8)
8. Write notes on any two of the following (2×8=16)
 - a) Integrated circuits
 - b) Non degenerate forms.
 - c) Magnitude comparators
 - d) Instruction codes.

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PGIS 275 B-19
M.C. A. I Semester Degree Examination
Computer Science
Discrete Mathematical Structures
Paper : MCA 12T
(New)

Time : 3 Hours

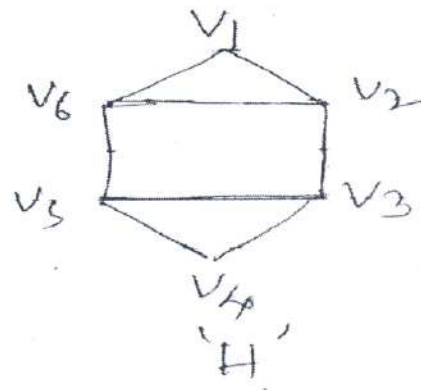
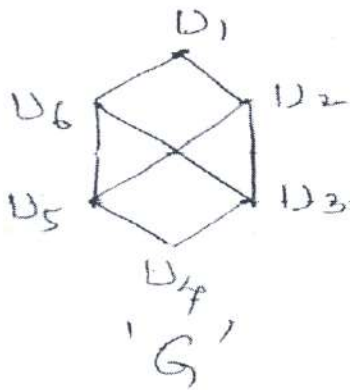
Maximum Marks : 80

Instructions to Candidates:

1. Answer any **five** questions.
2. All questions carry **equal** marks.

1. a) Suppose P and Q are statements.
P: Jack passed Maths
Q: Jill passed maths
 - i) Translate "Jack and Jill both passed Maths".
 - ii) Translate "If Jack passed Maths then Jill did not".
 - iii) Translate " $P \vee Q$ ".
 - iv) Translate " $\sim (P \wedge Q) \rightarrow Q$ ". (8)
- b) Show that " $(P \wedge Q) \wedge \sim (P \vee Q)$ is a contradiction. (8)
2. a) Verify the following compound propositions for Contradiction or contingency.
 - i) $[p \rightarrow (q \rightarrow r)] \rightarrow [(p \rightarrow q) \rightarrow (p \rightarrow r)]$
 - ii) $[p \wedge (q \wedge r)] \leftrightarrow [(p \wedge q) \vee (p \wedge r)]$ (8)
- b) Give a direct proof of the theorem "If n is an odd integer, then n^2 is odd". (8)
3. a) Prove that the complement of the intersection of two sets is the union of their complement. $\overline{A \cap B} = \overline{A} \cup \overline{B}$ (8)
- b) Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{0, 3, 6\}$. Find
 - i) $A \cup B$
 - ii) $A \cap B$
 - iii) $A - B$
 - iv) $B - A$ (8)

4. a) Prove that a function. $f : A \rightarrow B$ is invertible if and only if it is one-to-one and onto. (8)
- b) Let $A = \{a, b, c, d\}$ and $B = \{y, z\}$. Find
- $A \times B$
 - $B \times A$ (8)
5. a) What is mathematical induction? Prove by mathematical induction $1 + 2^1 + 2^2 + 2^3 + \dots + 2^n = 2^{n+1} - 1$ (8)
- b) It is required to seat 5 men and 4 women in a row so that the women occupy the even places. How many such arrangements are possible. (8)
6. a) Two Dice are thrown. Find the probability that
- The total numbers on the Dice is 8
 - The first Dice shows 6
 - Both Dice show the same number r .
 - The sum of the numbers shown by Dice is less than 5. (8)
- b) If A, B and C are any 3 sets, then prove that
- $$|A - B - C| = |A| - |A \cap B| - |A \cap C| + |A \cap B \cap C|$$
- (8)
7. a) Determine whether the graph G and H are isomorphic. (8)



- b) Show that K_n has a Hamilton circuit wherever $n \geq 3$ (8)

8. Write notes on any two of the following (2×8=16)
- Rules of Inference
 - Demorgans Laws
 - Partial order relation
 - Eulerian graph.

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PGIS-276 B-19
M.C.A. I Semester (CBCS) Degree Examination
Computer Science
Object Oriented Programming Using C++
Paper : MCA 13T
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. Answer any **Five** questions.
2. All questions carry **equal** marks.

1. a) List and explain various data types in C++ (8)
b) Write applications of OOP and explain the general structure of C++ program. (8)
2. a) Write a note on:
i) Enumerated data type
ii) Const and volatile qualifiers. (8)
b) Explain the difference between pointers and reference variables in C++. (8)
3. a) State the need of default argument. State the rules to follow while using default argument. (8)
b) Explain the different types of function overloading in C++. (8)
4. a) Write the syntax and program to overload the new and delete operators. (8)
b) Explain the importance of dynamic constructors and destructors in C++. (8)
5. a) Explain with suitable example how the parameters are passed to the base class constructor. (8)
b) Define data stream. Describe the hierarchy of file stream classes in C++. (8)
6. a) Explain the following unformatted I/O functions
i) getline()
ii) read() (8)
b) Give an example for creating user defined manipulator function: (8)

7. a) What is exception handling? Explain the need for it. (8)
b) Write a C++ program to handle 'stack full exception'. (8)
8. Write notes on any **Two** of the following (2×8=16)
- a) OOP principles.
 - b) Conversion of basic data type to derived data type.
 - c) Protected inheritance.
 - d) Class template.
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PGIS-277 B-19
M.C.A. I Semester (CBCS) Degree Examination
Computer Science
Operating System
Paper : MCA 14T
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. Answer any **Five** questions.
2. All questions carry **equal** marks.

1. a) Explain the different services that an operating system provides. (8)
b) With a neat diagram. Explain the categories of Mainframe Systems. (8)
2. a) Explain the different Computing Environments. (8)
b) Explain the properties of Real-time Systems and Hand-held Systems. (8)
3. a) Consider the following set of processes, with the length of the CPU burst time given in milliseconds. (8)

Process	Burst time
P1	6
P2	8
P3	7
P4	3

The processes are assumed to have arrived in the order P1, P2,P3,P4 all at time 0.

- i) Draw Gantt chart illustrating the execution of these processes using FCFS and SJF.
- ii) Calculate the average waiting time and average turn around time.
- b) Explain Dining-Philosophers solution using Monitors. (8)
4. a) Explain the issues with multithreaded programs. (8)
b) Explain Round-Robin Scheduling algorithm with suitable example. (8)

5. a) Explain the methods for deadlock prevention. (8)
b) Explain about Contiguous Memory Allocation. (8)
6. a) What is thrashing? Explain the methods to avoid thrashing. (8)
b) Describe the LRU page replacement algorithm assuming there are 3 frames and the page reference string is 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1. Find the no.of page faults. (8)
7. a) Illustrate the design principles of Linux System. (8)
b) Describe the Linux File System. (8)
8. Write notes on any **two** of the following (2×8=16)
a) The Memory Hierarchy
b) Semaphores
c) Paging
d) Driver Registration.
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