

B.Tech
 (SEM III) ODD SEMESTER
 MINOR TEST (EXAMINATION) 2021-2022

Switching Theory and Logic Design

Time: 2 Hours

Max. Marks: 30

Note: Answer all questions

Q.1 Attempt any Three parts of the following.Q.1 (a) is compulsory.

- (a) Distinguish between canonical and standard forms by giving an example. 4 - 2
- (b) Derive the sum of minterms for the function $f(a,b,c)=a'b+b'c'$. 3
- (c) Derive the product of maxterms for $f(a,b,c,d)=a.b.c+b'.d+c.d'$. 3
- (d) Write the truth table of half adder and Half Subtractor. 3

Q.2 Attempt any Three parts of the following.Q.2 (a) is compulsory.

- (a) What are the various logic gates, give the representation along with the truth table. 4
- (b) i) Simplify $A(B+C)+AB+ABC$ 3
- ii) Write the truth table and symbols of AND and OR gates. 3
- (c) Distinguish between weighted and non-weighted codes with example. 3
- (d) What are minterms and maxterms? Give examples for each. 3

Q.3 Attempt any Three parts of the following.Q.3 (a) is compulsory.

- (a) Obtain the simplified expression in SOP form of $F(a,b,c,d,e)=\sum(1,2,4,7,12,14,15,24,27,29,30,31)$ using K-maps. 4
- (b) Obtain the simplified expression in product of sums. 3
- i) $F(A,B,C,D)=\pi(0,1,2,3,4,10,11)$ 3

- ii) $F(A,B,C,D) = \pi(1,3,5,7,13,15)$
- (c) Define a multiplexer? Draw a 2:1 multiplexer for the function
 $f(x,y,z) = \sum(0,2,3,5,7)$
- (d) What is the use of don't care combinations?

3

3

2

B. Tech.
 ODD SEMESTER
 MINOR TEST 2021-2022
 Graph theory

Time:2 Hrs.

Max. Marks:20

Note: Answer all questions

1. Attempt any Three parts of the following. Q.1(a) is compulsory.

- (a) For any set A and B, prove that

4

$$P(A \cap B) = P(A) \cap P(B)$$

- (b) Define equivalence relation. Let
- $A = \{1, 2, 3\}$
- ,
- $B = \{p, q, r\}$
- and
- $C = \{x, y, z\}$
- and let
- $R = \{(1,p), (1,r), (2,q), (3,q)\}$
- and
- $S = \{(p,y), (q,x), (r,z)\}$
- . Compute SoR.

2

- (c) Define rooted tree. Prove that a binary tree with
- n
- nodes has exactly
- $(n+1)$
- null branches.

2

- (d) What are the uses of trees? Let the pre-order and in-order search of a binary tree T yield the following sequence of vertices (nodes):

In-order	d	b	p	h	q	s	e	a	c	r	k	f	L
Pre-order	a	B	d	e	h	p	q	s	c	f	k	r	l
		Root node						Root node					

2

Draw the Binary tree

2. Attempt any Two parts of the following. Q.2(a) is compulsory.

- (a) Show that for any two sets A and B,

$$A - (A \cap B) = A - B$$

4

- (b) Draw the Venn Diagram showing

$$A \cap B \subseteq A \cap C \text{ but } B \neq C$$

2

- (c) Define graph. Draw the graph (undirected) represented by the following adjacency matrix

$$\begin{bmatrix} 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

2

3. Attempt any Two parts of the following. Q.3(a) is compulsory.

- (a) Define Binary tree. Show that the number of vertices in a binary tree is odd.

4

- (b) Prove that there is one and only one path between every pair of vertices.

2

- (c) Define cut vertex. Show that total number of vertices in a full binary tree is always odd.

2

BIT 13

ROLL NO

2020011004

I.T. 2nd Year
(SEM III) ODD SEMESTER
MINOR TEST (EXAMINATION) 2021-2022

Subject Name: Object Oriented Programming

Times: 2 Hrs.

Max Marks: 20

Note: Answer all questions.

Q.1 Attempts any three parts of the following. Q.1 (a) is compulsory

- | | | |
|----|--|---|
| a) | What is Operator? Explain any three with example. | 4 |
| b) | What is keywords and list out 15 keywords available in C++ language? | 2 |
| c) | What is Access Specifier explain in details? | 2 |
| d) | What is Object Oriented Programming Paradigm and explain its features? | 2 |

Q.2 Attempts any two parts of the following. Q.2 (a) is compulsory

- | | | |
|----|---|---|
| a) | Define Array and Structure with example. | 4 |
| b) | What is Constants and what are the types of Constants in C++. | 2 |
| c) | Differentiate between If statement and If-else statement? | 2 |

Q.3 Attempts any two parts of the following. Q.3 (a) is compulsory

- | | | |
|----|---|---|
| a) | What are basic Object Oriented Programming Concepts? Explain any three in detail. | 4 |
| b) | What are the unique advantages of an Object Oriented Programming? | 2 |
| c) | What is Friend Function explain with example. | 2 |

BTECH
(SEM III) ODD SEMESTER
MINOR TEST (EXAMINATION) 2021-2022

INTERNET & JAVA PROGRAMMING

Time: 2Hrs.

Max. Marks: 20

Note: Answer all questions.

Q1. Attempt any three parts of the following. Q.1 (a) is Compulsory.

- (a) How classes are inherited? Write a program to illustrate multilevel inheritance. 4
- (b) Explain Sending and receiving files using email. 2
- (c) Differentiate between method overloading and method overriding. Give example for each. 2
- (d) Write a program in Java to create first 100 Fibonacci numbers. 2

Q2. Attempt any two parts of the following Q.2 (a) is compulsory.

- (a) What are the various services offered by internet? 4
- (b) What is Video and voice conferencing? Explain the various hardware and software used for voice and video conferencing. 2
- (c) Discuss various primitive data types supported by Java 2

Q3. Attempt any two parts of the following Q.3 (a) is compulsory.

- (a) What are Packages? How will you import a package in Java? Give Example. 4
- (b) What is WWW. Explain in detail? 2
- (c) Explain two ways of creating a thread in Java. Show it with an example Program. 2

BIT-12

ROLL NO

2020071004

B.Tech. 2nd Year
(SEM III) ODD SEMESTER
MINOR TEST (EXAMINATION) 2021-2022

Subject Name: Data Structure

Times: 2 Hrs.

Max Marks: 20

Note: Answer all questions.

Q.1 Attempts any three parts of the following. Q.1 (a) is compulsory

- a) What is Data Structures? Describe its important key features. What are the operations performed on data structure? 4
b) What do you mean by Stack? Explain the operations performed on stack. 2
c) What is an algorithm? What do you understand by efficiency of an algorithm? 2
d) What do you mean by Queue? Explain the operations performed on queue. 2

Q.2 Attempts any two parts of the following. Q.2 (a) is compulsory

- a) What is Array? Explain types of an array with a suitable example. 4
b) Convert the following infix expression $A+B*C-D/E^H$ into its equivalent postfix expression. 2
c) Explain asymptotic notation. 2

Q.3 Attempts any two parts of the following. Q.3 (a) is compulsory

- a) Why circular queue is used over simple queue? Write algorithm to implement all operations in a circular queue using array. 4
b) What is the advantage of doubly linked list over singly linked list? 2
c) What do you mean by Recursion? Write difference between Recursion and Iteration. 2

B. Tech.
 ODD SEMESTER
 MINOR TEST 2021-2022
 Discrete Mathematics

Time: 2 Hrs.

Max. Marks: 30

Note: Answer all questions

1. Attempt any Three parts of the following. Q.1(a) is compulsory.

- (a) Prove that
 - (i) $B - A \subseteq A'$
 - (ii) $A - B = A \cup B' = B' - A'$
 - (iii) $A' - B' = B - A$
 - (iv) $A \subseteq B$ then $B' \subseteq A'$4
- (b) Let $A = \{2, 4, 6\}$ and $B = \{1, 4, 5, 6\}$ then find out the relation from A to B defined by "is less than or equal to". Find out the domain and range of the relation. 3
- (c) Define Algebraic structure. Let $(\{a, b\}, *)$ be semi group where $a * a = b$ show that 3
 - (i) $a * b = b * a$
 - (ii) $b * b = b$
- (d) Define semigroup. Prove that $(A, +)$ is a semi-group where A be the set of all positive even integers and $+$ be ordinary addition operation. 3

2. Attempt any Three parts of the following. Q.2(a) is compulsory.

- (a) Define symmetric difference of sets. If A, B, C be sets, then prove $A - (B \cup C) = (A - B) \cap (A - C)$ 4
- (b) Prove that the union of countable family of countable sets is countable. 3
- (c)
 - (i) Prove that

$$\text{Power set } (A \cup B) = \text{power set}(A) \cap \text{power set}(B)$$
 - (ii) Show that for any two sets A and B .

$$A - (A \cap B) = A - B$$
3
- (d) Let $A = \{1, 2, 3\}$ and relation (R) is \leq on A . Determine its inverse. 3

3. Attempt any Three parts of the following. Q.3(a) is compulsory.

- (a) Define monoid, Group, and abelian group. 4
- (b) Show that the set I of all integers (positive or negative including zero), i.e., $I = \{\dots, -3, -2, -1, 0, 1, 2, \dots\}$ is an infinite abelian group with respect to the operation of addition of integers. 3
- (c) Define Subgroup. If H_1 and H_2 are two subgroups of a group G , then $H_1 \cap H_2$ is also a subgroup of G . 3
- (d) Define cyclic group. Show that every cyclic group is an abelian group. 3