3rd SEM./CSE/IT/ 2021(W)

CST301 Data Structure

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

a. State the need of a Data structure.

b. Define queue. Write the applications of queue data structure.

c. What are the advantages of linked list over array?

d. Define degree of node in a graph.

e. Define a complete binary tree

f. Write any string function with example.

g. What postfix expression is equivalent to the following infix expression?

(A + B) - C * D / (E - F / G)

h. How 2 dimensional array is represent in memory

i. Define sparse matrix

j. Explain overflow and underflow condition.

2. Answer Any Six Questions 5X6

a. Define data structure and discuss different type operation on data structure

b. Discuss about the best case, worst case and average case complexity

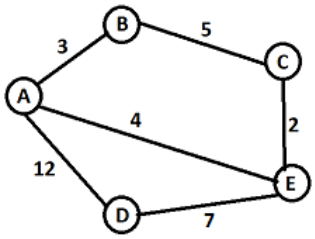
c. Define linear array. Write an algorithm to insert an element in a linear array.

d. Define BST. Construct a binary search tree with 45, 15, 79, 90, 10, 55, 12, 20, 50

e. Define stack. Write an algorithm for POP operation.

f. Discuss about garbage collection.

g Define linked list .Write an algorithm for traversing a linked list.

3	Define graph .Discuss about adjacency matrix. Construct the adjacency matrix for the below undirected weighted graph?  	10
4	Define tree and discuss about different type of tree traversal with example.	10
5	Define queue. What are the different types of queue? Write an algorithm for inserting an element in a queue.	10
6	Define searching. Write an algorithm for binary search and discuss it with an example.	10
7	Discuss about different collision resolution technique	10

III-SEM./CSE/ 2021(W) OLD

CST- 302 Management Information System

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

   a. Write down the objectives of MIS.

   b. Define System Software.

   c. Define Office Automation.

   d. Define MODEM.

   e. What is E-Mail?

   f. What is TPS?

   g. Mention two advantages and two disadvantages of information system.

   h. What do you mean by Data communication?

   i. Define DBMS.

   j. Define the term GDSS.

2. Answer **Any Six** Questions 5X6

   a. What is Network? Write down the types of Network.

   b. Explain DSS briefly.

   c. Describe the Framework of MIS and its Importance.

   d. Explain the generations of programming language.

   e. What are the methods used for organising data in files? Explain all.

   f. Differentiate between Primary Storage and Secondary Storage device.

   g Explain the Components & Functions of a Client-Server System.

3 What is SDLC ? Explain briefly with a Suitable diagram. 10

4 Describe the different layers of OSI Model. 10

5 What is Data Base model? Write different types of data model & explain with suitable diagram. 10

6 Identify the basic Components of a computer system & explain them. 10

7 What is Network Topology? Explain the types of network topologies with suitable diagram 10

3rd Sem./ E&TC/ AE & IE/CSE/ 2021(W)

ETT321/ ETT 302 DIGITAL ELECTRONICS

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

a. Subtract $(28)_{10}$ from $(39)_{10}$ by using 2's complement methods.

b. Convert (0011011) from gray to binary.

c. Define the term resolution and monotonicity.

d. What is decoder and where it is used?

e. Define don't care condition.

f. Explain the term fan-in and fan-out.

g. Perform excess-3 subtraction of (267-175).

h. What is the difference between weighted and non-weighted codes?

i. What is the meaning of Min. term and Max. term

j. Define racing condition.

2. Answer **Any Six** Questions 5X6

a. Design a 1:4 de-multiplexer with a neat circuit diagram.

b. With a neat diagram explain the operation of PIPO register.

c. Explain with sketch the working of a TTL NAND gate.

d. Simplify the Boolean expression

$$Y=AB+A(B+C)+B(B+C)$$

Draw the logic circuit for the simplified function.

e. Explain the working of Full subtractor. Draw its circuit using any one ofuniversal gate.

f. Differentiate between combinational and sequential circuit.

g Design an 8:3 encoder with neat circuit diagram.

3 With a neat diagram explain 4-bit ripple counter with its waveforms. 10

4 Which gates are referred to as universal gates and why? How other gates can be realized using NAND gates? 10

5 Draw the logic diagram of Master-Slave JK flip flop. Explain its working with a functional table. 10

6 Simplify and minimize the four variable logic expression using k-map 10

$F(A,B,C,D)=\Sigma M(1,5,7,8,9,10,11,14,15)$

7 Explain with a neat sketch the successive approximation A/D converter. 10

3rd Sem./ IT/CSE/ 2021(W)OLD

ETT322 FUNDAMENTAL ELECTRONICS DEVICES

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

a. What is biasing? Define forward and reverse biasing.

b. Define doping. Name two n-type impurities.

c. What is break down and knee voltage?

d. State the difference between depletion and enhancement type MOSFET.

e. Define the transconductance and shorted gate drain current.

f. Draw the symbols of MOSFET.

g. Define and classify feedback amplifier.

h. Write down two advantages of tuned amplifier.

i. State the Barkhausen criteria.

j. Why heat sinks are used in circuits?

2. Answer **Any Six** Questions 6 x 5

a. Explain the operation of photo transistor.

b. With neat diagram explain construction and working of complementary symmetry power amplifier.

c. Establish the relation among JFET parameters.

d. State and explain fundamental principle of working of oscillator.

e. Derive the input and output impedance of negative feedback amplifier.

f. Explain the working principle of single tuned amplifiers.

g Differentiate between voltage and power amplifier.

3 Describe the structure and mode of operation of MOSFET. 10

4 Derive the collector efficiency of class-A and class-B power amplifier. 10

5 With neat diagram explain the construction, working principle and advantages of push pull amplifier. 10

6 Write short note on- 10

a) Phase shift oscillator

b) Wein bridge oscillator

7 Describe the pure and impure semiconductor. 10

III-SEM./CSE/IT/ 2021(W)

TH-I Computer System Architecture

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
   a. What is computer architecture?
   b. What are the different types of field contain in an instruction format?
   c. Define indexed addressing mode.
   d. What is the requirement of page table?
   e. What is the use of RAID system?
   f. Define the types of micro operations.
   g. Define MIPS.
   h. Define MAR & MDR.
   i. Define hit ratio.
   j. What is parallel processing?

2. Answer **Any Six** Questions 5X6
   a. Differentiate between SRAM & DRAM.
   b. Explain the different address instruction format.
   c. Comparison between I/O mapped I/O & memory mapped I/O.
   d. How an instruction is executed? Explain the steps of each cycle.
   e. Why cache memory is needed? Explain the mapping procedures of cache memory.
   f. Explain five addressing modes with suitable example.
   g Explain the working principle USB protocol.

3 What is pipelining? Draw the space time diagram to represent the processing in a pipeline. 10

4 Define interrupt. Explain interrupt initiated I/O method of data transfer to and from peripherals. 10

5 Describe the FLYNN's classification. 10

6 What is bus structure? Explain the basic parameter of bus design. Write the function of each type of bus. 10

7 Draw a functional block diagram of a computer and explain the function of each unit. 10

III-SEM./ IT/CSE/ 2021(W)

TH-II Data Structure

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
   a. What is the need of time-space trade off of an algorithm?
   b. State at least two applications of stack?
   c. Differentiate between array and string?
   d. What will be the output of following code
      char str[]="Knowledge World"
      printf("%d", strlen(str));
      printf("%d", sizeof(str));
   e. Define ADT.
   f. Explain sparse matrix.
   g. What do you mean by polish notation? How it differs from two other notations?
   h. Differentiate between path matrix and adjacency matrix in a graph?
   i. Relate in between strict binary tree and complete binary tree.
   j. What will be the output of the following code
      int arr[5]={10,20,30,70,90};
      printf("%d",a[5]);

2. Answer any five 5X6
   a. Illustrate overflow and underflow status of Queue with example.
   b. Write a C program for linear search.
   c. Explain the procedure to insert a node at the end of a single linked list.
   d. Write the algorithm for binary search.
   e. How circular linked list differs from single linked list? Explain.
   f. Discuss at least five string library functions with examples.
   g Analyse the memory representation of one-dimensional array with example.

3 Write a C program to input and print a 3x2 dimensional matrix. 10

4 Explain different file organization and access methods? 10

5 Illustrate the push and pop operation of stack in evaluating an arithmetic expression. 10

6 Define binary tree. Discuss the traversing of a binary tree with example? 10

7 Write short notes on (any four) 10
   a) Priority Queue c) Recursion e) Hashing
   b) BST d) Garbage Collection

III-SEM./ETC/AE&IE/CSE/IT/MECHATRONICS/ ELECTRICAL(INST & CTRL/ECE/ 2021(W)
TH-III Digital Electronics

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

a. State De-Morgan's theorems.

b. Convert $(10110101)_2$ from binary to grey code.

c. Find out the number of input lines, output lines and select lines in : (i)1:8 De-Mux (ii)16:1 Mux

d. Write down the truth table of half subtractor.

e. Define race-around condition in flip flop and suggest a method to overcome it.

f. Difference between combination and sequential logic circuit.(any 4)

g. Mention the type of flip flops used in : (i)Ripple Counter (ii)Shift Register

h. Write the excitation table of D-flip flop.

i. List down different types of: (i) Analog to Digital Convertors ,(ii) Digital to Analog Convertors

j. Define Fan In and Fan Out.

2. Answer **Any Six** Questions 6 x 5

a. Simplify the below given expression using Karnaugh's map and draw the logic circuit using logic gates.
$F(a, b, c, d) = \Sigma m (0,2,3,4,7,9,10,11,15) + d (1,6,8)$

b. Explain the function of 4: 1 MUX with neat diagram and truth table.

c. Design the operation of full adder with the help of truth table and circuit diagram.

d. Design a JK flip flop using a RS flip flop.

e. With neat circuit diagram, Explain the working of R-2R ladder type DAC.

f. Write any 5 differences between SRAM and DRAM.

g Draw CMOS logic circuit of NAND and NOR gates.

3 Realize all the logic gates (NOT, AND, OR, NAND, NOR, XOR, XNOR) using NAND gates only. 10

4 Design a 2-bit magnitude comparator using logic gates. 10

5 Sketch the logic diagram of clocked JK Flip - Flop. Explain its working with functional table. 10

6 Explain briefly SISO, SIPO, PISO and PIPO shift register. 10

7 Design a mod-6 synchronous up counter. 10

3rd Sem./CSE/IT/ 2021(W)

Th4 OBJECT ORIENTED METHODOLOGY

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

   a. What is byte code?
   b. What are the different types of variables in java?
   c. Explain the usage of try and catch clause.
   d. How will you find out the length of a string in java?
   e. Define a package?
   f. How Java supports platform independency?
   g. Define Widening Type Casting
   h. Write the difference between method and constructor.
   i. Define stream.
   j. Difference between Buffered Reader and Scanner class in Java

2. Answer Any Six Questions 5X6

   a. Discuss about JVM. JRE, JDK.
   b. What are literals in Java? Mention their different types.
   c. Define stream. Discuss about Input Stream and Output Stream in Java.
   d. Distinguish between String and string buffer.
   e. Differentiate between Method Overloading and Method Overriding in Java.
   f. Discuss about Exception handling mechanism?
   g Explain how to use a particular package in a Java program. Give example.

3 Define inheritance. Describe different forms of inheritance. Does Java support multiple inheritances? 10

4 List out the looping statements available in Java. Explain with example. 10

5 Briefly explain the OOPS Concepts.. 10

6 What do you mean by Constructor? Discuss different types of constructor with example. 10

7 Explain about Class, Objects and Methods in Java with an example program 10