[B16 CS 2101]
II/IV B.Tech. DEGREE EXAMINATION
First Semester
DATA STRUCTURES
MODEL QUESTION PAPER
COMPUTER SCIENCE & ENGINEERING

Time: 3 Hrs. **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Briefly explain
   a) What is the role of stack in implementing Recursive algorithm?
   b) What is Space complexity?
   c) How do you represent a Polynomial using an array?
   d) What is complete binary tree and Give an example.
   e) What is Binary search tree, how it is useful.
   f) What are the applications of Stacks?
   g) Compare liner search and binary search

2. a) What is Abstract Data Type? Give ADT for Stack
   b) How to convert infix expression to postfix expression, write an algorithm for converting infix to postfix.

3. a) How to implement different Queue operations using single linked list.

   b) Write an algorithm for inserting an element in the middle of single linked list and in the middle of double linked list.
4. a) Arrange the following elements using Quick sort algorithm
   10   5   20   25   15   35   30

   b) Write a program for implementation of Quick sort, discuss the timing analysis of Quick sort in different cases.

5. a) How to sort the elements using BST explain with example, Write an algorithm for sorting elements using BST
   b) Write an algorithm to count the number of nodes in Binary tree.

6. a) Discuss about Graph Traversing techniques
   b) Discuss about different representations of Graphs

7. a) What is minimum cost spanning tree? Explain Prims algorithm by taking an example
   b) Write algorithms for inserting element to maxheap and deletion of element from maxheap.

8. Write short note on Two of the following
   a. Threaded Binary Tree
   b. Transitive Closure
   c. Circular Linked List
   d. Radix sort.

II/IV B.Tech. DEGREE EXAMINATION
First Semester
ELEMENTS OF ELECTRONICS ENGINEERING
MODEL QUESTION PAPER
(Common to CSE & IT)

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Briefly Explain
   a. Explain intrinsic and extrinsic semiconductor with examples.
   b. Define Drift and Diffusion currents.
   c. Define static and dynamic resistance of a diode.
   d. Define PIV of diode with examples.
   e. What is thermal runaway in transistors.
   f. Explain avalanche breakdown in PN diode.
   g. Compare FET with BJT .

2. a. Explain Hall effect and its application in details   **5 M**
   b. Derive an expression for diode current equation   **9 M**

3. a. Draw the V-I characteristics of zener diode and explain how zenerdiode acts as voltage regulator   **6 M**
   b. Explain tunneling phenomena, V-I characteristics and applications of tunnel diode   **8 M**

4. a**.** Draw the circuit diagram of bridge full wave rectifier with capacitor filter and explain its operation with the help of waveforms   **7 M**
   b. Determine I_{DC}, I_{RMS}, rectification efficiency and ripple factor of full wave rectifier with capacitor filter   **7 M**

5. a. What is Early effect and explain its consequences in transistor   **5 M**
   b. Draw the circuit diagram of NPN transistor connected in CE configuration and explain its input and output characteristics with diagrams   **9 M**

6. Draw the small signal low frequency h-parameter equivalent circuit of CE transistor amplifier. Derive expression for
   (i) current gain A_I(ii) voltage gain A_V,(iii) input impedance(iv) output admittance. **14 M**

7. a**.** Draw and explain different methods of biasing the transistor in details.   **7 M**
   b. Derive an expression for stability factor S of self bias circuit   **7 M**

8. a. Draw and explain the drain characteristics of common source field effect transistor 7M
   b. Explain the constructional details and characteristics of depletion type MOSFET **7 M**

II/IV B.Tech. DEGREE EXAMINATION
First Semester
DISCRETE MATHEMATICAL STRUCTURES
MODEL QUESTION PAPER
(Common to CSE & IT)

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. (a) Write the inverse, converse and contra positive of "If ΔABC is a right angle triangle
     then $AC^2 = AB^2 + BC^2$
    (b) Solve the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = 0, n \geq 2$
    (c) Define Planar graph with example
    (d) State Four Color theorem
    (e) Define Monoid and give an example
    (f) Prove that in a Lattice if $a, b \in L$ & $a \leq b, hen\ (a \bullet b) = a, (a \oplus b) = b$
    (f) Simplify the Boolean expression given by $(x \vee y) \wedge (x' \vee y)$

2.   a) Prove that $\{((p \vee q) \rightarrow r) \wedge (\neg p)\} \rightarrow (q \rightarrow r)$is a tautology

     b) Verify that the following argument is valid by using the rules of inference
        If Clifton does not live in France, then he does not speak French.
        Clifton does not drive a Datsun
        If Clifton lives in France, then he rides a bicycle
        Either Clifton speaks French, or he drives a Datsun
        Hence, Clifton rides a bicycle

3.   a) Using mathematical induction prove that n(n^2+5) is an integer multiple of 6.
     b)   How many integral solutions are there to x$_1$+ x$_2$+ x$_3$+ x$_4$+ x$_5$=20
        where x$_1$≥3, x$_2$≥2, x$_3$≥4, x$_4$≥6 and x$_5$≥0.

4. a) In how many ways can the letters $\{5.a, 4.b, 3.c\}$be arranged so that all the letters of the
        same kind are not in a single block?
    b) Solve the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = 0, n \geq 2$ by using
        generating function.S
5. a) Show that the following graphs are isomorphic

(a)   (b)
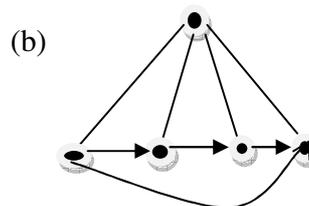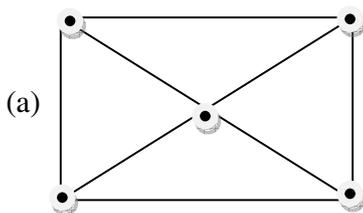
b) Define poset and draw the Hasse diagram for the poset $[P(A), \subseteq]$ where $A = \{a,b,c\}$

6. a) Prove that a tree with 'n' vertices has exactly 'n-1' edges
   b) State and Prove Euler's formula

7. a) Show that Every chain is a distributive lattice
   b) Show that the lattice (S_n, D) for n=216 is isomorphic to the direct product of lattices for n=8 and n=27

8. a) Use the karnaugh map representation to find a minimal sum of products expression of $f(a,b,c) = \sum (0,1,4,6)$
   b) Find the product of sums canonical forms of $((x_1 + x_2)(x_3 x_4)^1)^1$

[B16 CS 2102]

II/IV B.Tech. DEGREE EXAMINATION

First Semester

OBJECT ORIENTED PROGRAMMING

MODEL QUESTION PAPER

COMPUTER SCIENCE & ENGINEERING

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Answer the following.
    a) Write about virtual base class in C++.
    b) What is the use of final and super keywords in JAVA?
    c) Give an example of an Inline function.
    d) When do you use Friend functions?
    e) What is virtual destructor?

2. a) Explain concepts of Object Oriented Programming.
   b) Discuss Operator overloading concept with complex number addition example.

3. a) Explain all kinds of inheritance in C++ with examples.
   b) Write a program using class templates to sort an array of integers and an array of float numbers.

4. a) What is Constructor and explain the types of constructors in C++?
   b) Write a program using virtual functions. Your program contains two classes, base class by name College, derived class by branch derived both will contain a function display () that displays their respective details.

5. a) What is an abstract class? Explain the differences between abstract class and an interface
   b) What is Thread? Explain how threads are created in JAVA with an example

6. a) Discuss Exception handling mechanism in C++.
   b) Write a program for file copying using file streams in C++.

7. a) Explain the differences between method overloading and method overriding in JAVA.
   b) Write a program that implements an interface containing methods describing student information.

8. a) Differentiate the usage of access specifiers in java and their scope.
   b) What is a package? Write a program that shows scope of all kinds of variables inside and outside a package.

[B16 CS 2102]

[B16 CS 2103]
II/IV B.Tech. DEGREE EXAMINATION
First Semester
DIGITAL LOGIC DESIGN
MODEL QUESTION PAPER
COMPUTER SCIENCE & ENGINEERING

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1.   (a) Convert $(F5.E)_{16}$ into decimal.
        (b) What do you mean by K-map? Name it advantages and disadvantages.
        (c) Distinguish between a half-adder and a full-adder?
        (d) Explain the operation of a SR flip-flop?
        (e) What is a PLD? What is the principal advantage of a PLD?

2.   (a) Convert the following to Decimal and then to octal
            (i) $(125F)_{16}$ (ii) $(10111111)_2$ (iii) $(392)_{10}$
        (b) Perform the subtraction using 1's complement and 2's complement methods.
         (i) 11010 – 10000 (ii) 11010 – 1101 (iii) 100 – 110000
3.   (a) Simplify the following using K- map and implement the same using NAND gates.
       Y (A, B, C) = $\sum$ (0, 2, 4, 5, 6, 7)
        (b) Simplify the following Boolean expression.
           (i)   T(x, y, z) = (x + y) {[x' (y' + z')]'} +x' y' +x' z'
           (ii) X(A, B, C, D) = $A^1B^1C^1$ +(A+B+C^1)^1 +$A^1B^1C^1$D
4.   (a) Perform the realization of half adder and full adder using decoders and logic gates.
     (b) Design and draw the logic circuit diagram for full adder/subtractor. Let us consider a
        control variable w and the designed circuit that functions as a full adder when w=0,
        as a full subtractor when w= 1.
5.   (a) Draw the circuit diagram of a positive edge triggered JK flip flop and explain its
        operation with the help of a truth table?
     (b) Convert a D flip flop into SR flip flop and JK flip flop?
6.   (a) Design a sequential circuit for the given state diagram using D-flipflop
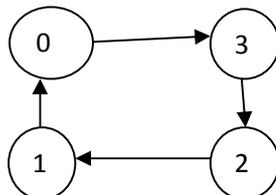
    b) Explain the operation of 4-bit ring counter with circuit diagram, state transition
diagram and state table. Draw the corresponding timing diagrams?

7. (a) Explain different types of registers with neat diagram?

     (b) Write the design steps of synchronous counters with suitable examples?

8. (a) Discuss how PROM, EPROM and EEPROM technologies differ from each other.

    (b) Implement the following multiple output functions using PROM

        $F1 = \sum m\ (0, 1, 4, 7, 12, 14, 15)$ $F2 = \sum m\ (2, 3, 7, 8, 10)$

        $F3 = \sum m\ (1, 3, 6, 9, 12)$ $F4 = \sum m\ (1, 3, 5)$

[B16 CS 2103]

II/IV B.Tech. DEGREE EXAMINATION
First Semester
ENVIRONMENTAL STUDIES
MODEL QUESTION PAPER
(Common to CIVIL, CSE & IT)

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write short answers for the following:

   (a) Give the objectives of Environmental Studies
   (b) Define ecosystem
   (c) What are hotspots?
   (d) What is soil erosion?
   (e) What is sustainable development?
   (f) State the practical benefits of watershed management
   (g) What is biomagnifications movement?

2. Write about structure and function of forest ecosystem

3. Give an account of the various energy resources of India and their merits and demerits.

4. Give the bio-geographical classification of India and add a brief note on threats to biodiversity

5. Explain causes, effects and control measures of water pollution

6. Write a critical account of the effect of population growth on environment.

7. Give an account of rain water harvesting and watershed management with suitable example

8. Write short notes:

   a) Conflicts of water
   b) Effect of modern agriculture
   c) Noise pollution
   d) Solid waste management

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II/IV B.Tech. DEGREE EXAMINATION
Second Semester
OPERATING SYSTEMS
MODEL QUESTION PAPER
COMPUTER SCIENCE & ENGINEERING

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Briefly explain about
   (a) Main Frame System.
   (b) Base Register.
   (c) Cache Memory.
   (d) Device Controller.
   (e) Control Word.
   (f) Page Table.
   (g) Write any 4 UNIX commands.

2. a) What are the functions of operating systems?
   b) Explain the structure of an operating system.

3. a) What is the difference between preemptive and non preemptive scheduling?
   b) Explain any Two non preemptive scheduling algorithms with suitable examples.

4. Explain any TWO Classical problems with code.

5. a) What are the conditions of deadlock? Explain with example.
   b) Explain about deadlock detection and recovery.

6. a) Discuss about various memory allocation strategies.
   b) What is page fault? What happens when page fault occurs?

7. 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.
    How many page faults would occur for the following page replacement algorithms,
    assuming an allocation of 4 frames?
    a) LRU
    b) FIFO
    c) OPTIMAL

8. a) b)Explain about different directory structures.
   b) Explain the process management in MS-DOS.

[B16 CS 2202]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester
COMPUTER ORGANIZATION
MODEL QUESTION PAPER
COMPUTER SCIENCE & ENGINEERING

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Write briefly about

       (a) Shift Micro Operations
       (b) Poling
       (c) Format of Micro instruction
       (d) Characteristics of RISC
       (e) Parallel Processing
       (f) RAM and ROM
       (g) Control Word

2. (a)Draw and Explain bus line with Three state Buffers.
    (b)Explain Arithmetic Micro Operations.

3. (a)Explain in detail about Instruction cycle with a flow chart.
   (b)Explain Memory Reference Instructions.

4. Explain Micro program sequencer with a Flow chart.

5.Write any two of the following

  (a) Pipelining
  (b) Vector pipeline
  (c)Array pipeline

6.(a)Describe Stack Organization.
  (b)Explain Addressing modes with suitable examples .

7.(a)Explain Hand shaking mechanism in Asynchronous Data Transfer.
  (b) Explain DMA controller with a neat sketch.

8. In detail explain Virtual Memory.

[B16 CS 2202]

II/IV B.Tech. DEGREE EXAMINATION
Second Semester
MICROPROCESSORS
MODEL QUESTION PAPER
COMPUTER SCIENCE & ENGINEERING

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. a)What is Microprocessor
    b)Write 8085 Interrupts
    c)Write IO instructions in 8085 MPU
    d)define the 8086 status word
    e)What is Read on fly operation
    f)Write 8253 modes
    g)SRAM vs DRAM

2. a) Explain the 8085 architecture and describe its PIN operation
    b) Design the Timing diagram for the instruction MVI A,32H

3. a)Explain Memory classification
    b) Describe the Interfacing characteristics of the IO devices

4. a) Explain the 8255 architecture and describe its MODEs of operation
    b) Explain the USART

5. a)Explain 8279 architecture
    b) Write the 8259 EOI commands

6. Explain the 8086 architecture
    a) Maximum Mode
    b) Minimum Mode

7. a) Explain 8086 addressing modes.
    b) Write the 8086 string manipulation instructions .

8. a) Design Interfacing diagram for 32KX8 SRAM by using 4KX8 SRAM's
    b) Write an assembly language program for HEXA keyboard.

II/IV B.Tech. DEGREE EXAMINATION
Second Semester
DATA COMMUNICATIONS
MODEL QUESTION PAPER
COMPUTER SCIENCE & ENGINEERING

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Briefly explain about
   (a) Define fundamental frequency.
   (b) Pulse stuffing.
   (c) Bit rate and Baud rate.
   (d) Goals of multiplexing.
   (e) Piggy backing.
   (f) Synchronous and Asynchronous transmission.
   (g) Different types of Modem.

2. (a) Explain about TCP/IP protocol architecture
   (b) Explain about Transmission Impairments.

3. (a) Explain about Digital – Digital encoding techniques.
   (b) Explain about pulse code modulation(PCM) and Delta modulation(DM).

4. (a) Explain about Cyclic Redundancy Check (CRC) in error detection process with example.
   (b) Explain about HDLC protocol.

5. (a) Differentiate between Synchronous TDM and Statistical TDM.
   (b) Explain about sliding window protocol.

6. Explain about switching processors and Front-end processors.

7. (a) Explain about various modes of propagation in wireless transmission.
   (b) Explain various Automatic Repeat Request techniques in error control.

8. (a) Explain about various types of terminals.
   (b) Explain about characteristics of interfacing.

II/IV B.Tech. DEGREE EXAMINATION
Second Semester
ADVANCED DATA STURUCTURES
MODEL QUESTION PAPER
COMPUTER SCIENCE & ENGINEERING

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Explain the following.
   a. Define Red Black Trees.
   b. d-Heaps
   c. Open Addressing
   d. Difference between Internal and External sorting
   e. Applications of ADT Disjoint set

2. a. Define AVL Tree. Explain single and double Rotations in an AVL tree.
   b. Explain B-Tree with an Example

3. a) Show the result of inserting 10, 12, 1, 14, 6, 5, 8, 15, 3, 9 ,7, 4, 11, 13 ,and 2 one at a
      time into an   initially empty binary Heap.
   b)Write Routine to perform delete_min operation for the above binary heap.

4. What are the advantages and disadvantages of different Collision Resolution strategies?

5. Explain the following.
    a) Multi Way Merge
    b) Poly-Phase Merge
    c) Replacement Selection.

6. a) Write a program to perform Topological sort on a Graph.
    b) Applications of DFS.

7. a) Advantages of Path Compression.
    b) Explain how Disjoint sets are useful in finding Minimum spanning Tree using
      KrusKal's Algorithm.

8. Show how to Merge two Skew Heaps with one top-down pass and reduce the merge cost
    to O(1) Amortized time.

[B16 CS 2206]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester
COMPUTER GRAPHICS
MODEL QUESTION PAPER
COMPUTER SCIENCE & ENGINEERING

Time: 3 Hrs.   **Max. Marks: 70**

Question No. 1 compulsory.
Answer any FOUR questions from the remaining.
All Questions Carry equal marks
All parts of a question must be answered at one place only

1. Explain the following
   a. What is a PIXEL?
   b. What is meant by Frame Buffer?
   c. What is inside-outside test?
   d. Define Homogeneous coordinates.
   e. What is Clipping?
   f. Distinguish between a Window and a Viewport?
   g. Define Approximation Splines.

2. a. List and explain applications areas of Computer Graphics?
   b.Differentiate Raster-Scan and Random-Scan systems with illustrations.

3. a. Implement simple DDA-Line drawing algorithm in C.
   b.Scan convert a circle with radius5 units using Mid-Point Circle Algorithm.

4. a.Explain basicTwo-Dimensional geometric transformations.
   b.Obtain the coordinates of a square with (-2,-2), (2,-2), (2,2)and (-2,2) as the corner points after rotating it by 90 degrees clockwise about the point (2,2).

5. a.Derive the transformation matrix for Window-to-Viewport coordinate transformation.
   b.Demonstrate Cohen-Sutherland line Clipping Algorithm with diagrams.

6. a.Scan convert a line starting at (0,0) and ending at (10,16) using Brenham's Line drawing algorithm.
   b.Explain Bezier curves and surfaces.

7. a.Construct basic Three-Dimensional geometric transformations using matrices.
   b.Derive transformation matrix for 3D Rotation about an arbitrary line.

8. a.What is a projection? Describe types of projections?
   b.What is Aliasing? Discuss about any two Anti-Aliasing Techniques.

[B16 CS 2206]