

[B16 IT 2101]
II/IV B.Tech. DEGREE EXAMINATION
First Semester
DATA STRUCTURES
MODEL QUESTION PAPER
INFORMATION TECHNOLOGY

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) 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.

[B16 IT 2101]

[B16 EC 2103]
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 zener diode acts as voltage regulator **6 M**
 - b. Explain tunnelling 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**

[B16 EC 2103]

[B16 ENG 2102]
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

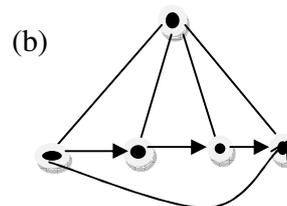
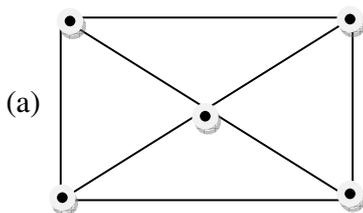
1. (a) Write the inverse, converse and contra positive of “If ΔABC is a right angle triangle then $AC^2 = AB^2 + BC^2$ ”
 (b) Solve the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = 0, n \geq 2$
 (c) Define Planar graph with example
 (d) State Four Color theorem
 (e) Define Monoid and give an example
 (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 $x_1 \geq 3, x_2 \geq 2, x_3 \geq 4, x_4 \geq 6$ and $x_5 \geq 0$.

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



- 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 $((x_1+x_2)(x_3x_4)^1)^1$

[B16 ENG 2102]

[B16 IT 2102]
II/IV B.Tech. DEGREE EXAMINATION
First Semester
OBJECT ORIENTED PROGRAMMING USING C++
MODEL QUESTION PAPER
INFORMATION TECHNOLOGY

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 a short answer to the following. [7x2 = 14 marks]
 - (a) What is Dynamic initialization?
 - (b) What are default arguments?
 - (c) What are inline functions?
 - (d) What is an Object?
 - (e) What is a static member variable?
 - (f) What is a constant pointer?
 - (e) What is an Abstract class?
2.
 - (a) Explain dynamic constructor with example.
 - (b) Explain Copy constructor with example.
3.
 - (a) What is a friend function and explain its characteristics.
 - (b) Write a c++ program to create 2 classes each with a single member variable, find out the maximum of two variables using a friend function.
4.
 - (a) Explain Operator overloading with example.
 - (b) What are virtual functions? With an example explain the usage of virtual functions.
5. Explain up casting, down casting and dynamic casting?
6.
 - (a) Explain multilevel inheritance.
 - (b) Explain Ambiguity resolution in inheritance.
7. What is a template? How they help in writing generic programs?
8. Explain the following
 - (a) Exception Handling in c++
 - (b) Polymorphism in c++
 - (c) Random access files.

[B16 IT 2102]

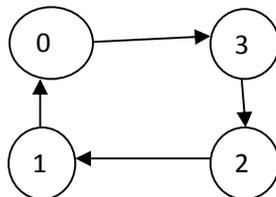
[B16 IT 2103]
II/IV B.Tech. DEGREE EXAMINATION
First Semester
DIGITAL LOGIC DESIGN
MODEL QUESTION PAPER
INFORMATION TECHNOLOGY

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 its 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) $X(A, B, C, D) = A^1 B^1 C^1 + (A+B+C^1)^1 + A^1 B^1 C^1 D$
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
- $$F1 = \sum m(0, 1, 4, 7, 12, 14, 15) \quad F2 = \sum m(2, 3, 7, 8, 10)$$
- $$F3 = \sum m(1, 3, 6, 9, 12) \quad F4 = \sum m(1, 3, 5)$$

[B16 IT 2103]

[B16 ENG 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

[B16 ENG 2103]

[B16 IT 2201]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester
OPERATING SYSTEMS
MODEL QUESTION PAPER
INFORMATION TECHNOLOGY

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

[B16 IT 2201]

[B16 IT 2202]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester
COMPUTER ORGANIZATION
MODEL QUESTION PAPER
INFORMATION TECHNOLOGY

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 IT 2202]

[B16 IT 2203]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester
MICROPROCESSORS
MODEL QUESTION PAPER
INFORMATION TECHNOLOGY

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.

[B16 IT 2203]

[B16 IT 2204]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester
DATA COMMUNICATIONS
MODEL QUESTION PAPER
INFORMATION TECHNOLOGY

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
 - (h) Define fundamental frequency.
 - (i) Pulse stuffing.
 - (j) Bit rate and Baud rate.
 - (k) Goals of multiplexing.
 - (l) Piggy backing.
 - (m) Synchronous and Asynchronous transmission.
 - (n) 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.

[B16 IT 2204]

[B16 IT 2205]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester
OPERATIONS RESEARCH
MODEL QUESTION PAPER
INFORMATION TECHNOLOGY

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 a short answer to the following. [7x2 = 14 marks]

- (a) Why artificial variable is needed in solving LPP?
- (b) Differentiate Big-M and Two Phase method?
- (c) What is Unbalanced Transportation problem?
- (d) What is the difference between PERT and CPM?
- (e) What is "Saddle Point Game"?
- (f) Differentiate Pure and Mixed Integer Programming?
- (g) What is Economic Order Quantity (EOQ)?

2. (a) Using Graphical method solve the following L.P.P

$$\begin{aligned} \text{Max (Z)} &= 3X + 2Y \\ \text{Subjected to constraints} \\ 3X_1 + X_2 &\geq 3, \quad 4X_1 + 3X_2 \geq 6, \quad X_1 + 2X_2 \geq 2 \text{ and } X_1, X_2 \geq 0 \end{aligned}$$

(b) Solve the following LPP

$$\begin{aligned} \text{Max(Z)} &= 4 X_1 + 3 X_2 \\ \text{Subjected to constraints } X_1 &\leq 5, \quad X_1 - X_2 \leq 8 \text{ and } X_1, X_2 \geq 0 \end{aligned}$$

3. (a) What is Degeneracy in LPP? How to resolve it?

(b) Standard weight of special purpose Brick is 5 Kgs and contains two ingredients B1&B2. B1 costs Rs 5/Kg & B2 costs Rs 8/Kg. Brick contains not more than 4Kg of B1 and minimum 2Kg of B2. Using Simplex method find the minimum cost of brick by satisfying above conditions?

4. a) Write the Dual of the Following Primal Problem

$$\begin{aligned} \text{Max (Z)} &= x_1 - 2x_2 + 3x_3 \\ \text{Subjected to constraints } -2x_1 + x_2 + 3x_3 &= 2, \quad 2x_1 + 3x_2 + 4x_3 = 1 \\ \text{and } x_1, x_2 &\geq 0, \quad x_3 \text{ is Unrestricted in sign?} \end{aligned}$$

b) Solve the following LPP using Dual Simplex method

$$\text{Max (Z)} = 5X_1 + 8X_2$$

Subjected to $X_1 \leq 4$, $X_2 \geq 2$, $X_1 + X_2 = 5$ and $X_1, X_2 \geq 0$

5. a) What is Inventory? Derive EOQ formula for Constant Demand?

b) The Project being planned involved the following activities

Activity	A	B	C	D	E	F	G
Predecessor	-	-	A	A,B	C,D	B,D	E,F
Duration	2	1	3	2	1	3	1

i. Construct the network diagram. ii. Find out the Critical path?

6. a) Explain the Hungarian Method to solve Assignment problem?

b) Explain Travelling Salesman Problem?

7. a) What is Two person Zero Sum Game? Explain Dominance Principle.

b) Find the optimal solution for the game using graphical method whose payoff matrix is given below?

		Player B				
		4	2	5	-6	6
Player-A		7	-9	7	4	8

8. (a) Explain Forward and Backward Recursion in Dynamic Programming.

(b) Solve the following LPP using Cutting Plane method

$$\text{Min } (Z) = 2x_1 + x_2 \quad \text{Subjected to } 3x_1 + x_2 \geq 3, 4x_1 + 3x_2 \geq 6, x_1 + 2x_2 \geq 2$$

$$\text{and } x_1, x_2 \geq 0 \text{ and Integers.}$$

[B16 IT 2206]
II/IV B.Tech. DEGREE EXAMINATION
Second Semester
JAVA PROGRAMMING
MODEL QUESTION PAPER
INFORMATION TECHNOLOGY

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 a short answer to the following. [7x2 = 14 marks]
 - a. What is a Remote Applet?
 - b. What is an event?
 - c. What is the usage of super keyword?
 - d. What is the use of finally keyword?
 - e. What is a garbage collector?
 - f. What is the difference between abstract class and an interface?
 - g. What are static methods?
2.
 - (a) Explain the Features of Java.
 - (b) Write a Java program to print prime numbers up to a given number.
3.
 - (a) What is the difference between an instance variable and class variable?
 - (b) How do you create an instance of a class?
4.
 - (a) Explain how an interface is different from a class.
 - (b) Explain how to achieve multiple inheritances in java with an example.
5.
 - (a) Explain different steps involved in creation and implementation of packages.
 - (b) Explain different ways of creating threads in java with examples.
6.
 - (a) Describe Exception Handling in java in detail
 - (b) Write a java program to reverse the digits of a given number.
7.
 - (a) Discuss briefly about the following
TCP,UDP,URL
 - (b) What is an Inet Address? How to create an InetAddress? What is its use?
8.
 - (a) Briefly describe the lifecycle of an Applet.
 - (b) Explain about different layout managers in AWT.

[B16 IT 2206]