Hall Ticket No: **Question Paper Code :**

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES
(AUTONOMOUS)
II/IV B. Tech I- Semester Regular Examinations Oct - 2016
(Regulations: R15)

Computer Organization

(IT)

Time: 3 hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT I

1. a) Show the block diagram of the hardware that implements the following register transfer statement YT2:R2 <- R1 , R1 <- R2 (4M)
   b) Draw the logic diagram for constructing a common bus system using multiplexer. (8M)

(OR)

2. a) Explain three state buffers and its purpose? (4M)
   b) Discuss about the various Arithmetic Micro operations along with a 4-bit Arithmetic circuit? (8M)

UNIT-II

3. a) Write a control sequence for execution of instruction: ADD(R3),R1? (4M)
   b) Explain about Memory Reference instructions with flowchart? (8M)

(OR)

4. a) Write a short notes on Instruction cycle? (4M)
   b) Explain with block diagram of basic organization of micro programmed control unit? (8M)

UNIT-III

5. a) What are the differences between microprocessor and micro program? (4M)
   b) Discuss about the various types of addressing modes by taking suitable example? (8M)

(OR)

6. a) How Stack is organized in computer? (4M)
   b) Explain general register organization? (8M)

UNIT-IV

7. a) Draw the block diagram of a 1Mx16memory using 512Kx8 memory chips? (4M)
   b) Show the organization of virtual memory address translation based in fixed length pages and explain its working? (8M)

(OR)

8. a) List Out characteristics of memory devices? (4M)
   b) What is the associate memory and what kind of operation it is more suitable? (8M)

UNIT-V

9. a) What are the types of Interrupts and define them? (4M)
   b) Why does I/O interrupt make more efficient use of the CPU? (8M)

(OR)

10. a) Compare and contrast I/O mapped I/O and memory mapped I/O? (4M)
    b) Explain the hardware registers that are required in a DMA controller chip? Why is it necessary for a DMA Controller to be able to interrupt the processor? Explain? (8M)

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II/IV B. Tech I- Semester Regular Examinations Oct - 2016
(Regulations: R15)

Data Communications

(IT)

Time: 3 hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT-I

1. a) Explain three Data communication Networks with a neat sketch (4M)
   b) Explain in detail different transmission impairments in communication systems (8M)

(OR)

2. a) Explain three wireless propagation (4M)
   b) Explain in detail the guided transmission medium with neat sketch (8M)

UNIT-II

3. a) Write any four characteristics of Line coding schemes (4M)
   b) Consider a stream of binary data 01001110 . Draw the wave form for this sequence using (8M)
      i) NRZ-L
      ii) Bipolar-AMI
      iii) Pseudoternary
      iv) Manchester

(OR)

4. Explain in detail the different methods used to convert a Digital Data to Analog Data (12M)

UNIT-III

5. a) For p=110011 and M=11100011, find the cyclic redundancy check(CRC) including the steps of the process (6M)
   b) Discuss about the Asynchronous and synchronous transmission with its character format (8M)

(OR)

6. Explain in detail the interfacing model of V.24/EIA-232-F along with their characteristics (12M)

UNIT-IV

7. a) Explain the TDM link control and pulse stuffing of synchronous time division multiplexing (8M)

   b) Write a short note on frequency division multiplexing (4M)

(OR)

8. Describe in detail the ADSL and xDSL with required diagrams (12M)

UNIT-V

9. a) Explain the basic characteristics of high level data link control including its frame format (12M)

(OR)

10. a) Explain the sliding window protocol using an example (6M)

    b) Describe several basic hardware in networking (6M)

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II/IV B. Tech I- Semester Regular Examinations Oct - 2016
(Regulations: R15)

Data Structures

(IT)

Time: 3 hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT-I

01. (a) Define and classify Data Structure. (2M)
(b) Discuss about Dynamic memory allocation. (4M)
(c) Implement the concept of Sparse Matrix by using dynamic memory allocation. (6M)

(OR)

02. (a) Explain primitive operations of single linked list with neat diagrams. (4M)
(b) Implement primitive operations of circular single linked list. (8M)

UNIT-II

03. (a) Convert 5+(3*(2^3/4*2)/4) into postfix notation using stack. (4M)
(b) Implement a program to evaluate postfix expression using primitive operations of stack. (8M)

(OR)

04. (a) Write advantages of circular queue over linked queue. (2M)
(b) Write a program to implement circular queue operations using Arrays. (8M)
(c) Discuss applications of queues. (2M)

UNIT-III

05. (a) Design a program to sort array of integer elements using quick sort. (6M)
(b) Explain different hashing techniques. (6M)

(OR)

06. (a) Design a program to search a key element using binary search. (6M)
(b) Discuss different collision regulation techniques in hashing. (6M)

UNIT-IV

07. (a) Design algorithm to convert a general tree into binary tree. (6M)
(b) Construct a binary tree using following traversal outputs.

- In order:
- Pre order: (6M)

(OR)

08. (a) Write a program to implement Insert, Delete and Traversal functions for a binary search tree. (8M)

(b) Explain rotations of AVL tree. (4M)

UNIT-V

09. (a) Discuss alternative ways of representation of graphs. (4M)

(b) Design a program to find path matrix of a graph using warshall's algorithm. (8M)

(OR)

10. (a) Discuss graph traversals with an example graph. (8M)

(b) Design an algorithm for finding minimal spanning tree using prim's. (4M)

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ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES
(AUTONOMOUS)
II/IV B. Tech I- Semester Regular Examinations Oct – 2016
(Regulations: R15)
Digital Logic Design
(Common for CSE and IT)

Time: 3 hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT-I

1. **(a)** Perform the following arithmetic operations using 8-bit registers. Use binary signed 1's complement notation, indicate overflow/underflow, if any (i) 29+ (-49) (ii) 27 -101 (iii) -28 + (-100) (iv) 68 + (-75). **(8M)**

(b). Design a full adder using two half adders and logic gates along with the logic equations **(4M)**

(OR)

2. **(a).**Determine the logic required to decode the binary number 1011 by producing a HIGH level on the output. **(2M)**

(b) Design a full subtractor and implement it using NAND gates. Explain its operation with the help of a truth table. **(4M)**

(c). Simplify the following expressions: **(6M)**

(i)AB + A(B+C) + B(B+C)

(ii)$\bar{A}BC + A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C} + A\bar{B}C + ABC$

(iii)$A\bar{B}C(BD+CDE) + A\bar{C}$

UNIT-II

3. **(a).** Minimize the following function in SOP form using k-map
F(A,B,C,D)= $\sum m(1,2,3,8,9,10,11,14)+ \sum d(7,15)$. **(4M)**

(b) Realize the above obtained Boolean function by using NOR gates. **(4M)**

(c) Draw the logic diagram of a 2- to- 4 line decoder using NAND gates and active Low enable input and write a HDL module for the same. (**4M)**

(OR)

4 (a) Use Karnaugh map, to realize the following POS expression,

$(A+B+C)\ (A+B+\overline{C})\ (A+\overline{B}+C)(\overline{A}+\overline{B}+C)\ (A+\overline{B}+\overline{C})$ **(4M)**

(b) Implement the resultant expression using NAND gates. **(4M)**

(c) Draw the logic diagram of a 2-to-4 line decoder with only NOR gates. Include an enable input. **(4M)**

UNIT-III

5. **(a)** Realize an edge triggered J-K flip-flop with SET and RESET inputs using NAND gates and explain its operation with truth table and waveforms. **(6M)**

(b) Show how a BCD ripple counter can be implemented. **(6M)**

(OR)

6. **(a)** Convert clock R-S flip-flop (FF) into

(i) JK F-F (ii) D-F-F (iii) T- F-F & Give the truth table for each. **(6M)**

(b) Explain different types of shift registers with neat diagrams. **(6M)**

UNIT-IV

7. **(a)** Write short notes about Races & Hazards. **(6M)**

(b) State Reduction & Assignment Problem. **(6M)**

(OR)

8. **(a)** State Reduction & Assignment Problem. **(5M)**

(b) Design a synchronous counter that goes through the sequence 2,6,1,7,5,4 and repeat. Use JK flip. **(7M)**

UNIT-V

9 **(a)** Design a ROM size to realize the following logic functions 5 * 32 line decoder & implement it. **(6M)**

(b) Draw a PLA circuit to implement the following functions and develop the programming table.

F1 = A'B + AC' + A'BC'

F2 = (AC + AB + BC)' **(6M)**

(Or)

10. **(a)** Write short note on types of ROMs. What is the use of EEPROM? **(4M)**

(b) Design a PLA to realize the following functions show the internal connection

F_1 (a,b,c,d,e)=a'b'd' +a'cd'+a'bcde'; **(8M)**

F_2 (a,b,c,d,e)=a'bc + b'cd'e;

F_3 (a,b,c,d,e)=a'b'd'+b'cd'e +a'bcd.

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II/IV B. Tech I- Semester Regular Examinations Oct - 2016
(Regulations: R15)
DISCRETE MATHEMATICAL STRUCTURES
(CSE, IT)

Time :3hours **Max Marks:60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT - I

1. a) Prove that A-B = $A \cap \overline{B}$ (6)

   b) Check whether the proposition is a $\{(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow R)\} \rightarrow R$ is tautology or not. (6)

(OR)

2. a) Using mathematical induction, Prove that if F_n is the nth Fibonacci number then

$$F_n = \frac{1}{\sqrt{5}}\left(\left(\frac{1+\sqrt{5}}{2}\right)^{n+1} - \left(\frac{1-\sqrt{5}}{2}\right)^{n+1}\right)$$ (6)

   b) Represent the following statement in to logical statement by using quantifiers.
   All men are fallible.
   All kings are men.
   Therefore all kings are fallible. (6)

UNIT – II

3. a) How many 3-digit numbers can be formed using the digits 1,2,3,4,5,6,8 and 9? and how many can be formed if no digit can be repeated? (6)

   b) In how many ways can 7 women and 3 men be arranged in a row if the 3 men must always stand next to each other? (6)

(OR)

4. a) Find the coefficient of x^3y^7 in i). $(x+y)^{10}$ and ii). $(2x-9y)^{10}$ (6)

   b) Use the multinomial theorem to expand $(x_1+x_2+x_3+x_4)^4$. (6)

UNIT – III

5. a) Find the coefficient of x^{20} in $(x^3 + x^4 + x^5 + ...)^5$. (6)

b) Solve the recurrence relations
$a_n - 3a_{n-1} - 4a_{n-2} = 0$ for n ≥ 2 and $a_0 = a_1 = 1$ (6)

(OR)

6. a) Solve the recurrence relation $a_n - 5a_{n-1} + 8a_{n-2} - 4a_{n-3} = 2^n$. (6)

b) Solve the recurrence relation $a_n - 7a_{n-1} + 12a_{n-2} = n4^n$. (6)

UNIT – IV

7. a) Draw the digraph of each of the following relations. (6)

i) The relation "divides," defined by "a divides b iff there exists a positive integer c such that a.c =b", on the integers $\{1,2,3,4,5,6,7,8\}$.

ii) the relation $\neq$ on the $\{0,1,2\}$.

b) Find the transitive closure of the relation R= {(a,b),(b,c),(c,d),(d,e)} on A = { a, b, c d, e } . (6)

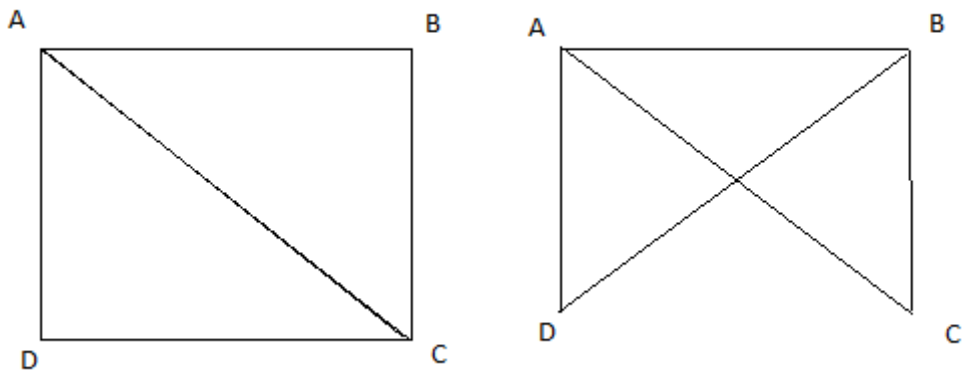
(OR)

8. a) Define equivalence relation and ordering relation with examples? (6)

b) Using Warshall's algorithm, compute the adjacency matrix of the transitive closure of the relation R = { (a,b),(b,c),(c,d),(d,e),(e,d) } on the set A = { a, b, c, d ,e }. (6)

UNIT - V

9. a) Verify the following graphs are isomorp hic or not? (6)

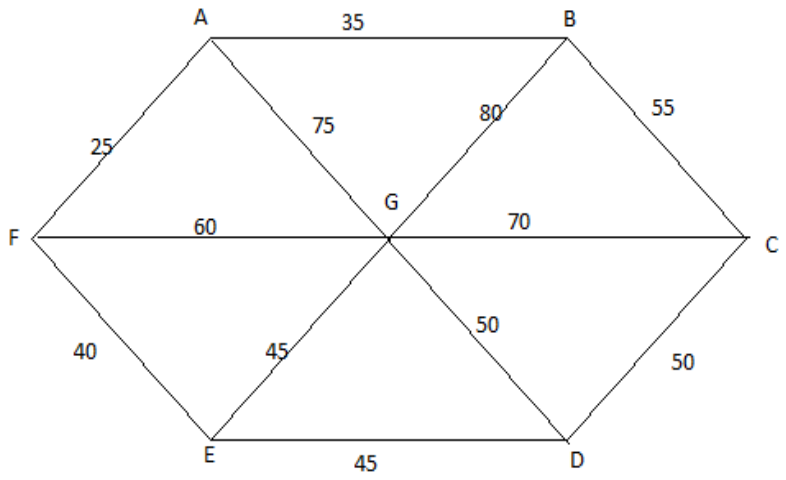


b) State and prove Euler's formula on plane graphs? (6)

(OR)

10. a) Define tree? Prove that a tree with n vertices has exactly n-1 edges. (6)

b) Find a minimal spanning tree for the following graph, Using kruskal's algorithm (6)



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DISCRETE MATHEMATICAL STRUCTURES
(CSE, IT)

Time :3hours **Max Marks:60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT - I

1 a) If $A=\{1,2,3\}$ *and* $\mathbf{B}=\{1,3,5\}$ are two sets, then find $((A\Delta B)\Delta B)-(A\Delta(B\Delta B))$ (6M)

b) Show that the proposition $((p\to q)\wedge(q\to r))\to((p\vee q)\to r)$ is a Tautology . (6M)

(OR)

2 a) Verify that the following argument is valid (or) not by using the rules of inference: (6M)

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, of he drives a Datsun.

Hence, Clifton rides a bicycle.

b) Using Mathematical Induction, Prove that for all integers $n\geq 4,\ 3^n>n^3$ (6M)

UNIT-II

3 a) How many 3-letter words can be formed using the letters a,b,c,d,e *and* f and using a letter only once if the letter $'a'$ is to used? (6M)

b) Use the multinomial theorem to expand $(x_1+x_2+x_3+x_4)^4$ (6M)

(OR)

4 a) How many integral solutions are there for $x_1+x_2+x_3+x_4=20$ if $1\leq x_1\leq 6,\ 1\leq x_2\leq 7,\ 1\leq x_3\leq 8,$ and $1\leq x_4\leq 9$ (6M)

b) Find the coefficient of x^5y^5 in $i).\ (x+y)^{10}$ ii). $(2x-9y)^{10}$? (6M)

UNIT-III

5 a) Calculate $B(X) = \sum_{r=o}^{\infty} b_r X^r = \frac{1}{X^2 - 5X + 6}$ (6M)

b) Solve the recurrence relation using the characteristic roots (6M)

$a_n + 7a_{n-1} + 8a_{n-2} = 0 \ and \ a_0 = 2, a_1 = -7$

(OR)

6 a) In how many ways can we distribute 24 pencils to 4 children, so that each child gets at least 3 pencils but not more than Eight? (6M)

b) Solve the recurrence relation $a_n - 7a_{n-1} + 10a_{n-2} = 7.3^n \ for \ n \geq 2$ using the method of undetermined coefficients. (6M)

UNIT-IV

7 a) Let **A** be the set of all nonzero real numbers. For $a, b \in A$, define $(a,b) \in R$ iff a/b is a rational number. Prove that R is an equivalence relation on **A** (6M)

b) Consider the relation $R = \{(a,b), (b,c), (b,d), (d,a), (c,c)\}$ on A={a,b, c, d, e } Then Draw a digraph of the relation i). R. ii). The complement of R, iii). The inverse of R, iv). $R \cap R^{-1}$. (6M)

(OR)

8 a) Define a POSET and show that $\langle P(A), \subseteq \rangle$ is a POSET where $P(A)$ is the Power set of $A = \{a, b, c\}$. (6M)

b) Find the Transitive closure of the Relation $R = \{(1.2), (1,3), (2,3), (3,1)\}$ on $A = \{1, 2, 3\}$. (6M)

UNIT-V

9 a) Write BFS and DFS algorithms for a spanning trees. (6M)

b) Prove that a complete graph K_n is planar graph if and only if $n \leq 4$. (6M)

(OR)

10 a) Write Kruskal's and Prim's algorithms for finding minimal spanning tree. (6M)

b) Define tree traversals of a binary tree and find a binary tree whose preorder, in order traversals are given (6M)

Preorder: $G\,B\,Q\,A\,C\,P\,D\,E\,R$

In order: $Q\,B\,C\,A\,G\,P\,E\,D\,R$