

Seat No.	
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SC - 821

Total No. of Pages : 3

S.Y. B.Tech. (Computer Science and Engg.) (Semester - III) (CBCS)

Examination, November - 2019

APPLIED MATHEMATICS

Sub. Code : 73276

Day and Date : Saturday, 23 - 11 - 2019

Total Marks : 70

Time : 10.00 a.m. to 12.30 p.m.

- Instructions :**
- 1) Attempt any three full questions from each section.
 - 2) Figures to the right indicate full marks.
 - 3) Use of non-programmable calculator are allowed.
 - 4) Assume suitable data if necessary.

SECTION - I

Q1) a) Find the two lines of regressions from the following data [6]

x	:	57	42	38	42	45	42	44	40	46	44	43	40
y	:	10	26	41	29	27	27	19	18	19	31	29	33

b) Fit straight line to the following data [6]

x	:	10	20	30	40	50	60	70	80
y	:	1	3	5	10	6	4	2	1

Q2) a) Out of 1000 families with 4 children each how many would you expect to have

- i) 2 boys and 2 girls
- ii) At least one boy
- iii) No girls

Assume boys and girls are equally likely.

[6]

b) A firm has two cars which it hires out day by day. The number of demand for a car on each day is distributed as a poisson's variate with mean 1.5. Calculate the probable no. of days in a year on which [5]

- i) Neither car is in demand
- ii) A demand is refused.

P.T.O.

Q3) a) Evaluate $\int_0^8 \frac{dx}{1+x^2}$ by using Trapezoidal rule, taking 6 steps. [5]

b) Use Simpson's $\frac{1}{3}$ rd rule to find $\int_0^{0.6} e^{-x^2} dx$ taking the 6 steps. [6]

Q4) Attempt any two.

a) Fit a second degree curve to the following data [6]

x :	0	1	2	3	4
y :	1	1.8	1.3	2.5	6.3

b) In a test of 2000 electric bulbs, it was found that the life time of the bulbs was normally distributed with the mean of 2040 hours and standard deviation of 60 hours. Estimate the number of bulbs likely to burn out

i) more than 2140 hours

ii) less than 1950 hours

(Given : for S.N.V.z area from $z=0$ to $z=1.83$ is 0.4664, that between $z=0$ and $z=1.5$ is 0.4332) [6]

c) Compute the value of $\int_{0.2}^{1.4} (\sin x - \log x + e^x) dx$ using Simpson's $\frac{3}{8}$ th rule taking 6 steps. [6]

SECTION - II

Q5) a) Define scalar cardinality and fuzzy cardinality. Give one example of each. [6]

b) Find α -cuts and strong α -cuts for the value of $\alpha=0.25$ and $\alpha=0.5$ for the fuzzy set $\overline{A \cup B}$ where [6]

$$A = \left\{ \frac{0.25}{1} + \frac{0.35}{2} + \frac{0.13}{3} + \frac{0.27}{4} + \frac{1}{5} \right\}, B = \left\{ \frac{x+1}{x+3} \right\} X \in \{1, 2, 3, 4, 5\}$$

Q6) a) Define fuzzy number and determine whether the following fuzzy set is a

$$\text{fuzzy number } A(x) = \begin{cases} \sin x & 0 \leq x \leq \pi \\ 0 & \text{otherwise} \end{cases} \quad [5]$$

b) Solve $A + X = B$ for the following fuzzy sets

[6]

$$A = \begin{cases} x-3 & 3 \leq x \leq 4 \\ 5-x & 4 \leq x \leq 5 \\ 0 & \text{otherwise} \end{cases}, B = \begin{cases} \frac{x-12}{8} & 12 \leq x \leq 20 \\ \frac{32-x}{12} & 20 \leq x \leq 32 \\ 0 & \text{otherwise} \end{cases}$$

Q7) Solve the assignment problem for minimization

[11]

		Machines				
		I	II	III	IV	V
Operators	A	8	20	19	31	25
	B	26	37	39	41	15
	C	9	11	24	5	7
	D	29	31	41	45	50
	E	71	19	21	31	45

Q8) Attempt any two questions from the following.

a) Find fuzzy cardinality of $\overline{A \cap B}$ where

[6]

$$A = \left\{ \frac{0.23}{1} + \frac{0.29}{2} + \frac{0.71}{3} + \frac{0.15}{4} + \frac{1}{5} \right\}, B = \left\{ \frac{x+1}{x+5} \right\} \quad X \in \{1, 2, 3, 4, 5\}$$

b) Find $A - B$ for the following fuzzy sets

[6]

$$A = \begin{cases} \frac{x-1}{2} & 1 \leq x \leq 3 \\ \frac{5-x}{2} & 3 \leq x \leq 5 \\ 0 & \text{otherwise} \end{cases}, B = \begin{cases} \frac{x-3}{2} & 3 \leq x \leq 5 \\ \frac{7-x}{2} & 5 \leq x \leq 7 \\ 0 & \text{otherwise} \end{cases}$$

c) Solve the assignment problem for maximization

[6]

	I	II	III	IV
A	2	3	4	5
B	11	12	9	7
C	21	35	15	7
D	9	15	13	14

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S.E. (Computer Science & Engineering) (Part - II) (Semester - III)

Examination, November - 2019

APPLIED MATHEMATICS

Sub. Code : 63524

Day and Date : Saturday, 23 - 11 - 2019

Total Marks : 50

Time : 9.30 a.m. to 11.30 a.m.

- Instructions :**
- 1) Attempt any two questions from each section.
 - 2) Figures to right indicate full marks.
 - 3) Use of non - programmable calculator is allowed.

SECTION - I

Q1) Attempt any two of the following (each six marks). [12]

- a) Find equation of line of regression of x on y to the following data.

x	11	26	39	47	58
y	47	49	56	67	78

- b) Find the value of the integral in five steps by using Trapezoidal rule.

$$\int_2^3 x^2 e^x dx..$$

- c) Determine the root of the following equation correct up to four decimal places using Secant Method $2x^2 - 4x - 1 = 0$

Q2) Attempt any two of the following (each six marks). [12]

- a) Verify whether following function is continuous probability density function.

$$f(x) = \begin{cases} \frac{3}{4} \times (2 - x) & 0 \leq x \leq 2 \\ 0 & \text{otherwise} \end{cases}$$

- b) The height of 300 students are normally distributed with mean 64.5" and standard deviation 3.3". How many students have height less than 60". (Standard Normal Variate from $z=0$ to 1.36 is 0.4131)
- c) It is 1 in 500 that an articles is defective. There are in a box 1000 articles of this type. Assuming Poisson distribution, if there are 5000 boxes of such type then find how many boxes contains not more than 1 defective articles.

P.T.O.

Q3) a) Fit a Binomial distribution to the following data.

[7]

x	0	1	2	3	4	5
f	5	7	16	15	6	1

b) Fit a second degree curve to the following data.

[6]

x	0	1	2	3	4	5
y	12	33	45	55	63	72

SECTION - II

Q4) a) If the fuzzy sets A and B are defined by

$$A(x) = \frac{0.8}{5} + \frac{0.5}{4} + \frac{0.7}{3} + \frac{0.3}{2} + \frac{0.1}{1}$$

$$B(x) = \frac{1}{1} + \frac{0.8}{2} + \frac{0.7}{3} + \frac{0.6}{4} + \frac{0.5}{5}$$

Find $A \cup B$, $A \cap B$ and $\bar{A} \cap B$.

[6]

b) If the fuzzy sets A and B are defined by

$$A(x) = \frac{0.3}{x_1} + \frac{0.9}{x_2} + \frac{0.7}{x_3} + \frac{0.6}{x_4} + \frac{0.1}{x_5}$$

$$B(x) = \frac{0.2}{x_1} + \frac{0.4}{x_2} + \frac{0.5}{x_3} + \frac{0.7}{x_4} + \frac{0.9}{x_5}$$

Calculate the degree of subset hood $S(A, B)$ and $S(B, A)$.

[7]

Q5) Attempt any two of the following.

- a) Define α - cuts and strong α - cuts and find α - cuts and strong α -cuts for $\alpha = 0.5, 0.7$ for the Fuzzy set defined by

$$A(x) = \frac{0.5}{x_1} + \frac{0.4}{x_2} + \frac{0.7}{x_3} + \frac{0.8}{x_4} + \frac{1}{x_5}$$

- b) Using extension principle find $f(A,B)$ where $f(x_1, x_2) = 2x_1 + x_2$ and A and B are given as

$$A(x) = \frac{0.5}{1} + \frac{0.6}{2} + \frac{0.9}{3} + \frac{1}{4} + \frac{0.2}{5}$$

$$B(x) = \frac{0.3}{3} + \frac{0.4}{4} + \frac{0.7}{5} + \frac{1}{6} + \frac{0.3}{7}$$

- c) Calculate the fuzzy number A.B for the fuzzy number A and B, given below

$$A(x) = \begin{cases} \frac{x-1}{2}, & 1 < x \leq 3 \\ \frac{5-x}{2}, & 3 < x \leq 5 \\ 0, & \text{otherwise} \end{cases} \quad \text{and} \quad B(x) = \begin{cases} \frac{x-3}{2}, & 3 < x \leq 5 \\ \frac{7-x}{2}, & 5 < x \leq 7 \\ 0, & \text{otherwise} \end{cases}$$

Q6) Solve the assignment problem.

[12]

		Tasks				
Persons		P	Q	R	S	T
	A	11	17	8	16	20
	B	9	7	12	6	15
	C	13	16	15	12	16
	D	21	24	17	28	26
	E	14	10	12	11	13



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S.Y.B.Tech. (Computer Science and Engineering)
(Semester - III) Examination, November - 2019

DATA STRUCTURES

Sub. Code : 73278

Day and Date : Thursday, 28 - 11 - 2019

Total Marks : 70

Time : 10.00 a.m. to 12.30 p.m.

- Instructions :**
- 1) Q. 1 is compulsory.
 - 2) Attempt any four questions from Q. 2 to Q. 6.
 - 3) Figures to the right indicate full marks.

Q1) Attempt any 10 out the following. (Write complete statement of question and answer in the answer sheet). [10]

- a) Which of the following data structures or its combinations can be used to implement Linear Queue?
 - i) Array
 - ii) Linked List
 - iii) Stack
 - iv) All the Above
- b) A binary tree whose left subtree and right subtree differ in height by only 1 is called as :
 - i) Complete Binary Tree
 - ii) General tree
 - iii) AVL tree
 - iv) Almost complete tree
- c) Given an undirected graph G with V vertices and E edges, the sum of the degrees of all vertices is
 - i) E
 - ii) 2E
 - iii) V
 - iv) 2V
- d) Which of the following is true about linked list implementation of stack?
 - i) In push operation, if new nodes are inserted at the beginning of linked list, then in pop operation, nodes must be removed from end.
 - ii) In push operation, if new nodes are inserted at the end, then in pop operation, nodes must be removed from the beginning.
 - iii) Both of the above
 - iv) None of the above

P.T.O.

- e) A full binary tree with n leaves contains
- i) n nodes
 - ii) $\log_2 n$ nodes.
 - iii) $2n - 1$ nodes
 - iv) 2^n nodes
- f) Which of the following sorting algorithms does not have a worst case running time of $O(n^2)$?
- i) Insertion sort
 - ii) Merge sort
 - iii) Quick sort
 - iv) Bubble sort
- g) The data structure required for Breadth First Traversal on a graph is
- i) queue
 - ii) stack
 - iii) array
 - iv) tree
- h) What data structure would you mostly likely see in a non-recursive implementation of a recursive algorithm?
- i) Stack
 - ii) Linked list
 - iii) Queue
 - iv) Trees
- i) An adjacency matrix representation of a graph cannot contain information of:
- i) nodes
 - ii) edges
 - iii) direction of edges
 - iv) parallel edges
- j) Which of the following data structures is indexed structure?
- i) Array
 - ii) Structure
 - iii) Stack
 - iv) Queue
- k) Consider the usual algorithm for determining whether a sequence of parentheses is balanced.

The maximum number of parentheses that appear on the stack AT ANY ONE TIME when the algorithm analyzes: $((((())) ()))$ are :

- i) 1
- ii) 2
- iii) 3
- iv) 4 or more

- Q2) a) Write a C program to implement Bubble sort algorithm. [7]
b) List and explain the Graph Terminologies. [8]
- Q3) a) Write a C program or Pseudo Code for implementation Linear Search algorithm. [7]
b) List and explain various types of Binary Tree with appropriate diagrams. [8]
- Q4) a) List and explain the graph traversal techniques. [8]
b) Write a C Program or Pseudo Code for implementation of Stack using array. [7]
- Q5) a) List the different types of Linked list. Explain each with appropriate diagrams. [7]
b) Write a C program or Pseudo code for following operations on a Doubly Linked List : [8]
i) Insert node at end of list
ii) Delete node at start of list
iii) Display the nodes from last node to first node of the list
- Q6) a) Define Queue. List and explain the applications of Queue in details. [7]
b) Write a C program or Pseudo code for following operations on a binary tree : [8]
i) Insert a new node to the tree
ii) Pre order traversal
iii) Post order traversal
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DATA STRUCTURES

Sub. Code : 63526

Total Marks : 50

Time : 9.30 a.m. to 11.30 a.m.

Instructions :

- 1) All Questions are compulsory
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data whenever necessary.

- Q1) a) Define Following Terms:** [4]
 i) Array ii) Asymptotic time complexity
 b) What is hashing? Explain different hashing techniques. [4]
 c) Explain Linear search technique. [4]

- Q2) a)** Explain Algorithm for following operations of doubly linked list [7]
 i) Attach a node in the beginning of the linked list.
 ii) Detach the last node of linked list
b) Explain push and pop operations of stack. [6]

OR

Explain Quick Sort algorithm.

- Q3) a) Explain different traversal techniques used in binary tree [6]
b) Explain insert node operation in Binary Search Tree. [7]

OR

Explain Depth First Traversal in Graph.

- Q4) a) Explain structure of B Tree. [4]
b) Explain following terms: [4]
i) Depth of a tree.
ii) Path matrix in a graph
c) What is heap? How heap is stored in an array? [4]



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S.Y. B.Tech. (CSE) (Part - II) (Semester - III)
Examination, November - 2019
DISCRETE MATHEMATICAL STRUCTURE
Sub. Code: 73277

Day and Date : Tuesday, 26 - 11 - 2019

Total Marks : 70

Time : 10.00 a.m to 12.30 p.m.

- Instructions :**
- 1) Question No. 1 is Multiple Choice Question (MCQ) type question and it is compulsory.
 - 2) Solve any 4 questions from question 2 to question 6.
 - 3) Figures at right indicates full marks.
 - 4) Choose suitable data whenever necessary.

Q1) Solve following Multiple Choice Questions by selecting correct option for a given question.

a) Given a set X , and $P(X)$ is its power set. The relation $\langle P(X), \subseteq \rangle$ is. [1]

- i) Equivalence Relation
- ii) Partial order relation
- iii) Compatibility relation
- iv) Reflexive relation

b) Given a Graph $G = \langle V, E \rangle$, where V is set of vertices and E is set of edges which are associated with an unordered pair $\langle u, v \rangle$. The graph is called _____. [1]

- i) Undirected Graph
- ii) Directed Graph
- iii) Mixed Graph
- iv) None of These

c) $(P \wedge P) = P$ is,

- i) De Morgan's law
- ii) Absorption law
- iii) Idempotent law
- iv) Commutative law

P.T.O.

- d) A set of formulas H_1, H_2, \dots, H_n is said to be consistent. [1]
- i) If the conjunction has truth value T
 - ii) If the conjunction has truth value F
 - iii) If the disjunction has truth value T
 - iv) If the disjunction has truth value F
- e) Let $N = \{1, 2, 3, \dots\}$ be ordered by divisibility, which of the following subset is totally ordered, [1]
- i) (2, 6, 24)
 - ii) (3, 5, 15)
 - iii) (2, 9, 16)
 - iv) (4, 15, 30)
- f) If B is a Boolean Algebra, then which of the following is true. [1]
- i) B is finite but not complemented lattice
 - ii) B is finite, complemented and distributive lattice
 - iii) B is a finite, distributive but not complemented lattice
 - iv) B is not distributive lattice
- g) $[\sim q \wedge (p \rightarrow q)] \rightarrow \sim p$ is, [2]
- i) Satisfiable
 - ii) Unsatisfiable
 - iii) Tautology
 - iv) Invalid
- h) Which of the following relations is symmetric. [1]
- i) $\{(1, 1), (1, 2), (1, 3)\}$
 - ii) $\{(1, 1), (1, 2), (1, 3), (2, 2), (2, 3), (3, 3)\}$
 - iii) $\{(1, 2), (2, 1), (2, 2), (3, 3)\}$
 - iv) $\{(1, 2), (1, 3), (2, 3)\}$

- i) In a directed graph, for any node V, the no. of edges which have V as their Initial node _____ [1]

- i) Indegree of node ii) Outdegree of node
 iii) Total degree of node iv) None of these

- Q2) a) Define tautology and contradiction. For the given statement formulas check whether they are tautology or Contradiction or none [6]

i) $((\sim p \rightarrow Q) \rightarrow (Q \rightarrow P))$

ii) $((P \vee Q) \rightarrow P)$

- b) Obtain PDNF and PCNF of $P \wedge (P \rightarrow Q)$ [4]

- c) What is a function? Define different types of functions with example. [5]

- Q3) a) Given $R = \{ \langle 1, 2 \rangle, \langle 3, 4 \rangle, \langle 2, 2 \rangle \}$, $S = \{ \langle 4, 2 \rangle, \langle 2, 5 \rangle, \langle 3, 1 \rangle, \langle 1, 3 \rangle \}$ find. [6]

i) R^2

ii) $R^2 \circ S$

iii) S^3

- b) Define subgroups & its Types. Find all proper subgroups of $\langle \mathbb{Z}_5, +_5 \rangle$ [7]

- c) Using the statements [2]

P : Mark is Rich

Q : Mark is Happy

Find: i) $\neg P \rightarrow Q$ ii) $\neg P \vee Q$

- Q4) a) Define Monoid Homomorphism? Give an example [5]

- b) Write short note on Minimization of Boolean Functions. [6]

- c) Consider a Set $S = \{a, b, c\}$. Draw Hasse Diagram of the POSET $\langle P(S), \subseteq \rangle$ [4]

Q5) a) Check whether following conclusion is valid or not:

[4]

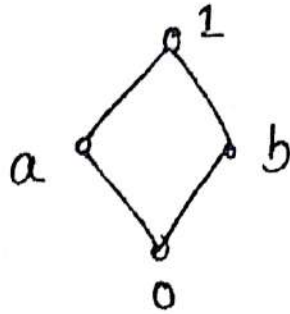
i) $P \rightarrow Q, Q \rightarrow R$, and $P \Rightarrow R$

b) Explain Clock Algebra. Give an example.

[4]

c) Show that following Lattice is Complemented & Distributive.

[3]

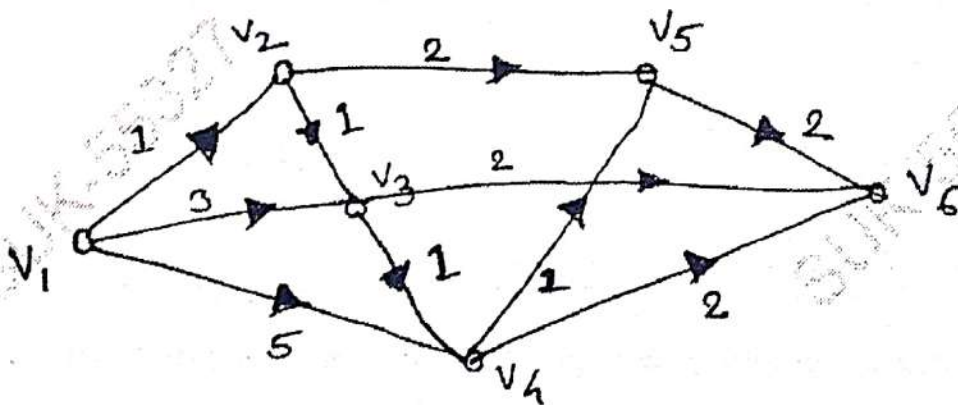


d) Define Cyclic group with example.

[4]

Q6) a) Find the critical path of the following Graph.

[4]



b) Define the following terms with an example

[6]

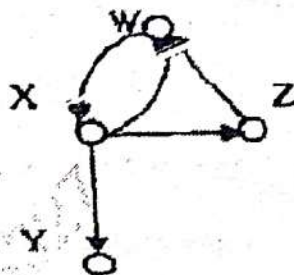
i) Path

ii) Digraph

iii) Null Graph

c) Draw Storage representation of following Diagram.

[5]



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S.Y.B. Tech. (Computer Sci.) (Semester - III)**Examination, November - 2019****COMPUTER NETWORKS-I****Sub. Code: 73279****Day and Date : Saturday, 30 - 11 - 2019****Total Marks : 70****Time : 10.00 a.m. to 12.30 p.m.**

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.

Q1) a) Draw & explain TCP/IP protocol model in detail. [7]

OR

Differentiate between Manchester & differential Manchester encoding.
Draw the signal for 01101011. [7]

b) List & explain framing methods in DLL. [6]

Q2) a) What is CSMA? differentiate between pure & slotted ALOHA. [6]

OR

A (7,4) Hamming codeword is received by the receiver as 1011011 by assuming even parity check, whether the error is there & if error then, what should be the right codeword. [6]

b) Explain collision free protocols in detail. [6]

Q3) Write short notes on (any two) [10]

- a) Sliding window protocol - selective Repeat.
- b) IEEE 802.3 frame format
- c) Dynamic channel Allocation.

P.T.O.

Q4) a) Explain Link state routing Algorithm with example. [7]

OR

What is subnetting? If class B network is divided into 4 subnetworks, then what will be the subnet ID & subnet mask. [7]

b) Define congestion? How to control congestion. [6]

Q5) a) Explain TCP segment format. [6]

OR

Explain in detail Transport service primitives. [6]

b) Explain ICMP error control formats. [6]

Q6) Write short notes on (Any Two) [10]

a) Flow control in TCP

b) Jitter control

c) ARP & RARP



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S.E. (C.S.E.) (Part-I) (Semester-III) Examination, December - 2019
MICROPROCESSORS

Sub. Code : 63528

Day and Date : Tuesday , 3-12-2019

Total Marks :50

Time : 9.30 a.m.to 11.30 a.m.

- Instructions :**
- 1) Attempt any two Questions from Q. No. 1,2,3 and 5,6,7.
 - 2) Questions No. 4 and 8 are compulsory

SECTION-I

- Q1) a)** Explain programming model of advanced Microprocessors in detail.[5]
b) Write Concept of Real Mode memory addressing of microprocessors. [5]
- Q2) a)** Explain all Data addressing Mode of advanced microprocessors. [5]
b) Write a program for 2*8 by using only ADD instruction. [5]
- Q3) a)** Draw and explain format of Access Right Byte in deep for interfacing [5]
b) Explain JUMP, CALL, Compare and HLT instructions. [5]
- Q4) Write short Note on (any one)** [5]
a) Load Effective Address
b) Flag register for entire 80 X86 and pentium microprocessor family.
c) 80386-P4 descriptor

P.T.O.

SECTION-II

- Q5) a)** Write all comparison instructions of advanced microprocessor with proper syntax. [5]
- b)** Draw and Explain architecture of recent advances in 80386DX microprocessor [5]
- Q6) a)** Draw and explain the internal structure of the pentium -Pro microprocessor [5]
- b)** Explain Basic Interrupt Processing [5]
- Q7) a)** Explain all BCD and ASCII instructions in details [5]
- b)** Explain Memory Paging Mechanism [5]
- Q8) Write short Note on (any one)** [5]
- a)** Virtual 8086 Mode
- b)** Hardware Interrupt
- c)** Hyper Threading Technology



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**S.Y. B. Tech. (Computer Science) (Part - II) (Semester - III)
(CBCS) (Revised) Examination, December - 2019**

MICROPROCESSORS

Sub. Code : 73280

Day and Date : Tuesday, 3 - 12 - 2019

Total Marks : 70

Time : 10.00 a.m. to 12.30 p.m.

- Instructions :**
- 1) Question 3a is compulsory and solve any one question from Q. 3b and Q. 3c.
 - 2) Question 6a is compulsory and solve any one question from Q. 6b and Q. 6c.
 - 3) Figures to the right indicate full marks.

Q1) Solve any two questions.

- a) Write short note on classification of instruction based on length [6]
- b) Write a short note on following arithmetic instructions related to 8085. [6]
 - i) ADD ii) SBB iii) INR
- c) Write a short note on Data Memory (RAM) of 8051 Microcontroller. [6]

Q2) Solve any two question.

- a) Write a short note on any three of the following special purpose registers. [6]
 - i) Instruction Pointer (IP) ii) Stack Pointer (SP)
 - iii) Carry flag (C) iv) Parity flag (P)
- b) In Context with data-addressing modes, write a short note on any two of the following. [6]
 - i) Base-Plus-Index addressing
 - ii) Register Relative Addressing
 - iii) Register Addressing
- c) Explain Indirect Program memory addressing in context with program memory-addressing modes. [6]

P.T.O.

- Q3) a) Explain String Instructions in 8086? [6]
b) Explain MOV instructions? Draw a diagram for MOV BX, CS instruction converted to binary machine language. [5]

OR

- c) With example write a short note on comparison instruction. [5]

Q4) Solve any two question.

- a) Explain 8086 instruction : TEST, NEG and NOT with example and its purpose? [6]
b) List and explain types of Software Interrupts? [6]
c) Write 8086 logical instructions to multiply the contents of AX register by:
i) 10 ii) 18 [6]

Q5) Solve any two question.

- a) Draw and explain physical memory system of 80386 Microprocessor? [6]
b) Explain Virtual 8086 Mode in 386 Processor? [6]
c) Explain Paging Mechanism in 80386? [6]

- Q6) a) Draw and briefly explain Memory Bank in Pentium Pro system? [6]
b) Explain Hyper Threading? [5]

OR

- c) List and explain functions of 8086 Flags? [5]



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S.E. (Computer Science and Engineering) (Semester - IV)

Examination, November - 2019

Automata Theory

Sub. Code : 63531

Day and Date : Wednesday 13-11-2019

Total Marks :50

Time : 2.30 p.m.to 4.30 p.m.

- Instructions :**
- 1) All questions are compulsory
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data whenever necessary.

- Q1) a) Define Following Terms:** [4]
- i) Extended Transition function for NFA.
 - ii) Context Free Grammar.
- b) Write Regular expression for following languages (assume $\Sigma = \{0,1\}$)** [4]
- i) The language of all strings containing at least two 0's.
 - ii) The language of all strings having 011 or 101 as substring.
- c) Draw Deterministic Finite Automata (DFA) for $r = (1+0)^* 101(1+0)^*$** [4]

- Q2) a) State and prove Kleen's theorem part-II.** [6]

OR

Write regular grammar for following languages:

- i) $r = (01)^* 01$
 - ii) $r = aa(a+b)^*$
- b) Convert Following Grammar into Chomsky Normal Form.** [4]
- i) $S \rightarrow ABC$
 - ii) $A \rightarrow aA \mid a$
 - iii) $B \rightarrow bbB \mid \Lambda$
 - iv) $C \rightarrow bC \mid \Lambda$

P.T.O.

- c) Write Context Free Grammar for following Language: [3]

$$L = \{a^i b^j c^k \mid K = i + j, i, j, k > 0\}$$

- .Q3) a) Explain the pumping Lemma for Context Free Languages. [3]

- b) Write moves and Draw PDA for following language (Attempt any one)[6]

i) $L = \{x \mid n_a(x) = n_b(x), x \in \Sigma^*, \Sigma = \{a, b\}\}$

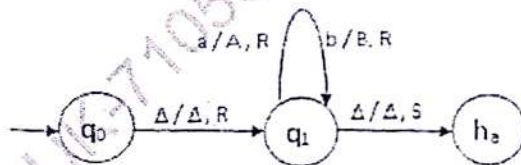
ii) $L = \{a^m b^n \mid m > n \text{ and } n > 0\}$

- c) Define following terms: [4]

i) Configuration of PDA.

ii) Computing a function by Turing Machine.

- Q4) a) Write encoding of following Turing machine. [4]



- b) Attempt any two questions: [8]

- Design Turing Machine for acceptance of a language containing strings having odd number of 1's (assume $\Sigma = \{0, 1\}$).
- Design Turing Machine to evaluate function $N\%2$ (assume N is a positive integer number).
- Design Turing Machine for acceptance of a language $r = (1+0)^*11$ (assume $\Sigma = \{0, 1\}$).



Seat No.	
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S.E. (C.S.E.) (Semester - IV) (Revised)**Examination, November - 2019****OPERATING SYSTEM - I****Sub. Code : 63534****Day and Date : Tuesday, 19 - 11 - 2019****Total Marks : 50****Time : 2.30 p.m. to 4.30 p.m.**

- Instructions :**
- 1) Question no. 1 & 4 are compulsory.
 - 2) Attempt any ONE from Q.2 and Q.3 and any ONE from Q.5 and Q.6.
 - 3) Figures to the right indicate full marks.
 - 4) Assume suitable data if required.

- Q1) a)** Explain the following in detail. [7]
i) Time sharing systems
ii) Real time Operating systems.
- b)** Explain monolithic operating system in detail. [6]
- Q2) a)** Draw and process state transition diagram in detail. [6]
b) Explain the issues related to message passing system. [6]
- Q3) a)** Explain FCFS scheduling in detail. [6]
b) Write a note on multilevel queue scheduling in detail. [6]
- Q4) a)** What is a page fault? Explain steps in handling a page fault. [7]
b) Explain recovery from deadlock in detail. [6]
- Q5) a)** State and different necessary conditions for deadlock. [6]
b) Explain concept of resource allocation graph in detail. [6]
- Q6) a)** With the help of suitable diagram explain concept of swapping. [6]
b) List and explain different operations on file. [6]



Seat No.	
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S.E. (C.S.E.) (Semester - IV) Examination, November - 2019
COMPUTER ORGANIZATION

Sub. Code : 63533

Day and Date : Friday, 15 - 11 - 2019

Total Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

- Instructions :**
- 1) Question Q.1 & Question Q.4 are compulsory.
 - 2) Attempt any one question from Q.2, Q.3 and one from Question Q.5, Q.6.
 - 3) Figures to the right indicate full marks.

- Q1) a)** With a neat diagram explain the structure of IBM system/360. [7]
b) What are user and supervisor programs? Explain CPU operation. [6]
- Q2) a)** Explain the architecture of AMD Processor. [6]
b) Explain the IEEE 754 standard 32 bit floating point format. [6]
- Q3) a)** Explain the big-endian and little-endian byte storage format. [6]
b) Explain the Booths algorithm with an example. [6]
- Q4) a)** Explain classical method of designing control unit for GCD processor. [7]
b) Explain non-restoring division algorithm for unsigned integers. [6]
- Q5) a)** Explain the four basic floating point arithmetic operations. [6]
b) With a neat diagram explain micro program controller. [6]
- Q6) a)** Write a short note on different memory types. [6]
b) Draw and explain the cache memory organization. [6]



Seat No.	
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S.E. (Computer Science and Engineering) (Part - II)
(Semester - IV) (Revised) Examination, November- 2019

COMPUTER NETWORKS

Sub. Code : 63532

Day and Date : Thursday, 14- 11 - 2019

Total Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

- Instructions :**
- 1) Solve any Two questions from each Section.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data whenever necessary.

SECTION-I

- Q1) a)** With neat diagram explain optimality principle. [6]
b) Explain link state routing with diagram. [7]
- Q2) a)** Change the following IPv4 addresses from binary notation to dotted-decimal notation.
 i) 10000001 00001011 00001011 11101111
 ii) 11000001 10000011 00011011 11111111 [4]
- b)** Change the following IPv4 addresses from dotted-decimal notation to binary notation. [4]
 i) 111. 56. 45. 78
 ii) 221. 34. 7. 82
- c)** Write a short note on address blocks in classless addressing. [4]
- Q3) a)** Explain Congestion Control in Virtual-Circuit Subnets. [6]
b) Write a short note on any ONE of the following. [6]
 i) RSVP- The Resource reservation Protocol.
 ii) Expedited Forwarding.

P.T.O.

SECTION-II

- Q4) a) List the states used in TCP connection management finite state machine. [7]
- b) Write a short note on UDP header. [6]
- Q5) a) Draw the diagram for the A portion of the Internet domain name space. Explain DNS name space. [6]
- b) Describe Terminal Network (Telnet) in detail. [6]
- Q6) a) Explain the substitution cipher encryption algorithms. [6]
- b) Write a short note on (any one) [6]
- i) RSA
 - ii) MIME
 - iii) Transposition Cipher.



Seat No.	
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S.E. (CSE) (Semester - IV) (Revised) Examination, November - 2019

SOFTWARE ENGINEERING

Sub. Code: 63535

Day and Date : Wednesday, 20 - 11 - 2019

Total Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.

Q1) a) Define software engineering. State and briefly explain various software engineering problems. [5]

b) Explain iterative model in detail. [5]

Q2) a) What is a formal technique? Explain syntactic domain, semantic domain & satisfaction relation of a specification language. [5]

b) Explain project staffing in detail. [4]

Q3) Write short notes on (any two): [6]

a) Waterfall model.

b) Risk Management.

c) Basic skills of project manager.

d) Format of SRS document.

Q4) a) State & explain any 2 methods of complexity metrics for object oriented design. [5]

b) Explain white box testing. [4]

P.T.O.

- Q5) a) What is objective of coding? Explain the concept of code walk through in code reviews. [5]
- b) Explain the steps required to get ISO 9000 certificate. [5]

Q6) Write short notes on (any two):

[6]

- a) Agile Project Management.
- b) PCMM.
- c) Coding standards & guidelines.
- d) Program Analysis Tools.

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