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## S.E. (Computer Science and Engg.) (Semester - III) (Revised) Examination, April - 2018
## APPLIED MATHEMATICS (Theory)
### Sub. Code : 63524

**Day and Date : Tuesday, 24 - 4 - 2018**  **Total Marks : 50**
**Time : 2.30 p.m. to 4.30 p.m.**

**Instructions :** 1) **All questions are compulsory.**
2) **Use of calculator is allowed.**

### SECTION-I

**Q1)** Attempt any two: **[12]**

a) Considering following data find equation of regression to estimate total units produced when number of workers is known

| Number of workers (X) | 122 | 140 | 165 | 170 | 183 | 194 | 180 |
|---|---|---|---|---|---|---|---|
| Total units produced (Y) | 40 | 65 | 71 | 95 | 104 | 111 | 102 |

b) Find value of following integral using Simpson's 3/8th rule $\int_0^{\pi/4} x^2 \cos x \, dx$.

c) Determine root of the equation correct up to four decimal places using Newton-Raphson Method $\sin x + 2e^x = 0$.

**Q2)** Attempt any two: **[12]**

a) If a worker has to repair on an average 2 machines out of 25 every day, what is the probability that

i) The worker will free on any day.

ii) Worker will have to repair at the most one machine.

b) Number of customers visiting the bank in one minute follows Poisson probability distribution average 2 customers per minute, find probability that in certain minute number of visitors will be more than 1 or less than 1.

***P.T.O.***

c) Life of certain electronic component follows normal distribution. Average life of component is 550 days and variance is 25 days. What percent of components will work.

    i) More than 540 days?

    ii) Less than 560?

Area under normal curve from 0 to 2 is 0.4886.

**Q3)** a) Fit Poisson probability distribution to the following data to find theoretical frequencies. **[6]**

| Number of defects in garments | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| Number of samples | 35 | 52 | 48 | 25 | 13 | 5 | 2 |

b) Fit second degree parabola to following data: **[7]**

| $x$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| $y$ | 2 | 6 | 7 | 8 | 10 | 11 | 11 | 10 | 9 |

## SECTION-II

**Q4)** Following table represent expected time required (in min.) to five different groups for completing four different tasks. Determine assignment schedule in order to minimize the time of completion of tasks. **[12]**

| | | Group | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | E |
| Task | I | 35 | 24 | 28 | 26 | 31 |
| | II | 34 | 32 | 35 | 24 | 32 |
| | III | 29 | 25 | 38 | 35 | 33 |
| | IV | 28 | 26 | 27 | 33 | 32 |

**Q5) a)** Define $\alpha$ - cut and strong $\alpha$ - cut. **[3]**

**b)** Let $A(x) = \dfrac{0.3}{1} + \dfrac{0.9}{2} + \dfrac{0.7}{3}$ and $B(x) = \dfrac{0.2}{-1} + \dfrac{0.4}{0} + \dfrac{0.5}{1}$. Also if $f: X \times X \to X$ is defined for all $x_1, x_2 \in X$ such that $f(x_1, x_2) = x_1 - x_2$ then using extension principle find $f(A, B)$. **[5]**

**c)** Find $\overline{(A \cup B)}$ using the fuzzy set defined by $A(x) = \dfrac{x}{x+1}$, $x \in \{0, 1, 2, 3\}$ and $B(x) = \dfrac{1}{x+1}$, $x \in \{0, 1, 2, 3, 4\}$. **[5]**

**Q6)** Attempt any two: **[12]**

**a)** Find $\alpha$ - cut and strong $\alpha$ - cut for $\alpha = 0.2, 0.4$, for the fuzzy set defined by $C(x) = \dfrac{x}{x+3}$, $x \in \{1, 2, 3, 4\}$.

**b)** If $A(x) = \dfrac{0.2}{x_1} + \dfrac{0.5}{x_2} + \dfrac{0.7}{x_3} + \dfrac{0.3}{x_4}$ and $B(x) = \dfrac{0.3}{x_1} + \dfrac{0.4}{x_2} + \dfrac{0.6}{x_3} + \dfrac{0.3}{x_4}$.

Find $A \cup B$ and $\overline{A \cup B}$. Also find heights of $A \cup B$ and $\overline{A \cup B}$.

**c)** Find fuzzy cardinality of $A(x) = \dfrac{1}{1} + \dfrac{0.5}{2} + \dfrac{0.6}{3} + \dfrac{0.7}{4} + \dfrac{0.2}{5}$.

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## S.E. (Computer Science and Engg.) (Semester - III) (New) Examination, April - 2018
## DISCRETE MATHEMATICAL STRUCTURES
### Sub. Code : 63525

**Day and Date : Wednesday, 25 - 4 - 2018**            **Total Marks : 50**
**Time : 2.30 p.m. to 4.30 p.m.**

**Instructions :**   1)   **Q. 3 and Q. 6 are compulsory from Section - I and Section - II.**
          2)   **Attempt any one questions from Q. 1 and Q. 2.**
          3)   **Attempt any one questions from Q. 4 and Q. 5.**

### SECTION-I

**Q1)** a)   Write the following statement in symbolic form                    **[4]**

   i)   Indians will win the world cup if their fielding improves.

   ii)  If I am not in a good mood or I am not busy then I will go for a movie.

   iii) If you know object oriented programming and oracle then you will get a job.

   iv)  I will score good marks in the exam if and only if I study hard.

   b)   Show that                                                          **[4]**

   $$(\sim P \wedge (\sim Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$$

   c)      Draw Venn diagram                                              **[5]**

   i)      $A - (B - C) = (A - B) \vee (A \cap B \cap C)$

   ii)     $(A - B) - C = A - (B \cup C)$

**Q2)** a)   $A = \{\alpha, \beta\}$ $B = \{1, 2, 3\}$ what are $A \times B$, $B \times A$, $B \times B$, $(A \times B) \cap (B \times A)$.

                                                                          **[4]**
   b)   What is Monoid Homomorphism? Explain with example.               **[4]**

   c)   Demonstrate that R is a valid inference from the premises $P \rightarrow Q$, $Q \rightarrow R$ and P.                                                     **[5]**

                                                                    *P.T.O.*

**Q3)** Write a short note on (Attempt any 3): **[12]**

    a)    Properties of Binary Relationship.

    b)    Clock Algebra.

    c)    Duality law and Duality theorem.

    d)    Partitioning and covering of set.

## SECTION-II

**Q4)** a)    Define following with respect to Graph. **[6]**

        i)    Mixed Graph.

        ii)    Isomorphic graph.

        iii)    Multigraph.
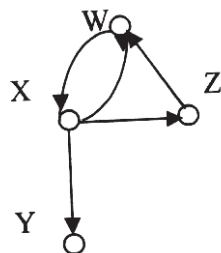
    b)    Explain Matrix representation of graph with example. **[6]**

**Q5)** a)    Write a short note on Distributive Lattice? **[6]**

    b)    Three dice were rolled. Given that no two faces were the same, what is the probability that there was an ace? **[6]**

**Q6)** a)    Define following with example **[6]**

        i)    Abelian group

        ii)    Sub group

        iii)    Cyclic group

    b)    Storage representation of following diagraph **[7]**



OR

Explain rule of product & rule of Sum. **[7]**

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# S.E. (C.S.E.) (Part-I) (Semester - III) (Revised) Examination, April - 2018
# DATA STRUCTURES (Theory)
## Sub. Code : 63526

**Day and Date : Thursday, 26 - 04 - 2018**　　　　　　　　　**Total Marks : 50**
**Time : 02.30 p.m. to 04.30 p.m.**

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

**Q1) a)**　Explain with suitable examples following terms:　　　　　　**[6]**

　　　i)　Structure

　　　ii)　Functions

　　　iii)　Pointers

　　**b)**　What are Hash Functions? Explain different types of Hash Functions.**[7]**

### OR

　　Write Algorithm for Heap Sort.　　　　　　　　　　　　　　**[7]**

**Q2)** Attempt **any two** from following questions.　　　　　　　　**[12]**

　　**a)**　Write Algorithm for enqueue and dequeue operation of circular queue, to be implemented using array.

　　**b)**　Write algorithm for binary Search. Explain it with suitable example.

　　**c)**　With the help of suitable example, explain working of Selection Sort.

**Q3) a)**　What is doubly Linked List? Explain algorithm for inserting a node in the middle of doubly linked list.　　　　　　　　　　　　　**[7]**

　　**b)**　Explain recursive algorithm for in-order and post-order traversal of a binary tree.　　　　　　　　　　　　　　　　　　　　**[6]**

### OR

　　Write algorithm for finding a minimum and maximum value from a Binary Search Tree.　　　　　　　　　　　　　　　　　　　　　**[6]**

*P.T.O.*

**Q4)** Attempt **any two** from following questions. [12]

a) Write algorithms for deleting a node from beginning and end of Singly Linked List.

b) Explain Breadth First Traversal Algorithm for a Graph.

c) Explain Following terms related to tree:

i) Complete Binary Tree.

ii) Height of a tree.

iii) Balanced binary tree.

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### S.E. (C.S.E.) (Part-II) (Semester - III) (Revised) Examination, April - 2018
### DATA COMMUNICATIONS (Theory)
#### Sub. Code : 63527

**Day and Date : Friday, 27 - 04 - 2018**       **Total Marks : 50**
**Time : 02.30 p.m. to 04.30 p.m.**

**Instructions :**   1)   Solve any TWO questions from each Section.
                         2)   Figures to the right indicate full marks.

## SECTION - I

**Q1) a)** With a neat diagram, explain about Simplex, Half-duplex and Full-duplex. **[6]**

  **b)** With neat diagram for transport layer discuss about the any four responsibilities of transport layer in OSI model. **[6]**

**Q2) a)** Explain Shannon Capacity for Noisy channel.

A telephone line normally has a bandwidth of 3000 Hz (300 to 3300 Hz) assigned for data communications. The signal-to-noise ratio is usually 3162. Find the channel capacity. **[6]**

  **b)** Explain about AMI line coding scheme. Draw diagram for 010010 using AMI scheme. **[6]**

**Q3) a)** Write about any five advantages and any two disadvantages of optical fiber. **[7]**

  **b)** Explain in brief about any TWO about following: **[6]**

  i)   Repeaters

  ii)  Bridges

  iii) Switches

## SECTION - II

**Q4)** a) Explain Parity check code. **[7]**

b) Difference between noisy channel Protocol and noiseless channel Protocol. **[6]**

**Q5)** a) Explain IEEE standard in details. **[6]**

b) Explain GO BACK N Protocol in detail. **[6]**

**Q6)** a) Design the Stop-and-Wait Protocol with ARQ in detail. **[7]**

b) Explain CSMA/CD Protocol in detail. **[6]**

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**S.E. (CSE) (Part - II) (Semester - III) Examination, April - 2018**
**MICROPROCESSORS**
**Sub. Code : 63528**

**Day and Date : Saturday, 28 - 04 - 2018**                     **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.**

## SECTION - I

**Q1)** a) Explain all Program Memory addressing Mode of advanced microprocessors. **[5]**

b) Write and explain program of Addition between two 16-bit no. **[4]**

**Q2)** a) Explain Flag register for entire 80X86 and Pentium microprocessor family. **[4]**

b) Explain architecture of 8085 Microprocessors in detail. **[6]**

**Q3)** Write Short Note on (Any Two): **[6]**

a) PUSH and POP Instruction.

b) Arithmetic Instructions of 8085.

c) Descriptor.

*P.T.O.*

## SECTION - II

**Q4)** a) Explain all Basic Logic Instructions. **[4]**

b) Draw and explain the architecture of the Pentium-Pro microprocessor.**[5]**


**Q5)** a) Explain All pins of 80386 Microprocessor. **[5]**

b) Explain all Multiplication and Division instructions of Microprocessors.**[5]**


**Q6)** Write Short Note on (Any Two): **[6]**

a) BCD and ASCII instructions.

b) Hardware Interrupts.

c) Assembler Details.

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## S.E. (Computer Science & Engineering) (Semester-IV) Examination, May - 2018
## AUTOMATA THEORY
### Sub. Code: 63531

**Day and Date : Friday, 04 - 05 - 2018**　　　　　　　**Total Marks : 50**
**Time : 9.30 a.m. to 11.30 p.m.**

**Instructions :**
1) Question no. 1 and 4 are compulsory.
2) Solve any one question out of question no. 2 and 3.
3) Solve any one question out of question no. 5 and 6.
4) Assume suitable data wherever necessary.
5) Figures to the right indicate full marks.

**Q1)** Solve any three questions :　　　　　　　　　　　　　　　　**[15]**

　　a)　Write a Regular expression for :

　　　　i)　The strings over {a, b} with an even number of a's?

　　　　ii)　String over {a, b} in the infinite sequence:

　　　　　　$aba,\ a^5, (aba)a^6, a^{11}, aba^{13}, a^{17}, ......$?

　　b)　Design a DFA for strings containing at least two a's and ending with an even number of b's.

　　c)　Find unreachable, dead and useful variables from the grammar.

　　　　$S \rightarrow ABC|AC$

　　　　$A \rightarrow aA|a$

　　　　$B \rightarrow Bb|Ba$

　　　　$C \rightarrow Cc|c$

　　　　$D \rightarrow DB|d$

　　d)　Give the regular grammar of the language accepted by following FA:
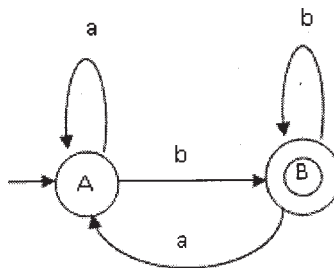


*P.T.O.*

**Q2)** a) Find the context free grammar for the language L = $\{a^n b^n c^m d^m | n, m \geq 1\}$ **[6]**

b) Describe nondeterministic finite automata with $\Lambda$ transition and recursive definition for extended transition function for NFA-$\Lambda$. **[4]**

**Q3)** a) Explain Recursive Descent Parser. **[4]**

b) Prove that any regular language can be accepted by a finite automation. **[6]**

**Q4)** Solve any three questions : **[15]**

a) For following Turing Machine :
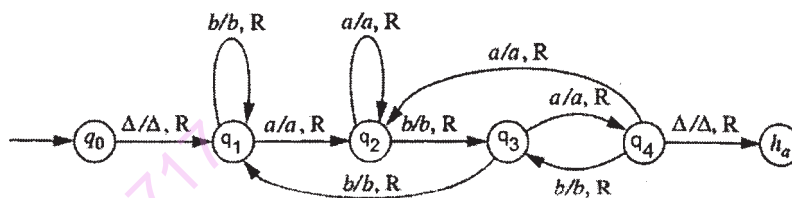


Trace moves made by machine from $q_0$ state to accept string "bbaaba".

b) Prove Pumping Lemma for Context Free Language.

c) Justify "Design of PDA to accept Language L=$\{a^n b^n | n>0\}$ is possible but not FA".

d) Define following Terms :

i) Configuration of PDA

ii) Transition function of Turing Machine.

**Q5)** a) Design PDA for following Grammar : **[7]**

$S \rightarrow (S) | [S] | SS | \Lambda$

b) Define Push Down Automata. **[3]**

**Q6)** a) Design Turing machine to copy string on the tape and store it after the Δ symbol at end of first string. **[7]**

(Example: If the string on the tape is Δ abbbab Δ then after copying, the string on the tape should be Δ abbbab Δ abbbab.)

b) Give encoding of following transition of a Turing Machine. **[3]**



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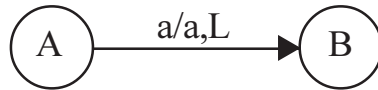
# S.E. (Computer Science & Engineering) (Semester - IV)
## (New) Examination, May - 2018
# COMPUTER NETWORKS
### Sub. Code: 63532

**Day and Date : Monday, 07 - 05 - 2018**          **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 the right indicate full marks.**

3)    **Assume suitable data whenever necessary.**

### SECTION-I

**Q1)** a)    With neat diagram explain Store-and-Forward Packet Switching.    **[6]**

b)    With context to routing within a datagram network discuss about Implementation of Connectionless Service.    **[6]**

**Q2)** a)    Change the following IPv4 addresses from dotted-decimal notation to binary notation.    **[6]**

i)    128.12.12.229

ii)    192.169.10.10

iii)    111.56.45.78

b)    In context  to IPv6 write about    **[6]**

i)    Unicast Addresses

ii)    Multicast Addresses

iii)    Anycast Addresses

*P.T.O.*

**Q3)** a) What is "Count to infinity" problem? How this problem is solved in link state routing? Write only names of five parts. **[6]**

b) With neat diagram write a short note on RSVP-The Resource reSerVation Protocol. **[7]**

## SECTION-II

**Q4)** a) What is two-army problem? Discuss. **[3]**

b) Write a short note on UDP header. **[4]**

c) Explain the socket system call regarding socket programming. **[5]**

**Q5)** a) Draw the diagram for the A portion of the Internet domain name space. Explain DNS name space. **[6]**

b) What are the three types of keys used in cryptography? Explain in brief. **[3]**

c) Explain the following terms. **[3]**

   i) Plaintext

   ii) Ciphertext

   iii) Key

**Q6)** a) Explain three-way handshake concept. **[5]**

b) Explain the following system call regarding socket programming. **[8]**

   i) recv

   ii) sendto

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## S.E. (CSE) (Part - II) (Semester - IV) Examination, May - 2018
## COMPUTER ORGANIZATION
### Sub. Code: 63533

**Day and Date : Friday, 11 - 05 - 2018**      **Total Marks : 50**
**Time : 9.30 a.m. to 11.30 a.m.**

**Instructions :**
1) Solve all questions.
2) Q. No. 1 and Q. No. 4 is compulsory.
3) Solve any one from Q. No. 2, 3 and one from Q. No. 5, 6.
4) Figures to right indicate full marks.

**Q1)** a) Write the IEEE 754 32 bit floating point number format. **[1]**

     b) Illustrate Booth multiplication algorithm for X = 10110011 Y = 11010101. **[6]**

     c) Write Non-restoring division algorithm for unsigned integres. **[6]**

**Q2)** a) Explain basic features of third generation computer. **[6]**

     b) Explain VLSI era. **[6]**

**Q3)** a) Write HDL format for Z = X + Y using single address instruction. **[6]**

     b) Explain a typical CPU with general register organization. **[6]**

**Q4)** a) Explain structure of a Set-associative memory. **[6]**

     b) Explain all page replacement policies for the paging system in which M1 has a capacity of 3 pages. The execution of a program Q requires reference to five distinct pages Pi, i < = 5 and i is page address. The page address stream formed by executing Q is

         2   3   2   1   5   2   4   5   3   2   5   2         **[6]**

**Q5)** a)  Explain with architecture diagram P-IV processor. **[6]**

   b)  Explain Wilkes basic structure of a micro programmed control unit. **[6]**


**Q6)** a)  Design GCD processor using classical method. **[6]**

   b)  Draw and explain a neat diagram of twos complement multiplier with a set of control points. **[6]**


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## S.E. (C.S.E) (Part - II) (Semester - IV) (Revised) Examination, May - 2018
## OPERATING SYSTEM-I
### Sub. Code : 63534

**Day and Date : Monday, 14-05-2018**  **Total Marks : 50**
**Time : 9.30 a.m. to 11.30 a.m.**

**Instruction :**  1)  Q.No.3 and Q.No. 6 are compulsory.
2)  Solve any one from Q.No. 1 and 2 and any one from Q.No. 4 and 5.
3)  Assume suitable data wherever necessary.

## SECTION-I

**Q1)** a)  What is an Operating System? Explain user view and system view.  **[5]**

b)  Explain Multiprogramming operating systems.  **[5]**

**Q2)** a)  Define and explain race condition.  **[5]**

b)  Describe the difference among short-term, medium-term and long term scheduling.  **[5]**

**Q3)** Write short notes on (any three):  **[15]**

1)  Scheduling Criteria

2)  Semaphore

3)  Thread.

4)  Round-Robin Scheduling.

*P.T.O.*

## SECTION-II

**Q4)** a) Explain Banker's algorithm? Write resource request algorithm. **[5]**

b) What is a Deadlock? What are the necessary conditions for deadlock?**[5]**

**Q5)** a) Explain TLB. **[5]**

b) What are the steps in handling a page fault? **[5]**

**Q6)** Write short notes on (any three): **[15]**

1) Resource allocation graph.

2) Swapping.

3) FIFO Page replacement.

4) I/O hardware.

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## S.E.(CSE) (Semester - IV) (Revised)
## Examination, May - 2018
## SOFTWARE ENGINEERING (Theory)
### Sub. Code : 63535

**Day and Date : Wednesday, 16-05-2018**　　　　　　**Total Marks : 50**
**Time : 9.30 am. to 11.30 a.m.**

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

### SECTION-I

**Q1) a)** What are the major factors of software engineering? State various software quality attributes. **[6]**

　　**b)** Define the term software process. With the help of appropriate diagram. Briefly explain two major. Components in a software process. **[4]**

**Q2) a)** Who are system analysts? What do they do? **[4]**

　　**b)** State and explain principles of project scheduling. **[5]**

**Q3)** Write short note on (any 2) **[3+3]**

　　a)　CPM

　　b)　Non-functional requirements.

　　c)　Project planing process.

*P.T.O.*

**SECTION-II**

**Q4)** a) What is cohesion? State and briefly explain different levels of cohesion with respect to function oriented design. **[6]**

b) What is black box testing? Explain with an example. **[4]**

**Q5)** a) Explain coding standards and guidelines for developing software. **[5]**

b) Explain structure design methodology with an appropriate example. **[4]**

**Q6)** Write short note on (any two) **[3+3]**

a) Six sigma

b) UML

c) Integration Testing

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