

SE-54

Pz 1 to 64

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S.E. (Computer Science and Engineering) (Part - I) (Semester - III)
Examination, December - 2015
APPLIED MATHEMATICS (Revised)
Sub. Code : 63524

Day and Date : Monday, 07 - 12 - 2015

Total Marks : 50

Time : 10.00 a.m. to 12.00 noon

- Instructions :
- 1) All questions are compulsory.
 - 2) Use of non programmable calculator is allowed.
 - 3) Figures to the right indicate full marks.

SECTION - I

Q1) Attempt any one : **[9]**

- a) The table below gives the respective heights x and y of a sample of 10 fathers and their sons :

- i) Find regression line of y on x .
- ii) Find regression line of x on y .
- iii) Estimate son's height if father's height is 65 inches.
- iv) Estimate father's height if son's height is 60 inches.

Height of father x (inches) :	65	63	67	64	68	62	70	66	68	67
Height of son y (inches) :	68	66	68	65	69	66	68	65	71	67

- b) Fit a second degree parabolic curve to the following data :

x :	-4	-3	-2	-1	0	1	2	3	4	5
y :	21	12	4	1	2	7	15	30	45	67

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[8]

Q2) Attempt ANY TWO :

- a) The life-time of certain type of battery has mean life of 400 hours and a standard deviation of 50 hours. Assuming the distribution of life-time to be normal, find
- The percentage of batteries which have life-time more than 350 hours.
 - The percentage of batteries which have life-time between 300 and 500 hours.

(For S.N.V.z area under the curve between $z = 0$ and $z = 1$ is 0.3413 and that of between $z = 0$ and $z = 2$ is 0.4772)

- b) In a certain factory turning out razor blades, there is a small chance of $1/500$ for any blade to be defective. The blades are supplied in a packet of 10. Use Poisson distribution to calculate the approximate number of packets containing no. defective and two defective blades, in a consignment of 10,000 packets.
- c) A die is thrown 8 times and it is required to find the probability that 3 will show :
- Exactly 2 times
 - at least seven times

Q3) Attempt ANY TWO :

[8]

- a) Find a root of the equation $x^3 - 2x - 5 = 0$ using secant method correct to three decimal places.
- b) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Simpson's 3/8 rule.
- c) Using Newton-Raphson method, find the positive root of $x^4 - x = 10$ correct to three decimal places.

SECTION - II

Q4) Attempt ANY TWO :

[8]

- a) Consider the fuzzy set A and B given by

$$A(x) = \frac{x}{x+1}, \quad B(x) = 1 - \frac{x}{10}; \quad x \in \{0, 1, 2, \dots, 10\}.$$

Find $|A|, |B|, S(A, B), S(B, A)$.

- b) Find the fuzzy cardinality of the fuzzy set defined by :

$$A(x) = \frac{35-x}{15}; \quad x \in \{20, 22, 24, 26, 28, 30, 32, 34\}.$$

- c) If the fuzzy sets A and B are defined by the following membership functions

$$A(x) = \frac{0.1}{1} + \frac{0.6}{2} + \frac{0.8}{3} + \frac{0.9}{4} + \frac{0.7}{5} + \frac{0.1}{6}$$

$$B(x) = \frac{0.9}{1} + \frac{0.7}{2} + \frac{0.5}{3} + \frac{0.2}{4} + \frac{0.1}{5} + \frac{0}{6}$$

Calculate $\overline{A}, \overline{B}, \overline{A \cup B}, \overline{A \cap B}$

Q5) Attempt ANY ONE :

[9]

- a) Calculate the fuzzy number
- $A + B$
- and
- $A - B$
- , where

$$A(x) = \begin{cases} 0 & , \quad x \leq -2 \text{ and } x > 4 \\ \frac{x+2}{3} & , \quad -2 < x \leq 1 \\ \frac{x-1}{3} & , \quad 1 < x \leq 4 \end{cases}; \quad A(x) = \begin{cases} 0 & , \quad x \leq 4 \text{ and } x > 10 \\ \frac{x-4}{3} & , \quad 4 < x \leq 7 \\ \frac{10-x}{3} & , \quad 7 < x \leq 10 \end{cases}$$

- b) Determine which of the fuzzy sets are fuzzy numbers, using the criteria of a fuzzy set to be fuzzy number.

i)
$$A(x) = \begin{cases} \min(1, x) & \text{for } x \geq 0 \\ 0 & \text{for } x < 0 \end{cases}$$

ii)
$$B(x) = \begin{cases} \sin x & \text{for } 0 \leq x \leq \pi \\ 0 & \text{other wise} \end{cases}$$

iii)
$$C(x) = \begin{cases} \tan x & \text{for } 0 \leq x \leq \pi/4 \\ 0 & \text{other wise} \end{cases}$$

iv)
$$D(x) = \begin{cases} x & \text{for } 0 \leq x \leq 1 \\ 0 & \text{other wise} \end{cases}$$

Q6) Attempt ANY ONE :

- a) A travelling salesman has to visit five cities. He wishes to start from a particular city, visit each city once and then return to his starting point. The travelling cost (in ' 000 Rs) of each city from a particular city is given below :

		To City				
		A	B	C	D	E
From City	A	∞	2	5	7	1
	B	6	∞	3	8	2
	C	8	7	∞	4	7
	D	12	4	6	∞	5
	E	1	3	2	8	∞

What should be the sequence of visit of the salesman so that the cost is minimum?

- b) A department of a company has five employees with five jobs to be performed. The time (in hours) that each man takes to perform each job is given in the effectiveness matrix.

		Employees				
		I	II	III	IV	V
Jobs	A	10	5	13	15	16
	B	3	9	18	13	6
	C	10	7	2	2	2
	D	7	11	9	7	12
	E	7	9	10	4	12

How should the jobs be allocated, one per employee, so as to minimize the total matrix-hours?

OR

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**S.E. (Computer Science & Engg. - I) (Semester - III) Examination,
December - 2015**
DISCRETE MATHEMATICAL STRUCTURE (Paper - C)
Sub. Code : 63525

Day and Date : Wednesday, 09 - 12 - 2015

Total Marks : 50

Time : 10.00 a.m. to 12.00 noon

- Instructions :
- 1) Questions No. 3 and 6 are compulsory.
 - 2) Solve any one question from Q.1 & Q.2.
 - 3) And solve any one question from Q.4 & Q.5.
 - 4) Figures to right indicate full marks.

- Q1) a) Show the following equivalence $\neg(P \wedge Q) \rightarrow (\neg P \vee (\neg P \vee Q)) \Leftrightarrow (\neg P \vee Q)$ [4]
- b) Let $x = \{2, 3, 6, 12, 24, 36\}$ and the relation \leq be such that $x \leq y$ if x divides y draw the hasse diagram of (x, \leq) [4]
- c) Obtain the PDNF of following without constructing truth table
 $(\neg P \rightarrow R) \wedge (Q \Rightarrow P)$ [5]
- Q2) a) i) Define cartesian product and write the members of $\{a, b\} \times \{1, 2, 3\}$ [4]
- ii) $A = \{2, 3, 4\}$ $B = \{4, 5, 6\}$
Find $A + B$ and $B + C$
- b) Prove that $\langle \mathbb{Z}_4, +_4 \rangle$ is a group, where $+_4$ is congruence modulo 4 [4]
- c) Let $R = \{\langle 1, 2 \rangle, \langle 3, 4 \rangle, \langle 2, 2 \rangle, \dots\}$
 $S = \{\langle 4, 2 \rangle, \langle 2, 5 \rangle, \langle 3, 1 \rangle, \langle 1, 3 \rangle\}$ [5]
Find
- i) RoS ii) SoR
iii) $(\text{RoS}) \circ R$ iv) $\text{Ro}(\text{SoR})$
v) RoRoR

P.T.O.

Q3) Answer any three (4 marks each) :

[12]

- a) Demonstrate that R is a Valid inference from the premises $P \rightarrow Q, Q \rightarrow R$ and P.
- b) Show the following are equivalent formula :
- $P \vee (P \wedge Q) \Leftrightarrow P$
 - $P \vee (\neg P \wedge Q) \Leftrightarrow P \vee Q$
- c) Prove that
- $$A \times (B \cup C) = (A \times B) \cup (A \times C)$$
- d) Explain group and subgroup with example.

Q4) a) Define following :

[6]

- Boolean algebra
- Complete lattice
- Lattice homomorphism

b) When a certain defective die is rolled, the number from 1 to 6 will appear with the following probabilities. [6]

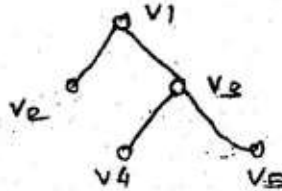
$$P(1) = \frac{2}{18} \quad P(2) = \frac{3}{18} \quad P(3) = \frac{4}{18} \quad P(4) = \frac{3}{18} \quad P(5) = \frac{4}{18} \quad P(6) = \frac{2}{18}$$

Find the probability that

- an odd number is on top
- a prime number is on top
- a number less than 5 is on top

Q5) a) Give different representations for tree given below :

[6]



b) Explain lattices as an algebraic system.

[6]

Q6) a) Explain role of product and rule of sum with example.

[5]

b) Define :

[4]

- adjacency matrix
- Path matrix

OR

b) Draw the graph of methane (CH_4) and propane (C_3H_8)

[4]

c) Define preorder, inorder, post order traversal with example.

[4]

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**S.E. (Computer Science and Engineering) (Part - I) (Semester - III)
Examination, December - 2015**

DATA STRUCTURES (Revised)

Sub. Code : 63526

Day and Date : Monday, 14 - 12 - 2015

Total Marks : 50

Time : 10.00 a.m. to 12.00 noon

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

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

- i) Array
- ii) Functions
- iii) Control Structures

b) Explain working of the Bubble Sort Algorithm. Comment on Complexity of Sorting Algorithms. [7]

OR

b) Sort the following given numbers using Radix Sort Technique. [7]

6, 5, 3, 1, 8, 7, 2, 4

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

- a) What are Hash Functions? List and explain different types of Hash Functions.
- b) With the help of examples and an algorithm, explain Overflow and Underflow conditions for Stack, Simple Queue and Circular Queue.
- c) Explain the procedure of converting Infix Notation to Postfix notation using stack.

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- Q3)** a) Write algorithm for Deleting a node from the beginning and end of singly linked list. [7]
- b) What is Binary Search Tree? How to store Binary Search Tree in an Array? [6]

OR

- b) Explain algorithm for inserting a new data entry in B tree. [6]

Q4) Attempt any two from the following questions : [12]

- a) Explain techniques used to store a Graph.
- b) What is doubly Linked List? Explain algorithm for inserting a node in the middle of doubly linked list.
- c) Explain Insert Node operation in AVL Tree.



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**S.E. (CSE) (Part - II) (Semester - III) (Revised) Examination,
December - 2015
DATA COMMUNICATIONS
Sub. Code : 63527**

Day and Date : Wednesday, 16 - 12 - 2015

Total Marks : 50

Time : 10.00 a.m. to 12.00 p.m.

- Instructions: 1) Attempt any two questions from each Section.
2) Figures to the right indicate full marks.

SECTION - I

- Q1)** a) Define protocol and explain five components of data communication. [6]
b) With neat diagram for data link layer discuss about the any four responsibilities of Data link layer in OSI model. [6]
- Q2)** a) Explain data rate limit for noiseless channel. Consider the noiseless channel with bandwidth of 3000 Hz transmitting a signal with two signal levels. What is the maximum bit rate. [6]
b) Explain about return-to-zero line coding scheme. Draw diagram for 01001110 using Polar NRZ-L scheme. [6]
- Q3)** a) Write about any five advantages and any two disadvantages of optical fiber. [7]
b) Explain in brief about any three about following : [6]
i) Repeaters
ii) Bridges
iii) Switches
iv) Routers

P.T.O

SECTION - II

- Q4)* a) Define Hamming distance and Explain Hamming code for C(7,4) in detail. [7]
b) Difference between Go-Back-N Protocol and Selective Repeat Protocol. [6]
- Q5)* a) Difference between Pure ALOHA and Slotted ALOHA Protocol. [6]
b) Explain configuration of HDLC in detail. [6]
- Q6)* a) Design the Stop-and-Wait ARQ Protocol for Noisy channels in detail. [7]
b) Compare IEEE standard IEEE802.3, 802.4 and 802.5 [6]



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S.E. (CSE) (Part - I) (Semester - III) Examination, December - 2015
MICRO PROCESSORS
Sub. Code : 63528

Day and Date : Friday, 11 - 12 - 2015

Max Marks : 50

Time : 10.00 a.m. to 12.00 p.m.

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

SECTION - I

- Q1)** a) Draw & Explain Architecture of 8085. [4]
b) Explain any three directives related to assembler details. [4]
- Q2)** a) Explain PUSH and POP instruction with suitable diagram. [4]
b) Write a program for find greater number between two no's [4]
- Q3)** Write a short note on (any three) [3 × 3 = 9]
a) Assembler
b) Protected Mode memory addressing.
c) MOV revisited
d) Program memory addressing mode.

SECTION - II

- Q4)** a) Explain Test & Bit Test Instruction. [4]
b) Draw & Explain Special 80386 Registers. [4]
- Q5)** a) Explain instruction related to addition operation. [4]
b) Explain basic interrupt processing. [4]
- Q6)** Write a short note on (any three) [3 × 3 = 9]
a) Near Jump
b) Virtual 8086 mode
c) Memory Interface
d) Hyper threading technology

