Seat
No.

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]**

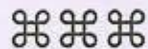**b)** Explain the steps required to get ISO 9000 certificate. **[5]**

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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Seat
No.

S.E. (Computer Science and Engineering) (Semester - III) (New) Examination, November - 2019
DISCRETE MATHEMATICAL STRUCTURES
Sub. Code : 63525

Day and Date : Tuesday, 26 - 11 - 2019   **Total Marks : 50**
Time : 9.30 a.m. to 11.30 a.m.

Instructions :   1)   Q.3 & Q.6 are compulsory.
               2)   Attempt any one from Q.1 and Q.2 also any one from Q.4 and Q.5.

Q1) a) Obtain PCNF and PDNF of the following without constructing Truth Table $(Q \vee (P \wedge \neg Q))$ **[4]**

     b)   Show that, $P \rightarrow (Q \rightarrow P) \Leftrightarrow \neg P \rightarrow (P \rightarrow Q)$ **[4]**

     c)   Draw Hasse diagram for the following   **[5]**

        $A = \{1, 3, 9, 27, 36, 108\}$

        Find upper bound, lower bound, GLB & LUB by considering subset $\{9, 27, 36\}$

Q2) a) Given A = {1, 2, 3, 4, 5}, B={2, 3, 6, 7} & C= {3, 4, 5, 6}   **[4]**
        Find

        i) $A \cup (B \cap C)$

        ii) $A \cap (B \cup C)$

        iii) $A + B + C$

     b)   Derive the following using rule CP if necessary.   **[4]**

        $\neg P \vee Q, \neg Q \vee R, R \rightarrow S \Rightarrow P \rightarrow S$

     c)   Write the following formulas in prefix & suffix form.   **[5]**

        $P \rightarrow Q \wedge \neg R \wedge S$

P.T.O.

Q3) Solve Any Three. [12]

    a)   Composition of Relation

    b)   Group & Group Homomorphism

    c)   Well Formed Formula

    d)   Function & it's types

Q4) a)   For the following function give [6]

       i)   Truth Table Representation

       ii)   Cube Representation

       iii)   K-map Representation

$$f(x, y, z) = x + x'yz' + x'yz$$

    b)   Verify that the given functions is Probability Distribution Functions. [6]
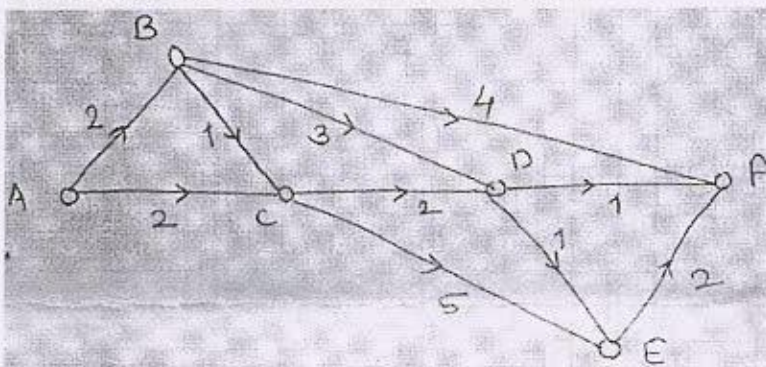
$$f(x) = (3x - 2)/35, \text{ for } x = 1, 2, 3, 4, 5$$

Q5) a)   Explain Lattice as a POSET with example? [6]

    b)   Explain Rule of Sum & Rule of Product with example. [6]

Q6) a)   Explain in detail Matrix Representation of Graph. [6]

    b)   Find earliest completion time and the latest completion time for the nodes in the diagram. Also find the critical path. [7]

Seat No.

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]

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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]

<div align="center">OR</div>

    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]

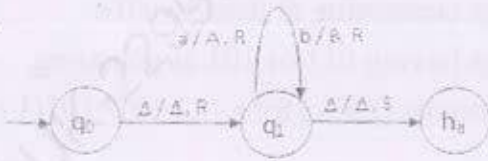i) $L = \{x \mid n_a(x) = n_b(x), x \in \Sigma^*, \Sigma = \{a,b\}\}$

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]
i) Design Turing Machine for acceptance of a language containing strings having odd number of 1's (assume $\Sigma = \{0,1\}$).

ii) Design Turing Machine to evaluate function N%2 (assune N is a positive integer number).

iii) Design Turing Machine for acceptance of a language
$r = (1+0)*11$ (assume $\Sigma = \{0,1\}$).

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Seat No.

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.

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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]**
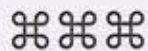
   b) Explain white box testing.   **[4]**

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.
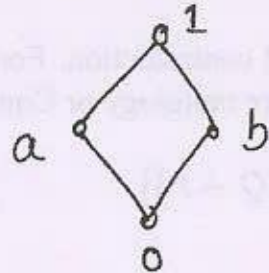
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5) a) Check whether following conclusion is valid or not: **[4]**

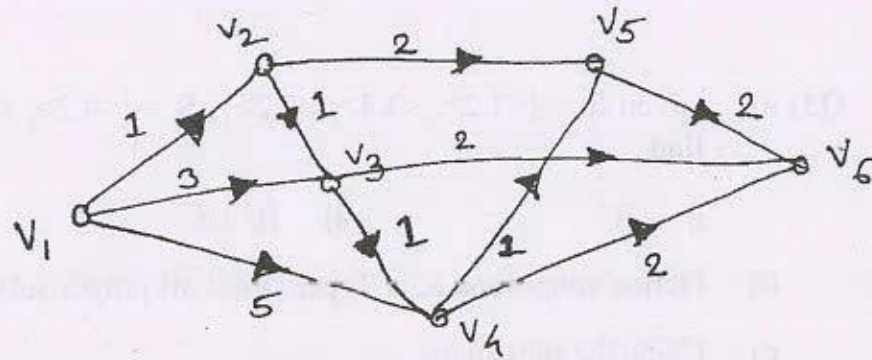   i) $P \to Q$, $Q \to R$), and $P \Rightarrow R$

b) Explain Clock Algebra. Give an example. **[4]**

c) Show that following Lattice is Complemented & Distributive. **[3]**

d) Define Cyclic group with example. **[4]**
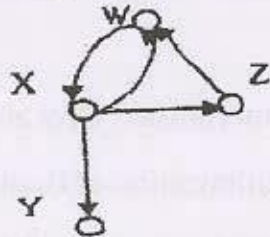
6) a) Find the critical path of the following Graph. **[4]**

b) Define the following terms with an example **[6]**

     i)   Path   ii)   Digraph   iii)   Null Graph

c) Draw Storage representation of following Diagraph. **[5]**

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Seat No. [ ]

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 $< P(X), \subset >$ is . **[1]**

     i)   Equivalence Relation   ii)   Partial order relation

     iii)   Compatibility relation   iv)   Reflexive relation

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

     i)   Undirected Graph   ii)   Directed Graph

     iii)   Mixed Graph   iv)   None of These

c) $(P \wedge P) = P$ is, **[1]**

     i)   De Morgan's law   ii)   Absorption law

     iii)   Idempotent law   iv)   Commutative law

P.T.O.

d) A set of formulas H1, H2 _____ Hn is said to be consistent. [1]

   i) If the conjuction has truth value T

   ii) If the conjuction 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, _____} 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) $\lfloor \sim q \wedge (p \to q) \rfloor \to \sim p$ 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 direct 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) $((\sim p \to Q) \to (Q \to P))$

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

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

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

Q3) a) Given R = {<1,2>, <3,4>, <2,2>}, S = {<4,2>, <2,5>, <3,1>, <1,3>} find. [6]

   i) R^2 ii) R^2 oS   iii) S^3

b) Define subgroups & is Types. Find all proper subgroups of $<Z_{5, +5}>$ [7]

c) Using the statements [2]

   P : Mark is Rich

   Q : Mark is Happy

   Find : i) $\neg P \to Q$ 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 $<P(S), \underline{C}>$ [4]

Seat No.

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
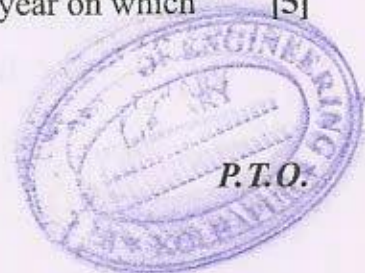   i)   2 boys and 2 girls
          ii)   At least one boy
          iii) No girls
          Assume boys and girls are equally likely.   **[6]**

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 poissons 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.

23) a) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ 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]**

24) 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 $\int_{0.2}^{1.4}\left(\sin x - \log x + e^x\right)dx$ using Simpson's $\frac{3}{8}^{th}$ rule taking 6 steps. **[6]**

SECTION - II

25) 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 α=0.25 and α=0.5 for the fuzzy set $\overline{A \cup B}$ where **[6]**

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

26) a) Define fuzzy number and determine whether the following fuzzy set is a fuzzy number $A(x)=\begin{cases}\sin x & 0\le x\le\pi \\ 0 & \text{otherwise}\end{cases}$ **[5]**

b) Solve A + X = B for the following fuzzy sets **[6]**

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

27) Solve the assignment problem for minimization **[11]**

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

28) Attempt any two questions from the following.

a) Find fuzzy cardinality of $\overline{A \cap B}$ where **[6]**

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

b) Find A–B for the following fuzzy sets **[6]**

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

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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Seat No. [ ]

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.

$$f(x) = \frac{3}{4} \times (2-x) \qquad 0 \le x \le 2$$
$$= 0 \qquad\qquad otherwise$$

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 $\overline{A \cap B}$.   [6]

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

$$A(x) = \frac{0.3}{x1} + \frac{0.9}{x2} + \frac{0.7}{x3} + \frac{0.6}{x4} + \frac{0.1}{x5}$$

$$B(x) = \frac{0.2}{x1} + \frac{0.4}{x2} + \frac{0.5}{x3} + \frac{0.7}{x4} + \frac{0.9}{x5}$$

Calculate the degree of subset hood S(A,B) and S(B,A).   [7]

Q5) Attempt any two of the following. [12]

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

$$A(x) = \frac{0.5}{x1} + \frac{0.4}{x2} + \frac{0.7}{x3} + \frac{0.8}{x4} + \frac{1}{x5}$$

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

$$A(x) = \begin{cases} \dfrac{x-1}{2}, & 1 < x \le 3 \\[2mm] \dfrac{5-x}{2}, & 3 < x \le 5, \\[2mm] 0, & otherwise \end{cases} \quad \text{and} \quad B(x) = \begin{cases} \dfrac{x-3}{2}, & 3 < x \le 5 \\[2mm] \dfrac{7-x}{2}, & 5 < x \le 7 \\[2mm] 0, & otherwise \end{cases}$$

Q6) Solve the assignment problem. [12]

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

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