Total No. of Page(s): 1 *Roll No.................*

SECOND SEMESTER **B.E. (COE)**

B.E. MID SEM. EXAMINATION, March - 2017

CEC01 (Discrete Structures)

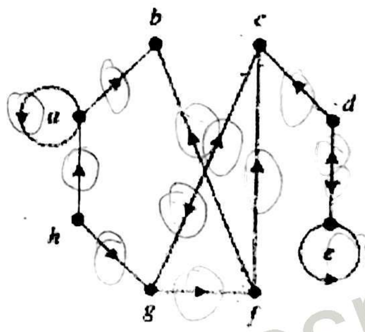
Time: 01:30 Hrs. Max. Marks: 25

Note: Attempt **All** questions.

1. [a] How many five digit positive integers that are divisible by 3 can be formed using the digits 0,1,2,3,4 and 5, without any of the digits getting repeating? [4]

   [b] Using mathematical Induction show that 1.1! + 2.2! + 3.3! + ...+ n.n! = (n+1)! -1, for n>=1. [3]

2. A relation R on a set A= {a, b, c, d, e, f, g, h} has following directed graph.



   [a] List the elements of R.

   [b] List the elements of R o R.

   [c] Draw the directed graph of R o R. [6]

3. [a] Let A = {n ϵ Z; 2 ≤ n ≾ 12}, A partial order relation R on A is defined by aRb if and only if a divides b or (a is prime and a < b). Draw the Hasse diagram of A and also find its least and maximal elements. [3]

   [b] Prove that $(\bar{p} \wedge q) \vee (\overline{p \vee q}) \equiv \bar{p}$ using Law's. (Don't use truth table method). [2]

4. [a] The integers from 1 to 10 are randomly distributed around a circle. Prove that there must be three neighbors whose sum is at least 17. What about 18? What about 19? (Hint: Use Pigeon Hole Principle). [4]

   [b] Find the image set of function $f: R \to R$ defined by

$$f(x) = \frac{3x}{x^2 + 1}$$

[3]

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B.E.(COE) V^{th} Semester

MID SEMESTER EXAMINATION, SEPTEMBER – 2015

COE – 302 : DMDA (DISCRETE MATHEMATICS AND DESIGN OF ALGORITHM

Time : 1:30 Hours Max Marks : 20

Note : Attempt all questions. Assume suitable missing data, if any.

Q.1 : What is predicate? How will you represent the following statements using predicate calculus.

(a) Mark is poor but happy.

(b) Mark is poor or he is both rich and unhappy. [3]

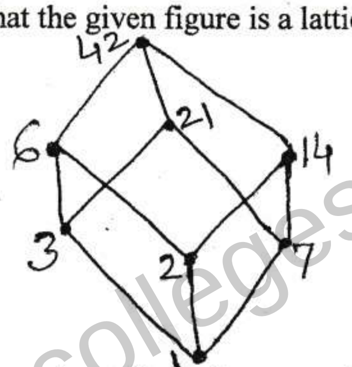
Q.2 : Show that (RVS) follows logically from the premises (CVD) where

(CVD) -> ~H, ~H -> (A/\ ~B) and (A/\ ~B) -> (RVS)

Also indicate the rules used. [3]

Q.3 : What is a lattice? Prove that the given figure is a lattice or not, where

D= {1,2,3,6,7,14,21,42}



[3]

Q.4 : Construct a set of natural numbers. Show that a set of real numbers between 0 and 1 is not a countably infinite set. [3]

Q.5 : Let R be binary relation on the set of all positive integers such that

R = { (a, b) | (a-b) is an odd positive integer}

Find whether it is equivalence relation or partial ordering relation? [3]

Q.6 : Explain with examples (any two)

(a) Well formed formulas.

(b) Lexicographic order.

(c) Normal forms.

(d) Sets and Multisets. [2.5x2=5]

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FIFTH SEMESTER

Roll No.--246/CO/09
B.E. (COE)

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MID SEMESTER EXAMINATION, September-2011

COE-302: DISCRETE MATHEMATICS AND DESIGN OF ALGORITHMS

Time: 1:30 Hrs

Max. Marks: 20

Note: All questions are compulsory. Assume suitable missing data, if any.

1. Verify the validity of the following argument.
Every living thing is a plant or an animal. John's gold fish is alive and it is not a plant. All animals have hearts. Therefore John's gold fish has a heart. [3]

2. Construct a proof for the following argument, giving all necessary additional assertions. Specify the rules of inference used at each step.
(My program runs successfully) or (the system bombs and I blow my stack.) Further more, (the system does not bomb) or (I don't blow my stack and my program runs successfully.) Therefore my program runs successfully. [3]

3. Let A={1, 2, 3, 4, 5, 6, 7}. Determine a relation R on A by aRb $\Leftrightarrow$ 3 divides (a-b). Show that R is an equivalence relation. Also determine the partition generated by R [3]

4. Using induction prove that $2^{n+2} + 3^{2n+1}$ is divisible by 7. [3]

5. Simplify the following propositional form. State each law you use.
a) $[(P\Rightarrow Q)\vee(P\Rightarrow R)]\Rightarrow(Q\vee R)$ P V Q V R [2]

6. Determine whether each of the following functions is a bijection from R to R
(a) $f(x) = 2x+1$ (b) $f(x) = (x^2+1) / (x^2+2)$ [2]

7. State the extended Pigeonhole Principle. Using this principle show that if any 30 students are selected, then we may choose a subset of 5 so that all 5 were born on the same day of the week. [2]

8. A survey of 500 television watchers produces the following information: 285 watch football games, 195 watch hockey games, 115 watch basketball games, 45 watch football and basketball games, 70 watch football and hockey games, 50 watch hockey and basketball games, and 50 do not watch any of the three kinds of games.
a. How many people watch all three kinds of games?
b. How many people watch exactly one of the games? [2]

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Roll No.:

Fifth Semester

BE(COE/ICE)

Mid Semester Examination, September 2010

COE/ICE-304: Linear Integrated Circuits

Time : 1 ½ Hours

Total Marks : 20

Note: Attempt all questions. All question carry equal marks. Missing data if any may be suitable assumed.

1. What is a Generalised Impedance Converter (GIC)? Find out an expression for Z_{in} when GIC is terminated by a load Z_L. Explain its application in the simulation of low value of grounded resistance, high value of grounded capacitance, a floating inductor, grounded FDNR and grounded FDNC.

2. Find the transfer functions $\left(\frac{V_{o1}}{V_{in}}\right), \left(\frac{V_{o2}}{V_{in}}\right), \left(\frac{V_{o3}}{V_{in}}\right)$, of the circuit shown in Fig. 2, identify the type of filters realizable at V_{o1}, V_{o2}, V_{o3}. Give the expression of filter parameters (H_0, ω_0 and ω_0/Q_0) in each case.

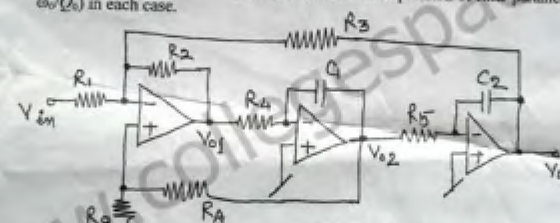

Fig.2

3. Derive an expression of V_o for the circuit shown in Fig.3. Show that it can be used as an instrumentation amplifier. Comment on its specific features.

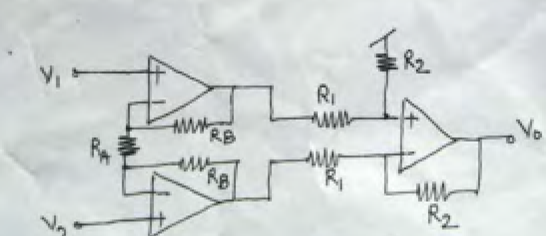

Fig. 3