Examination May-2014
B. Tech (CSE) (Sem-4th)
Discrete Structures
Sub Code: BTCS 402
Paper ID- A2305

Total no of page-1

Maximum Marks: 60

Time: 3 hrs.
Instructions to the Candidates:
1) Section A is compulsory carrying Ten Questions each of Two marks.
2) Section-B contains Five Questions carrying 5 Marks. Attempt any four questions.
3) Section-C contains Three Question carrying 10 Marks. Attempt any two questions.

Section-A

Q1) a) Differentiate between Equal and Equivalent set?
  b) What is function and what are its types.
  c) Prove that If R is an equivalence relation on a set A. Show that R^{-1} is also an equivalence relation on A.
  d) Give an example of a relation which is neither reflexive, nor symmetric, nor transitive and nor anti- symmetric.
  e) $A(n) = A(n-1)+2A(n-2)$ where $n>=3$ is a sequence of integer with basic values $A(1) = 1$, $A(2) = 1$. Find $A(5)$ by Recursion and Iterative Method.?
  f) Prove de-Morgan's Law: $\overline{a+b}=\bar{a}.\bar{b}$
  g) Prove that maximum degree of any vertex in a simple graph having n vertices is n-1.
  h) Draw 3-regular graphs with nine vertices
  i) Define Groups. Give example for the same
  j) Prove by using Boolean algebra:
     $a+a'.c = a+c$

Section -B

Q2) If $A(n) - 6A(n-1) + 8 A(n-2) = 0$ for $n>=2$ with, $A(0)=10$ and $A(1)=25$. Determine the sequence from its generating function.

Q3. a) Give an example of Planar and non Planar graphs
  b) What is Euler path and circuit? Give example?

Q4) a) Draw on-off switching diagram of : $a[(b+\bar{d})+(\bar{c}(a+d+\bar{c}))]b$
  b) Draw the gate diagram of : $(x1((x2\ \bar{x}3)+(\ \bar{x}2\ \bar{x}3)))+(\ \bar{x}1\ \bar{x}2\ \bar{x}3)$

Q5. a) What is monoid? Explain with example?
  b) Prove that the set Z of integers form an Abelian Group w.r.t usual addition of integers i.e. $(Z,+,0)$ is an Abelian Group.

Q6. A class consists of 40 girls and 60 boys. In how many ways can a President , Vice President, Treasurer and Secretary be chosen if the treasurer must be a girl, the secretary must be a boy and a student may not hold more than one office?

Section –C

Q7. a) Prove that in a graph the number of vertices of odd degree is even
  b) Write the Dijkstra's Algorithm
  c) What is Euler's Formula?

Q8. a) Prove that if A is a set then identify function 1 on A is one –one onto
  b) Give an example of a relation which is reflexive and transitive but not symmetric
  c) Give an example of relation which is reflexive, symmetric, anti-symmetric and transitive.

Q9: a) By finding generating function of sequence s(n), find solution of recurrence relations:
     $S(n+2)-7S(n+1)+12S(n)=0$ for $n>=0$ Given $S(0)=2, S(1)=5$
  b) Prove De-Morgan's Law.

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