Code No: NR/RR210501

NR/RR

Set No. 2

II B.Tech I Semester Examinations,November 2010
DISCRETE STRUCTURES AND GRAPH THEORY
Common to Information Technology, Electronics And Computer Engineering, Computer Science And Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Give an example of a relation on a set which is neither symmetric nor anti-symmetric. [6+10]
   (b) Let R = $\{(1,2),(3,4),(2,2)\}$ and S = $\{(4,2),(2,5),(3,1),(1,3)\}$. Find $R \bullet S, S \bullet R, R \bullet (S \bullet R), (R \bullet S) \bullet R, R \bullet R, S \bullet S, R \bullet R \bullet R$.

2. (a) In how many ways can 10 people be seated in a row so that a certain pair of them are not next to each other ? [8+8]
   (b) Define the combinations and permutations.

3. (a) Prove that any two simple connected graphs with n vertices and all of degree two are isomorphic [8+8]
   (b) Suppose G_1 and G_2 are isomorphic prove that if G_1 is connected then G_2 is also connected.

4. (a) Define the term 'lattice', clearly stating the axioms. [6]
   (b) Let C be a collection of sets which are closed under intersection and union. Verify whether (C, $\cap$, $\cup$) is a lattice. [10]

5. (a) Give the adjacency matrix for the following graph. [6]
   $G = (\{1,2,3,4,5,6\},\{1,2\},\{1,4\},\{2,5\},\{2,6\},\{3,4\},\{3,5\},\{3,6\},\{4,5\},\{4,6\},\{5,6\})$
   (b) Describe the breadth-first-search technique with the help of an example situation. [10]

6. (a) Show that [8+8]
   $P \rightarrow (Q \rightarrow R) \Leftrightarrow P \rightarrow (\urcorner QVR\ ) \Leftrightarrow (P \wedge Q) \rightarrow R$
   (b) Show that
   $(\urcorner P \wedge (\urcorner\ Q \wedge R))\ V\ (Q \wedge R)\ V\ (P \wedge R) \Leftrightarrow R$

7. Solve the recurrence relation a_n-9a_{n-1+}26$a_{n-2} - 24a_{n-3}$=0 for n$\geq$ 3. [16]

8. (a) Show that K_5- e is planar for any edge e of K_5 where K_5 is a complete graph with 5 vertices. [8+8]
   (b) Show that $K_{3,3}$- e is planar for any edge e of $K_{3,3}$ where $K_{3,3}$ is a complete bipartite graph.

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Code No: NR/RR210501 **NR/RR** **Set No. 4**

II B.Tech I Semester Examinations,November 2010
DISCRETE STRUCTURES AND GRAPH THEORY
Common to Information Technology, Electronics And Computer Engineering, Computer Science And Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Solve the recurrence relation a_n-9a_{n-1+}26$a_{n-2} - 24a_{n-3}$=0 for n≥ 3. [16]

2. (a) Show that [8+8]
   P → (Q → R) ⇔ P → (˥QVR) ⇔ (P ∧ Q) → R
   (b) Show that
   (˥P ∧ (˥ Q ∧ R)) V (Q ∧ R) V (P ∧ R) ⇔ R

3. (a) Give an example of a relation on a set which is neither symmetric nor anti-symmetric. [6+10]
   (b) Let R = {(1, 2), (3, 4), (2, 2)} and S = {(4, 2), (2, 5), (3, 1), (1, 3)}. Find R • S, S • R, R • (S • R), (R • S) • R, R • R, S • S, R • R • R.

4. (a) In how many ways can 10 people be seated in a row so that a certain pair of them are not next to each other ? [8+8]
   (b) Define the combinations and permutations.

5. (a) Define the term 'lattice', clearly stating the axioms. [6]
   (b) Let C be a collection of sets which are closed under intersection and union. Verify whether (C, ∩, ∪) is a lattice. [10]

6. (a) Give the adjacency matrix for the following graph. [6]
   G = ({1, 2, 3, 4, 5, 6}, {1, 2}, {1, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 6}, {4, 5}, {4, 6}, {5, 6})
   (b) Describe the breadth-first-search technique with the help of an example situation. [10]

7. (a) Show that K_5- e is planar for any edge e of K_5 where K_5 is a complete graph with 5 vertices. [8+8]
   (b) Show that $K_{3,3}$- e is planar for any edge e of $K_{3,3}$ where $K_{3,3}$ is a complete bipartite graph.

8. (a) Prove that any two simple connected graphs with n vertices and all of degree two are isomorphic [8+8]
   (b) Suppose G_1 and G_2 are isomorphic prove that if G_1 is connected then G_2 is also connected.

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Code No: NR/RR210501 **NR/RR** **Set No. 1**

II B.Tech I Semester Examinations,November 2010
DISCRETE STRUCTURES AND GRAPH THEORY
Common to Information Technology, Electronics And Computer Engineering, Computer Science And Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) In how many ways can 10 people be seated in a row so that a certain pair of them are not next to each other ? [8+8]
   (b) Define the combinations and permutations.
2. (a) Define the term 'lattice', clearly stating the axioms. [6]
   (b) Let C be a collection of sets which are closed under intersection and union. Verify whether (C, ∩, ∪) is a lattice. [10]
3. (a) Give an example of a relation on a set which is neither symmetric nor anti-symmetric. [6+10]
   (b) Let R = $\{(1,2),(3,4),(2,2)\}$ and S = $\{(4,2),(2,5),(3,1),(1,3)\}$. Find $R \bullet S, S \bullet R, R \bullet (S \bullet R), (R \bullet S) \bullet R, R \bullet R, S \bullet S, R \bullet R \bullet R$.
4. (a) Show that [8+8]
   $P \rightarrow (Q \rightarrow R) \Leftrightarrow P \rightarrow (\urcorner QVR) \Leftrightarrow (P \wedge Q) \rightarrow R$
   (b) Show that
   $(\urcorner P \wedge (\urcorner Q \wedge R)) \; V \; (Q \wedge R) \; V \; (P \wedge R) \Leftrightarrow R$
5. (a) Show that K_5- e is planar for any edge e of K_5 where K_5 is a complete graph with 5 vertices. [8+8]
   (b) Show that $K_{3,3}$- e is planar for any edge e of $K_{3,3}$ where $K_{3,3}$ is a complete bipartite graph.
6. (a) Prove that any two simple connected graphs with n vertices and all of degree two are isomorphic [8+8]
   (b) Suppose G_1 and G_2 are isomorphic prove that if G_1 is connected then G_2 is also connected.
7. Solve the recurrence relation a_n-9a_{n-1+}26$a_{n-2} - 24a_{n-3}$=0 for n≥ 3. [16]
8. (a) Give the adjacency matrix for the following graph. [6]
   $G = (\{1,2,3,4,5,6\}, \{1,2\}, \{1,4\}, \{2,5\}, \{2,6\}, \{3,4\}, \{3,5\}, \{3,6\}, \{4,5\}, \{4,6\}, \{5,6\})$
   (b) Describe the breadth-first-search technique with the help of an example situation. [10]

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Code No: NR/RR210501

NR/RR

Set No. 3

II B.Tech I Semester Examinations,November 2010
DISCRETE STRUCTURES AND GRAPH THEORY
Common to Information Technology, Electronics And Computer Engineering, Computer Science And Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Show that [8+8]
   $P \to (Q \to R) \Leftrightarrow P \to (\urcorner Q V R) \Leftrightarrow (P \wedge Q) \to R$
   (b) Show that
   $(\urcorner P \wedge (\urcorner Q \wedge R)) \; V \; (Q \wedge R) \; V \; (P \wedge R) \Leftrightarrow R$

2. (a) Give the adjacency matrix for the following graph. [6]
   $G = (\{1,2,3,4,5,6\}, \{1,2\}, \{1,4\}, \{2,5\}, \{2,6\}, \{3,4\}, \{3,5\}, \{3,6\}, \{4,5\}, \{4,6\}, \{5,6\})$
   (b) Describe the breadth-first-search technique with the help of an example situation. [10]

3. (a) In how many ways can 10 people be seated in a row so that a certain pair of them are not next to each other ? [8+8]
   (b) Define the combinations and permutations.

4. (a) Show that K_5- e is planar for any edge e of K_5 where K_5 is a complete graph with 5 vertices. [8+8]
   (b) Show that $K_{3,3}$- e is planar for any edge e of $K_{3,3}$ where $K_{3,3}$ is a complete bipartite graph.

5. Solve the recurrence relation a_n-9a_{n-1+}26$a_{n-2} - 24a_{n-3}$=0 for n$\geq$ 3. [16]

6. (a) Prove that any two simple connected graphs with n vertices and all of degree two are isomorphic [8+8]
   (b) Suppose G_1 and G_2 are isomorphic prove that if G_1 is connected then G_2 is also connected.

7. (a) Give an example of a relation on a set which is neither symmetric nor anti-symmetric. [6+10]
   (b) Let $R = \{(1,2),(3,4),(2,2)\}$ and $S = \{(4,2),(2,5),(3,1),(1,3)\}$. Find $R \bullet S, S \bullet R, R \bullet (S \bullet R), (R \bullet S) \bullet R, R \bullet R, S \bullet S, R \bullet R \bullet R$.

8. (a) Define the term 'lattice', clearly stating the axioms. [6]
   (b) Let C be a collection of sets which are closed under intersection and union. Verify whether $(C, \cap, \cup)$ is a lattice. [10]

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