Code No: 07A3BS04 **R07** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Common to Information Technology, Computer Science And Engineering, Computer Science And Systems Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Let (S_1, $*_1$), (S_2, $*_2$) and (S_3, $*_3$) be semi groups and f: $S_1 \rightarrow S_2$ and g: $S_2 \rightarrow S_3$ be homomorphisms. Prove that the mapping of g o f: $S_1 \rightarrow S_3$ homomorphism.
   (b) Prove that H = {0, 2, 4} forms a subgroup of (Z_6, +). [8+8]
2. (a) Let X = {1, 2, 3, 4, 5, 6, 7} and R = $\{(x, y) \mid x - y$ is divisible by 3} in X. Show that R is an equivalence relation.
   (b) Let A = {1, 2, 3, 4} and P = {{1, 2,3}, {4}} be a partition of A. Find the equivalence relation determined by P. [10+6]
3. (a) A book binder is to bind 10 different books in red, blue and brown cloth. In how many ways can he do this if each color of cloth is to be used at least one book?
   (b) Explain Multi- nominal Theorem with an example. [8+8]
4. (a) Explain BFS with an example.
   (b) Explain minimal spanning tree with an explain. [8+8]
5. (a) Show that $(\forall x)\,(H\,(x) \rightarrow M\,(X)) \wedge (\exists X)\,H\,(x) \Rightarrow (\exists x)\,M\,(x)$
   (b) Determine the validity of the following arguments using propositional logic: "*Smoking is healthy. If smoking is healthy, then cigarettes are prescribed by physicians. Therefore, cigarettes are prescribed by physicians*". [8+8]
6. Solve simultaneous recurrence relations:
   (a) $a_n = 3\ a_n + 2\ b_{n-1}$
   (b) $b_n = a_{n-1} + 2\ b_{n-1}$. [8+8]
7. (a) Give an example of a graph with ten edges that has a bridge as well as an Euler path.
   (b) In the definition of Euler circuit discuss the requirement that the Euler circuit intersects with every vertex at least once. [8+8]
8. (a) Show that $(A \oplus B) \vee (A \downarrow B)$ is equivalent to $(A \uparrow B)$
   (b) Obtain the canonical product of sums of the propositional formulas: $\sim X \wedge (\sim Y \vee Z)$. [8+8]

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Code No: 07A3BS04 **R07** **Set No. 4**

II B.Tech I Semester Examinations,November 2010
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Common to Information Technology, Computer Science And Engineering, Computer Science And Systems Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Solve simultaneous recurrence relations:
   (a) $a_n = 3\ a_n + 2\ b_{n-1}$
   (b) $b_n = a_{n-1} + 2\ b_{n-1}$. [8+8]

2. (a) Let $(S_1, *_1)$, $(S_2, *_2)$ and $(S_3, *_3)$ be semi groups and f: $S_1 \rightarrow S_2$ and g: $S_2 \rightarrow S_3$ be homomorphisms. Prove that the mapping of g o f: $S_1 \rightarrow S_3$ homomorphism.
   (b) Prove that H = {0, 2, 4} forms a subgroup of $(Z_6, +)$. [8+8]

3. (a) Explain BFS with an example.
   (b) Explain minimal spanning tree with an explain. [8+8]

4. (a) A book binder is to bind 10 different books in red, blue and brown cloth. In how many ways can he do this if each color of cloth is to be used at least one book?
   (b) Explain Multi- nominal Theorem with an example. [8+8]

5. (a) Give an example of a graph with ten edges that has a bridge as well as an Euler path.
   (b) In the definition of Euler circuit discuss the requirement that the Euler circuit intersects with every vertex at least once. [8+8]

6. (a) Let X = {1, 2, 3, 4, 5, 6, 7} and R = $\{(x, y)\ |x - y$ is divisible by 3} in X. Show that R is an equivalence relation.
   (b) Let A = {1, 2, 3, 4} and P = {{1, 2,3}, {4}} be a partition of A. Find the equivalence relation determined by P. [10+6]

7. (a) Show that $(\forall x)\,(H\,(x) \rightarrow M\,(X)) \wedge (\exists X)\,H\,(x) \Rightarrow (\exists x)\,M\,(x)$
   (b) Determine the validity of the following arguments using propositional logic: "*Smoking is healthy. If smoking is healthy, then cigarettes are prescribed by physicians. Therefore, cigarettes are prescribed by physicians*". [8+8]

8. (a) Show that $(A \oplus B) \vee (A \downarrow B)$ is equivalent to $(A \uparrow B)$
   (b) Obtain the canonical product of sums of the propositional formulas: $\sim X \wedge (\sim Y \vee Z)$. [8+8]

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Code No: 07A3BS04 **R07** **Set No. 1**

II B.Tech I Semester Examinations,November 2010
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Common to Information Technology, Computer Science And Engineering, Computer Science And Systems Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Let X = {1, 2, 3, 4, 5, 6, 7} and R = $\{(x, y) \mid x - y$ is divisible by 3} in X. Show that R is an equivalence relation.
   (b) Let A = {1, 2, 3, 4} and P = {{1, 2,3}, {4}} be a partition of A. Find the equivalence relation determined by P. [10+6]
2. (a) Let (S_1, $*_1$), (S_2, $*_2$) and (S_3, $*_3$) be semi groups and f: $S_1 \longrightarrow S_2$ and g: $S_2 \rightarrow S_3$ be homomorphisms. Prove that the mapping of g o f: $S_1 \rightarrow S_3$ homomorphism.
   (b) Prove that H = {0, 2, 4} forms a subgroup of (Z_6, +). [8+8]
3. (a) Show that $(A \oplus B) \vee (A \downarrow B)$ is equivalent to $(A \uparrow B)$
   (b) Obtain the canonical product of sums of the propositional formulas: $\sim X \wedge (\sim Y \vee Z)$. [8+8]
4. (a) A book binder is to bind 10 different books in red, blue and brown cloth. In how many ways can he do this if each color of cloth is to be used at least one book?
   (b) Explain Multi- nominal Theorem with an example. [8+8]
5. Solve simultaneous recurrence relations:
   (a) $a_n = 3\ a_n + 2\ b_{n-1}$
   (b) $b_n = a_{n-1} + 2\ b_{n-1}$. [8+8]
6. (a) Explain BFS with an example.
   (b) Explain minimal spanning tree with an explain. [8+8]
7. (a) Show that $(\forall x)\,(H\,(x) \rightarrow M\,(X)) \wedge (\exists X)\,H\,(x) \Rightarrow (\exists x)\,M\,(x)$
   (b) Determine the validity of the following arguments using propositional logic: "*Smoking is healthy. If smoking is healthy, then cigarettes are prescribed by physicians. Therefore, cigarettes are prescribed by physicians*". [8+8]
8. (a) Give an example of a graph with ten edges that has a bridge as well as an Euler path.
   (b) In the definition of Euler circuit discuss the requirement that the Euler circuit intersects with every vertex at least once. [8+8]

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Code No: 07A3BS04 **R07** **Set No. 3**

II B.Tech I Semester Examinations,November 2010
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Common to Information Technology, Computer Science And Engineering, Computer Science And Systems Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) A book binder is to bind 10 different books in red, blue and brown cloth. In how many ways can he do this if each color of cloth is to be used at least one book?
   (b) Explain Multi- nominal Theorem with an example. [8+8]
2. (a) Show that $(A \oplus B) \vee (A \downarrow B)$ is equivalent to $(A \uparrow B)$
   (b) Obtain the canonical product of sums of the propositional formulas: $\sim X \wedge (\sim Y \vee Z)$. [8+8]
3. (a) Show that $(\forall x)\,(H\,(x) \rightarrow M\,(X)) \wedge (\exists X)\,H\,(x) \Rightarrow (\exists x)\,M\,(x)$
   (b) Determine the validity of the following arguments using propositional logic: "*Smoking is healthy. If smoking is healthy, then cigarettes are prescribed by physicians. Therefore, cigarettes are prescribed by physicians*". [8+8]
4. Solve simultaneous recurrence relations:
   (a) $a_n = 3\ a_n + 2\ b_{n-1}$
   (b) $b_n = a_{n-1} + 2\ b_{n-1}$. [8+8]
5. (a) Let $(S_1,\ *_1)$, $(S_2,\ *_2)$ and $(S_3,\ *_3)$ be semi groups and f: $S_1 \rightarrow S_2$ and g: $S_2 \rightarrow S_3$ be homomorphisms. Prove that the mapping of g o f: $S_1 \rightarrow S_3$ homomorphism.
   (b) Prove that $H = \{0, 2, 4\}$ forms a subgroup of $(Z_6, +)$. [8+8]
6. (a) Give an example of a graph with ten edges that has a bridge as well as an Euler path.
   (b) In the definition of Euler circuit discuss the requirement that the Euler circuit intersects with every vertex at least once. [8+8]
7. (a) Explain BFS with an example.
   (b) Explain minimal spanning tree with an explain. [8+8]
8. (a) Let $X = \{1, 2, 3, 4, 5, 6, 7\}$ and $R = \{(x, y)\ |x - y$ is divisible by 3$\}$ in X. Show that R is an equivalence relation.
   (b) Let $A = \{1, 2, 3, 4\}$ and $P = \{\{1, 2,3\}, \{4\}\}$ be a partition of A. Find the equivalence relation determined by P. [10+6]

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