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

II B.Tech I Semester Examinations,May/June 2012
MATHEMATICAL FOUNDATION 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

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Prove the equivalence: $(\sim P \wedge (\sim Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$
   (b) Show that C is a logical consequence of the formula:
   $A \wedge (A \rightarrow (B \vee C)) \wedge (B \rightarrow \sim A)$
   using truth tables. [8+8]

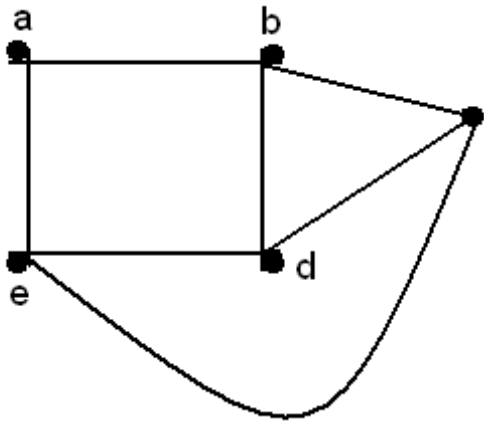
2. (a) Explain, in detail, the algebraic systems: Group, Abelian Group and Monoid. with suitable examples.
   (b) Give an example of a monoid which is NOT a group. [8+8]

3. (a) Let the relation R = {(a, b) |a − b is divisible by 3} on the set, S = {1, 2, 3, 5, 6, 7}. Show that R is an equivalence relation and draw the graph of R.
   (b) Using the Pigeonhole Principle, show that: "*there must be at least* 90 *ways to choose numbers from* 1 *to* 15 *so that all the choices have the same sum.*" [8+8]

4. (a) Write the rules for constructing Hamiltonian paths and cycles.
   (b) Write the difference between Hamiltonian graphs and Euler graphs. [8+8]

5. (a) Determine the coefficient of x^5 and x^4 in $(a+bx+cx^2)^{10}$
   (b) What is the sum of all numbers of the form 12! / $q_1!$ q_2 ! q_3 !. where q_1, q_2, q_3 range over all the sets of nonnegative integers such that q1+q2+q3=12? [8+8]

6. (a) Write the algorithm for breadth first search spanning tree. Explain how the algorithm.
   (b) Apply breadth first search on the following figure work with an example. [6+10]



7. Write the quantifiers of the following statements, where predicate symbols denotes, F(x): x is fruit, V(x): x is vegetable and S(x, y): x is sweeter than y.

   (a) Some vegetable is sweeter than all fruits

   (b) Every fruit is sweeter than all vegetables

   (c) Every fruit is sweeter than some vegetables

   (d) Only fruits are sweeter than vegetables. [16]

8. Chose an appropriate substation to translate $a_n = 2\ a_{n/4}$+n for n=$4^k >= 4$ and a1=1 in to a first order relation. Solve this relation by underdetermined coefficients and then fined a_4k. [16]

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

II B.Tech I Semester Examinations,May/June 2012
MATHEMATICAL FOUNDATION 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

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Explain, in detail, the algebraic systems: Group, Abelian Group and Monoid. with suitable examples.
   (b) Give an example of a monoid which is NOT a group. [8+8]

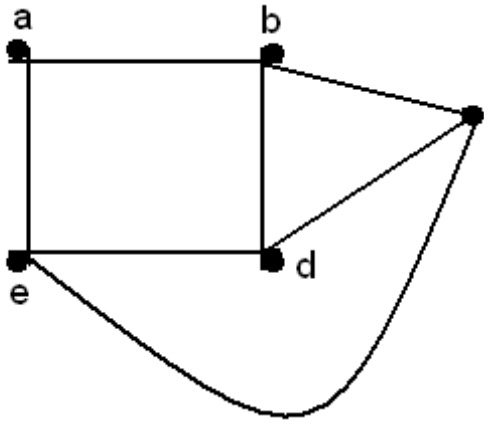
2. (a) Determine the coefficient of x^5 and x^4 in $(a+bx+cx^2)^{10}$
   (b) What is the sum of all numbers of the form 12! / q_1! q_2 ! q_3 !. where q_1, q_2, q_3 range over all the sets of nonnegative integers such that q1+q2+q3=12? [8+8]

3. Chose an appropriate substation to translate $a_n = 2\ a_{n/4}$+n for $n=4^k >= 4$ and a1=1 in to a first order relation. Solve this relation by underdetermined coefficients and then fined a_4k. [16]

4. (a) Prove the equivalence: $(\sim P \wedge (\sim Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$
   (b) Show that C is a logical consequence of the formula:
   $A \wedge (A \rightarrow (B \vee C)) \wedge (B \rightarrow \sim A)$
   using truth tables. [8+8]

5. (a) Write the rules for constructing Hamiltonian paths and cycles.
   (b) Write the difference between Hamiltonian graphs and Euler graphs. [8+8]

6. (a) Write the algorithm for breadth first search spanning tree. Explain how the algorithm.
   (b) Apply breadth first search on the following figure work with an example. [6+10]



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8. (a) Let the relation R = {(a, b) |a − b is divisible by 3} on the set, S = {1, 2, 3, 5, 6, 7}. Show that R is an equivalence relation and draw the graph of R.

   (b) Using the Pigeonhole Principle, show that: "*there must be at least* 90 *ways to choose numbers from* 1 *to* 15 *so that all the choices have the same sum.*" [8+8]

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

II B.Tech I Semester Examinations,May/June 2012
MATHEMATICAL FOUNDATION 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
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1. (a) Write the rules for constructing Hamiltonian paths and cycles.
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2. (a) Determine the coefficient of x^5 and x^4 in $(a+bx+cx^2)^{10}$
   (b) What is the sum of all numbers of the form 12! / q_1! q_2 ! q_3 !. where q_1, q_2, q_3 range over all the sets of nonnegative integers such that q1+q2+q3=12? [8+8]

3. (a) Let the relation R = {(a, b) |a − b is divisible by 3} on the set, S = {1, 2, 3, 5, 6, 7}. Show that R is an equivalence relation and draw the graph of R.
   (b) Using the Pigeonhole Principle, show that: "*there must be at least* 90 *ways to choose numbers from* 1 *to* 15 *so that all the choices have the same sum.*" [8+8]

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   (b) Show that C is a logical consequence of the formula:
   $A \wedge (A \rightarrow (B \vee C)) \wedge (B \rightarrow \sim A)$
   using truth tables. [8+8]

5. Chose an appropriate substation to translate $a_n = 2\ a_{n/4}$+n for n=$4^k >= 4$ and a1=1 in to a first order relation. Solve this relation by underdetermined coefficients and then fined a_4k. [16]

6. (a) Write the algorithm for breadth first search spanning tree. Explain how the algorithm.
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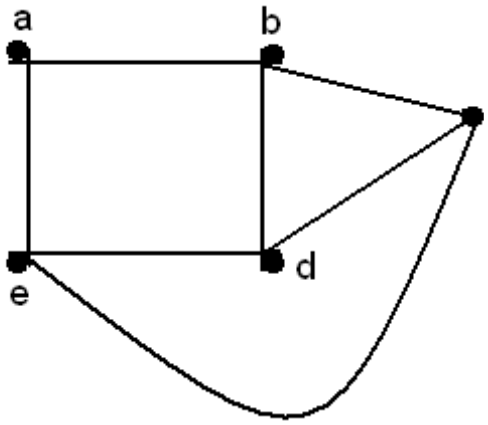

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Code No: 07A3BS04 **R07** **Set No. 3**

II B.Tech I Semester Examinations,May/June 2012
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE
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Answer any FIVE Questions
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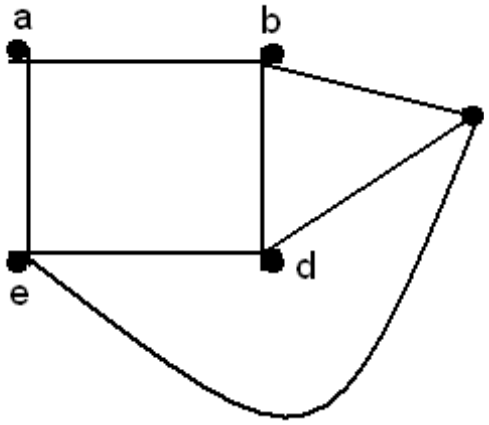
   (b) Give an example of a monoid which is NOT a group. [8+8]

2. (a) Write the rules for constructing Hamiltonian paths and cycles.
   (b) Write the difference between Hamiltonian graphs and Euler graphs. [8+8]

3. (a) Write the algorithm for breadth first search spanning tree. Explain how the algoritm.
   (b) Apply breadth first search on the following figure work with an example. [6+10]



4. (a) Determine the coefficient of x^5 and x^4 in $(a+bx+cx^2)^{10}$
   (b) What is the sum of all numbers of the form 12! / q_1! q_2 ! q_3 !. where q_1, q_2, q_3 range over all the sets of nonnegative integers such that q1+q2+q3=12? [8+8]

5. Chose an appropriate substation to translate $a_n = 2\ a_{n/4}$+n for $n=4^k >= 4$ and a1=1 in to a first order relation. Solve this relation by underdetermined coefficients and then fined a_4k. [16]

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