

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 ?????

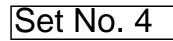
- 1. (a) Let $(S_1, *_1)$, $(S_2, *_2)$ and $(S_3, *_3)$ be semi groups and f: $S_1 ! S_2$ and g: $S_2 ! S_3$ be homomorphisms. Prove that the mapping of g o f: $S_1 ! S_3$ homomorphism.
 - (b) Prove that H = f0, 2, 4g forms a subgroup of $(Z_6, +)$. [8+8]
 - 2. (a) Let X = f1, 2, 3, 4, 5, 6, 7g and R = f(x; y) jx y is divisible by 3g in X. Show that R is an equivalence relation.
 - (b) Let A = f1, 2, 3, 4g and P = ff1, 2,3g, f4gg be a partition of A. Find the equivalence relation determined by P. [10+6]
- 3. (a) A book binder is to bind 10 di erent 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 (8x) (H (x) ! M (X)) ^ (9X) H (x)) (9x) 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 de nition of Euler circuit discuss the requirement that the Euler circuit intersects with every vertex at least once. [8+8]
 - 8. (a) Show that (A B) (A # B) is equivalent to (A "B)
 - (b) Obtain the canonical product of sums of the propositional formulas:

X ^ (Y _ Z).

[8+8]



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 - 3. (a) Explain BFS with an example.

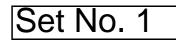
(b) Explain minimal spanning tree with an explain. [8+8]

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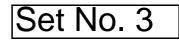
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