

**IV B.Tech II Semester Supplementary Examinations, Apr/May 2006**  
**ROBOTICS**

**(Computer Science & Engineering)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Explain the principle of Newton-Euler formulation in robot arm dynamics. [16]
2. How do you justify the performance and stability of a second order control system? [16]
3. Explain the principle of various sensor devices used in robot work cells and give its applications. [16]
4. (a) Explain the principle of electron beam scanning pattern.  
(b) Explain the principles of thresholding. [8+8]
5. (a) Explain the various capabilities and limitations of the robot languages. [7]  
(b) Describe the following search techniques:
  - i. Depth-first search
  - ii. Breadth-first search
  - iii. Best-first search. [9]
6. (a) Briefly discuss the following predicate logic components:
  - i. Predicate symbols
  - ii. Variable symbols
  - iii. Function symbols
  - iv. Constant symbols.  
(b) Describe the procedure to produce the desired solution by a general graph-search technique. [8+8]
7. Explain the following in brief while carrying out work cell design
  - (a) Speed of response and stability
  - (b) Precision of movement
  - (c) End effectors selected. [5+5+6]
8. Write a brief note on:
  - (a) A Robot controller
  - (b) Electromechanical relays
  - (c) Programmable controllers. [5+5+6]

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