

11/12/2012

B.E. (VIT) Computer

Robotics & AI

V-A4-II-HF-Ex-12-D-69

1102

Con. 8367-12.

KR-1161

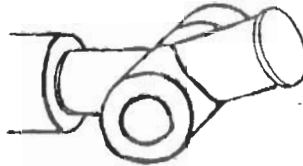
(3 Hours)

[Total Marks : 100

- N.B. : (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions from Question No. 2 to Question No. 7.
 (3) Assume **suitable** data if **necessary**.

1. Answer following question in brief :— 20
 (a) Briefly explain the role of Robotics in Industries.
 (b) Explain in brief the forward and inverse Kinematics.
 (c) Explain Heuristic function with example.
 (d) List sensors used for reactive robot.

2. (a) Describe DH parameters with suitable sketch. 6
 (b) Find the Kinematic transformation matrix using DH Method for following robot. 14



3. (a) Explain how you will formulate search problem. Formulate 8-puzzle problem. 6
 (b) Describe Depth-first search using suitable example. 4
 (c) What do you mean an admissible heuristics function ? Discuss with suitable example. 5
 (d) Describe IDA* search algorithm giving suitable example. 5

4. (a) Describe backward-chaining algorithms for propositional logic. 6
 (b) Represent the following sentences in first-order logic, using a consistent vocabulary. 4
 (i) Every person who buys a policy is smart.
 (ii) No person buys an expensive policy.
 (iii) There is an agent who sells policies only to people who are not insured.
 (iv) There is a barber who shaves all men in town who do not shave themselves.
 (c) Describe backward chaining algorithm with example. 10

5. (a) You have two neighbors, John and Mary, who have promised to call you at work when they hear the alarm. John always calls when he hear the alarm, but sometimes confuses the telephone ringing with the alarm and calls then, too. Mary on the other hand, likes rather loud music and sometimes misses the alarm altogether. Given the evidence of who has or has not called, we would like to estimate the probability of a burglary. Draw a Bayesian network for this domain with suitable probability tables. 10
 (b) Give steps in designing the Reactive Behavioral system. 10

6. (a) What is planning problem ? How it differs from search problem ? 5
 (b) Explain screw Transformation. 5
 (c) Explain supervised, unsupervised and reinforcement learning with example. 10

7. (a) Describe following electrical actuators : DC motor, synchronous motor, stepper motor. 10
 (b) Explain following sensors used in robotics application : Potentiometer, inductor, capacitor, LVDT. 10