Code No: D5506 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech II - Semester Examinations, March/April 2011
ROBOTICS
(EMBEDDED SYSTEMS)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks
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1. a) Discuss the application of gantry and arm type robots in the automobile industry?
   b) Explain the control programs of the robots. [6+6]

2. a) Explain with the neat sketches offset and in-line wrist of robots?
   b) Discuss the different geometrical configurations of robots. [6+6]

3. a) Derive the basic rotation matrix?
   b) Derive the 4×4 d-h transformation matrix. [6+6]

4. Explain the inverse kinematic analysis of any spatial 3 dof by choosing a link parameter table. [12]

5. a) Explain the time of flight range finders.
   b) Discuss about RFID. [6+6]

6. a) Explain the working of hydraulic and pneumatic type actuators.
   b) Discuss about Piezo-electric and infrared sensors. [6+6]

7. a) What is a stepper motor? Explain.
   b) Discuss about incremental encoders? [6+6]

8. a) What are the characteristics of task level languages? Explain.
   b) Discuss the workplace design considerations for safety? [6+6]

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