

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014****Subject code: 1725001****Date: 16-06-2014****Subject Name: Robotics and Artificial Intelligence****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Compare and Contrast Artificial Intelligence Vs. Human Intelligence with examples. **07**
 (b) What do you mean by robot configuration? Explain 2P, 2PR, and 3R configuration. **07**

- Q.2** (a) Explain the following terminologies in regard to robotics: **07**
 (1) Rich, (2) Repeatability, (3) Cycle Time, (4) Degree of freedom,
 (5) Pay Load, (6) Work envelope, (7) Speed of response
 (b) Define Automation. List out all the types of Automation and Explain them in detail by giving the industrial applications of each. **07**

OR

- (b) Fig. 1 Shows 3 ñ D.O.F. articulated robot arm. **07**
 Do Forward Kinematic analysis using Denavit-Hartenberg table.

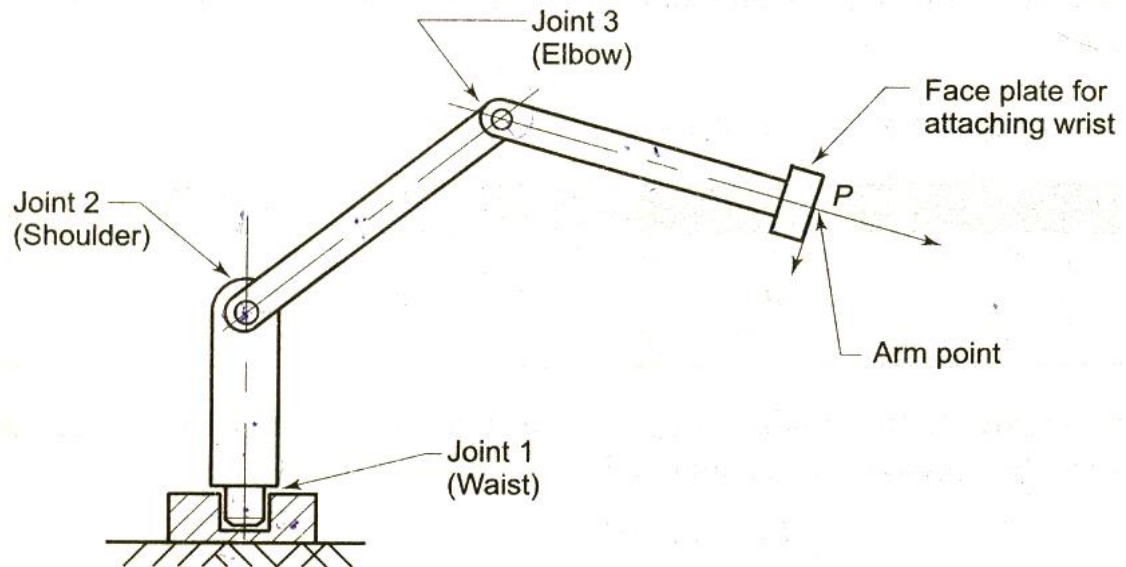


Fig. 1 (3 ñ D.O.F. articulated robot arm)

- Q.3** (a) Explain various types of gripper mechanism. Explain design procedure of anyone in detail. **07**
 (b) Derive transformation matrix for Euler angles D-H representation of forward kinematics. **07**

OR

- Q.3** (a) A vacuum cup gripper will be used to lift flat plates of 18-8 S.S. Each piece of steel is 0.25 inch thick and measures 2 x 3 ft. The gripper will utilize two suction cup is round and has a dia. of 5 inch. Two cups are considered a requirement to overcome the problem that the plates may be off center w.r.t. the gripper. Consider the F.O.S. as 1.6 **07**
 (b) Enlist robot cell layouts. Compare 'Robot centered cell' and 'Inline robot cell'. **07**

- Q.4** (a) Explain with neat sketch Vidicon tube in Machine Vision System. **07**
 (b) Explain application of robot in Spray coating. Also write benefits of it. **07**

OR

- Q.4** (a) Classify the types of the cost. Also explain the life cycle of cash flows in capital investment project. **07**
(b) Explain "Remote Center Compliance (RCC) Device" for Assembly Operation. **07**
- Q.5** (a) Explain the term Artificial intelligence with its problems and applications. **07**
(b) Solve 8-puzzle problem using Depth-First Search. **07**
- OR**
- Q.5** (a) Differentiate the DFS and BFS with merits and demerits. **07**
(b) Write and Explain the applications of AI in manufacturing. **07**
