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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION-OCTOBER 2017

B. Tech 7th Semester

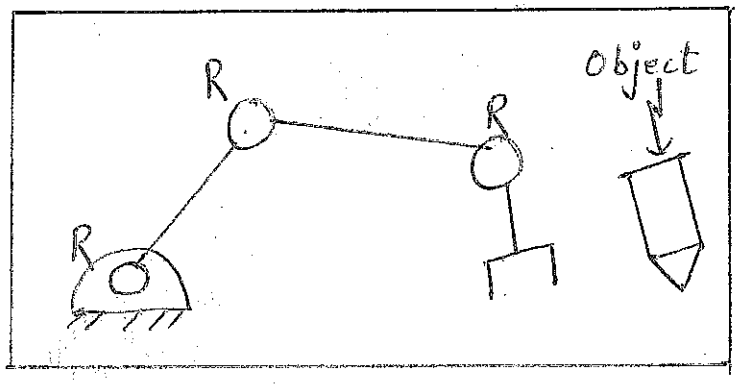
COURSE CODE: 17B1WEC733 MAX. MARKS:15

COURSE NAME: **ROBOTIC SYSTEMS AND CONTROL**

COURSE CREDITS: 3 MAX. TIME: 1Hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Make assumptions incase if find any information missing.

1. **[4 marks]** A planar robot manipulator having three revolute joints is used to pick the object placed on the table as shown in figure below. If the link lengths and joints angles are given, compute
   (a) How many DOF robot manipulator have?
   (b) If robot manipulator is used as a measuring device, find the position and orientation of the object?
   Draw appropriate diagrams to justify your answer.



2. **[3 marks]** Find the joint angles θ_1 *and* θ_2, where the tool is located at coordinates $\left(\frac{1}{2}, \frac{1}{2}\right)$.

3. **[3 marks]**A moving frame is rotated about x-axis of the fixed coordinate frame by $\pi/6$ radians. The coordinates of a point Q in fixed coordinate frame is given by Q= $[2\ 0\ 3]^T$. what will be the coordinates of a point Q with respect to the moving frame?

4. **[3 marks]** In a sentence or two, define: degree of freedom, workspace, accuracy and repeatability.

5. **[2 marks]** List 5 robot applications that a continuous path robot could do that a point-to-point robot could not do.

EC-G, BT