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MID TERM EXAMINATION- JUNE 2018

B. Tech SUMMER Semester

COURSE CODE: 17B1WEC733

MAX. MARKS: 50

COURSE NAME: ROBOTIC SYSTEMS AND CONTROL

COURSE CREDITS: 3

MAX. TIME: 2hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Make valid assumptions if required.

1. [10 marks] In a sentence or two, define: degree of freedom, workspace, accuracy and repeatability.
2. [10 marks] For the two-link manipulator with link lengths $L_1 = L_2 = 1$. Find the coordinates of the tool when $\theta_1 = \frac{\pi}{6}$, and $\theta_2 = \frac{\pi}{2}$.
3. [10 marks] Explain the block diagram of robotic closed loop system. Define the sensors and controller. Explain any two internal state sensors.
4. [5 marks] What do you mean by dynamics and control of robotic system? Discuss the challenges for a control engineer for analysis and synthesis of robotic systems?
5. [5 marks] List 5 robot applications that a continuous path robot and a point-to-point robot could do.
6. [2.5 marks each] Write Short Notes on:
 - a) System modeling
 - b) Trajectory tracking
 - c) Forward and inverse kinematics
 - d) Transfer function vs. State-space approach