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CC-83

M. Tech. EXAMINATION, Dec. 2018

(Third Semester)

(B. Scheme) (Main & Re-appear)

(ME)

MED601B

MECHANISM AND MANIPULATOR DESIGN

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

Unit IV

7. (a) How inertia tensor is different from translational inertia ?

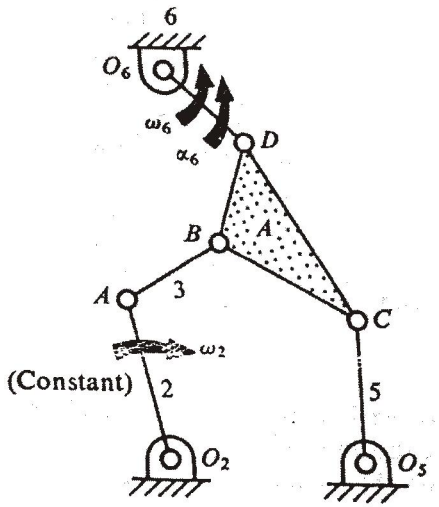
(b) What do you understand by principal moment of interia ? How principal axes are determined ? **15**

8. Explain Newtonian approach to solve dynamics of a rigid body. **15**

Unit I

1. Differentiate between number and dimensional synthesis ? Prove thate minimum number of binary links in a constrained is four. **15**

2. In the mechanism shown below, $\omega_2 = 10$ rad/s(CW), Determine ω_6 and α_6. Given $O_2A = 7.5$ cm; AB = 5 cm; BC = 7.5 cm; $O_5C = 6.25$ cm; CD = 10 cm; BD = 5 cm; $O_6D = 5$ cm,; $\angle O_2AB = 110^\circ$, $\angle ABC = 115^\circ$; $\angle O_6DB = 117^\circ$. **15**



Unit II

3. Explain motion, path and function generation in dimensional synthesis. **15**

4. Determine the lengths of the links of a four-bar linkage to generate $y = \log_{10} x$ in the interval $1 \leq x \leq 10$. The length of the smallest link is 5 cm. Use three accuracy points with Chebyshev's spacing. **15**

Unit III

5. Explain different types of electric actuators used for a robotics manipulator with their advantages and diadvantages. **15**

6. Differentiate in forward and inverse kinematics. Also explain DenavitHertnberg. notation kused to solve kinematics of a manipulator. **15**