



INSTITUTE OF ENGINEERING
AND TECHNOLOGY

JK LakshmiPat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

B. Tech.,

3rd Year (5th Semester)

Term-III Examination, Dec, 2022

Course No. : IL1206
Course Title : Mechanisms for Machines
Nature of Exam : Open Notes
Max Marks : 60
Duration : 3 Hrs.

No. of Pages = 02

No. of Questions = 08

Roll No: _____

Note:

1. Draw neat diagrams using pencil (if required).
2. All questions are compulsory.
3. Assume data as and when required
4. Write only Roll No in Question Paper

- 1 Determine the links, joints and mobility (degrees of freedom) of the mechanism shown in Fig. 1(a,b,c,d) using Kutzbach mobility criterion and classify them. MM:10 CO1

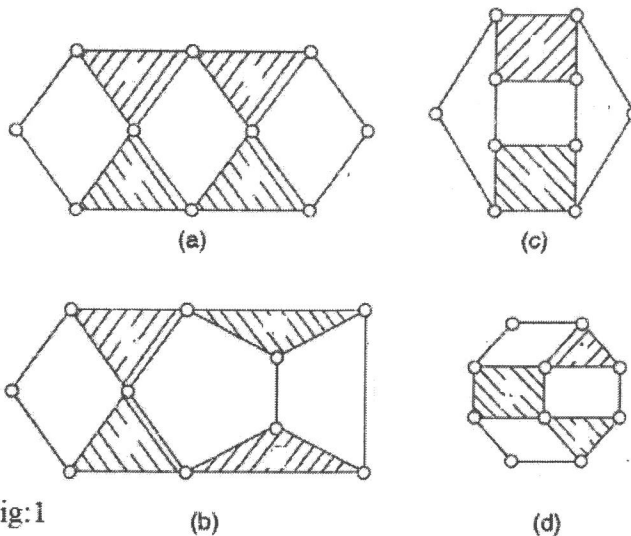


Fig:1

- 2 Locate all the instantaneous centres for a four bar mechanism as shown in Fig. 2. The lengths of various links are : AD = 130 mm ; A B = 65.5 mm ; BC = CD = 80 mm. If the link A B rotates at a uniform speed of 10 r.p.m. in the clockwise direction, find the angular velocity of the links BC and CD. MM:10 CO1

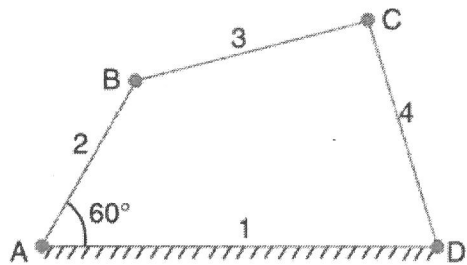


Fig: 2

3 A cam operating a knife-edged follower has the following data :

MM:10 CO2

- Follower moves outwards through 40 mm during 60° of cam rotation.
- Follower dwells for the next 45° .
- Follower returns to its original position during next 90° .
- Follower dwells for the rest of the rotation.

The displacement of the follower is to take place with simple harmonic motion during both the outward and return strokes. The least radius of the cam is 50 mm. Draw the profile of the cam when the axis of the follower passes through the cam axis. If the cam rotates at 300 rpm., determine maximum velocity and acceleration of the follower during the outward stroke and the return stroke.

4 What are the different types of motion with which a follower can move. Draw the displacement, velocity and acceleration diagrams for a follower when it moves with simple harmonic motion.

MM:10 CO2

5 What is a machine? Giving example, differentiate between a machine and a structure. Explain different kinds of kinematic pairs giving example for each one of them.

MM:09 CO1

6 With the use of given microcontroller having $V_{OH} = 3.3$ V, $V_{OL} = 0.2$ V and $I_{out} = 10$ mA, design an electronic circuit to charge a battery of 6 V and 90 mA.

MM:5 CO3

7 Interface a transistor with Node-MCU to operate the load rated 3 V and 80 mA

MM:3 CO3

8 Select suitable sensors to measure rotary motion and design an embedded system to display the angular speed of rotating motor rated 5 A and 230 volts

MM:3 CO2
CO3