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VIT
Vellore Institute of Technology

SCHOOL OF MECHANICAL ENGINEERING

CONTINUOUS ASSESSMENT TEST – I - WINTERSEMESTER 2019-2020

Programme Name & Branch: BTech., Mechanical Engineering

Course Code: MEE 2004

Course Name: Mechanics of Machines

Faculty Name(s): Prof. Devendiran S, Prof. Manikandan M., Prof. Sovan Sundar Dasgupta, Prof. D. S. Mohan Varma

Class Number(s):/ VL2019205001575 /VL2019205001723/VL2019205001845/ VL2019205000803

Exam Duration: 90 mins **Maximum Marks: 50**

General instruction(s):

Answer all questions

1. Briefly describe the different inversions of a four bar mechanism with neat sketches along with applications. **[10 marks]**
2. Find the number of degrees of freedom of the following mechanisms **[4 marks]**

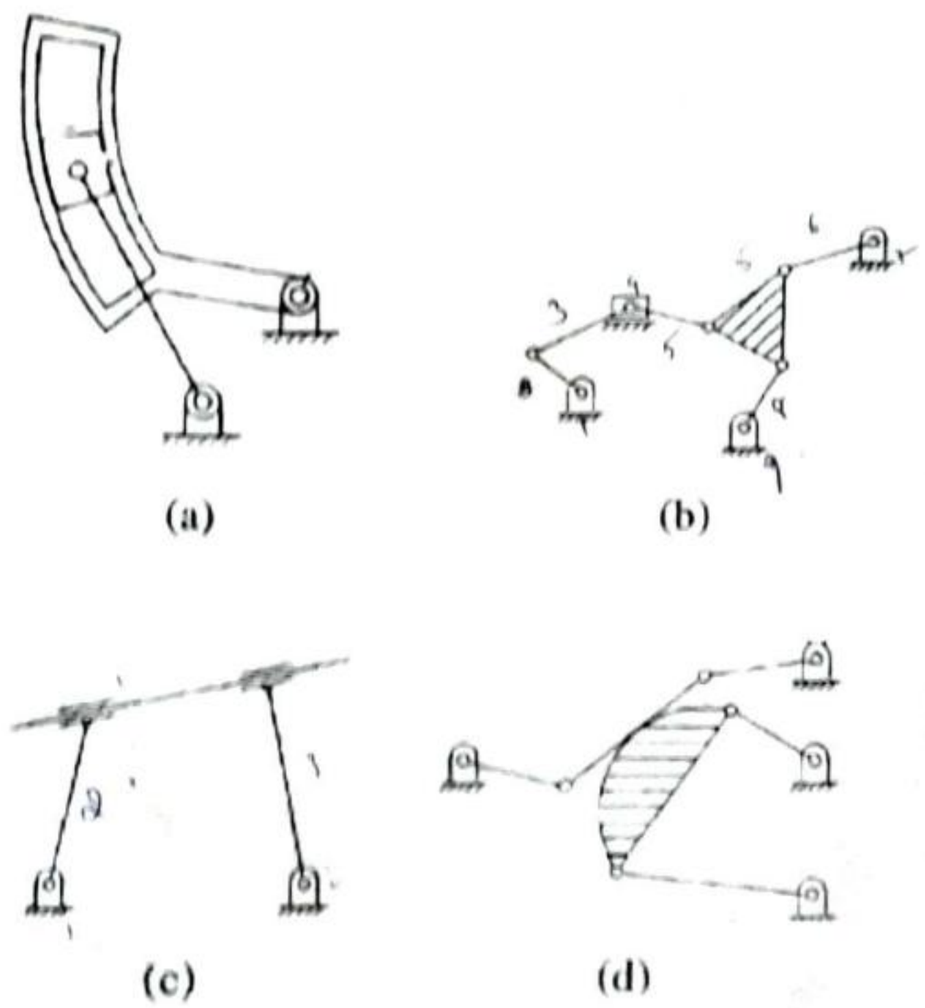
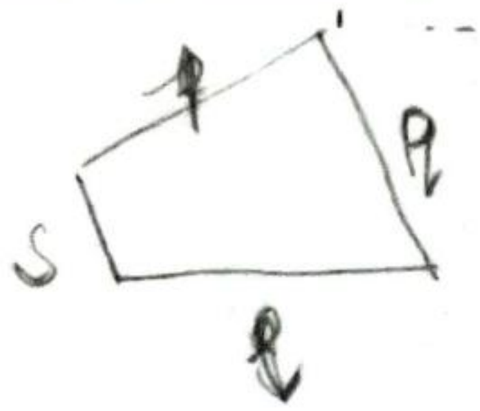


Figure 1: Figure for problem 2

3. Determine if each of the following four bar mechanisms is Grashof or Non-Grashof. Also classify the type of mechanism as crank-rocker, double-rocker or double-crank. Link 1.1 is the fixed link in all cases. **[6 marks]**



(i) L1 = 4; L2 = 3; L3 = 1; L4 = 5
(ii) L1 = 5; L2 = 10; L3 = 10; L4 = 2
(iii) L1 = 2; L2 = 4; L3 = 9; L4 = 6

4. Draw the displacement diagram of the follower and construct the cam profile of a radial cam operating a roller reciprocating follower with the following data: Minimum radius of cam = 25 mm; Lift = 30 mm; Roller diameter = 15 mm. The cam lifts the follower for 120° with SHM followed by a dwell period of 30°. Then the follower lowers down during 150° of the cam rotation with uniform acceleration and deceleration followed by a dwell period. **[15 marks]**

5. Determine the absolute velocities and accelerations of points A, B and C for the given instance of the mechanism. Also find the angular velocity and angular acceleration of link AB. The crank OA is rotating with constant angular velocity. Draw velocity and acceleration diagrams. **[15 marks]**

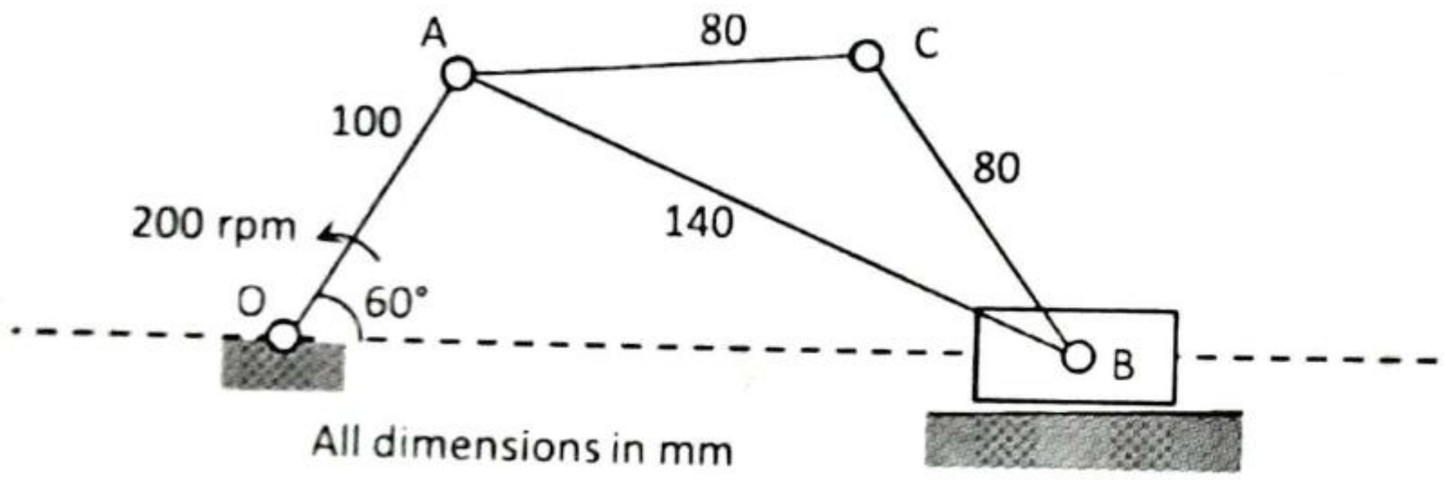


Figure 2: Figure for problem 5