

Homework 7: Instant Centers Part1

 Graded

Student

Shihong Yuan

Total Points

29.75 / 30 pts

Question 1

(no title)

17.75 / 18 pts

1.1 Mechanism 1ab

3.5 / 3.5 pts

✓ - 0 pts Correct

- 3.5 pts Missing

- 1 pt Incorrect I23

- 1 pt Incorrect I13

- 1 pt Incorrect I12

- 0.5 pts Incorrect IC calculation.

- 0.5 pts Small error

1.2 Mechanism 2ab

3.5 / 3.5 pts

✓ - 0 pts Correct

- 3.5 pts Missing

- 0.5 pts Incorrect I12

- 0.5 pts Incorrect I13

- 0.5 pts Incorrect I14

- 0.5 pts Incorrect I23

- 0.5 pts Incorrect I24

- 0.5 pts Incorrect I34

- 1 pt Missing/Extra instant center

- 2 pts Multiple Missing/Extra instant centers

- 0.5 pts Labelling error

1.3	Mechanism 3ab	3.5 / 3.5 pts
	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> - 0 pts Correct - 0.5 pts Incorrect I13 - 0.5 pts Incorrect I24 - 0.5 pts Incorrect I14 - 0.5 pts Incorrect I12 - 0.5 pts Incorrect I23 - 0.5 pts Incorrect I34 - 0.5 pts Incorrect IC calculation - 0.5 pts Minor labeling issue - 1 pt No labels - 3.5 pts Missing 	
1.4	Mechanism 4ab	5.25 / 5.5 pts
	<ul style="list-style-type: none"> - 0 pts Correct - 0.5 pts Incorrect/missing IC calculation <input checked="" type="checkbox"/> - 0.25 pts 1 incorrect Instant Center - 0.5 pts 2-3 incorrect Instant Centers - 1.5 pts 4-6 incorrect Instant Centers - 2.5 pts 7-9 incorrect Instant Centers - 3.5 pts 10-12 incorrect Instant Centers - 4.5 pts 13-15 incorrect Instant Centers - 5.5 pts Missing 	
1.5	Neatness/completion	2 / 2 pts
	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> - 0 pts No Issues - 0.5 pts Diagrams excessively messy/difficult to read - 1 pt Missing key parts 	

Question 2

(no title)

12 / 12 pts

2.1 (no title)

2 / 2 pts

✓ - 0 pts Correct

- 0.5 pts number of instant centers not computed

- 0.2 pts missing an IC

- 0 pts Click here to replace this description.

2.2 (no title)

3 / 3 pts

✓ - 0 pts Correct

- 1 pt Missing equation

- 3 pts Incorrect

- 1 pt incorrect location

- 1 pt Incorrect direction

- 0.5 pts Equation wrong

- 2 pts 2 equation wrong

- 3 pts Incorrect

- 1 pt Direction missing

2.3 (no title)

2 / 2 pts

✓ - 0 pts Correct

- 2 pts Missing

- 0.5 pts Partial correctness

- 1 pt incorrect

2.4 (no title)

1.5 / 1.5 pts

✓ - 0 pts Correct

- 0.75 pts Incorrect, the correct is no.

- 1.5 pts Missing

- 2 pts Click here to replace this description.

2.5 L (no title) 3.5 / 3.5 pts

✓ - 0 pts Correct

- 0.2 pts No negative sign needed, just magnitude

- 1 pt Incorrect Magnitude Definition

- 2 pts Missing equation

- 0.5 pts Partially Correct Magnitude Definition

- 0.5 pts Incorrect diagram

- 3.5 pts Missing

- 1 pt missing diagram

Question 3

Penalties

0 / 0 pts

✓ - 0 pts Correct

- 3 pts No Pages Assigned

- 3 pts Less than 1 day late

- 6 pts Less than 2 days late

- 9 pts Less than 3 days late

Questions assigned to the following page: [1.1](#), [1.2](#), and [1.5](#)

NAME: shihong yuan
 UIN: 665249431
(syuan19)

Problem 1 [18 pts]:

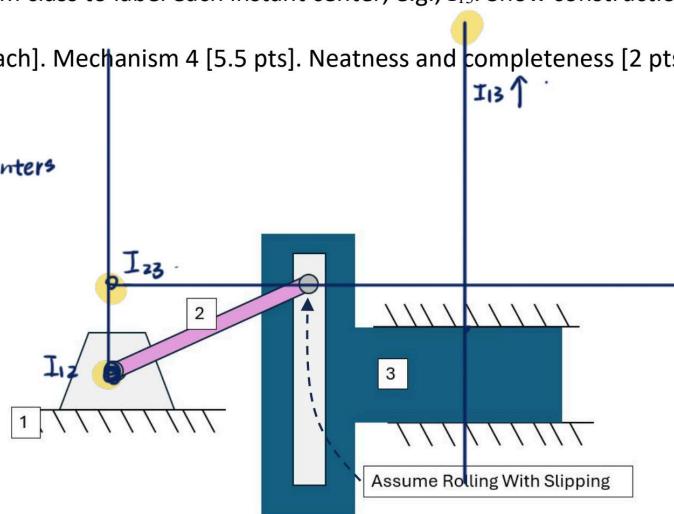
For the five mechanisms shown below:

- (a) Compute how many instant centers should there be in the mechanism.
- (b) Identify all instant centers (ICs) for the mechanism using a linear graph to track them. Use the labeling convention from class to label each instant center, e.g., I_{13} . Show construction lines if needed (Rules 2,3,5).

Mechanisms 1-3 [3.5 pts each]. Mechanism 4 [5.5 pts]. Neatness and completeness [2 pts].

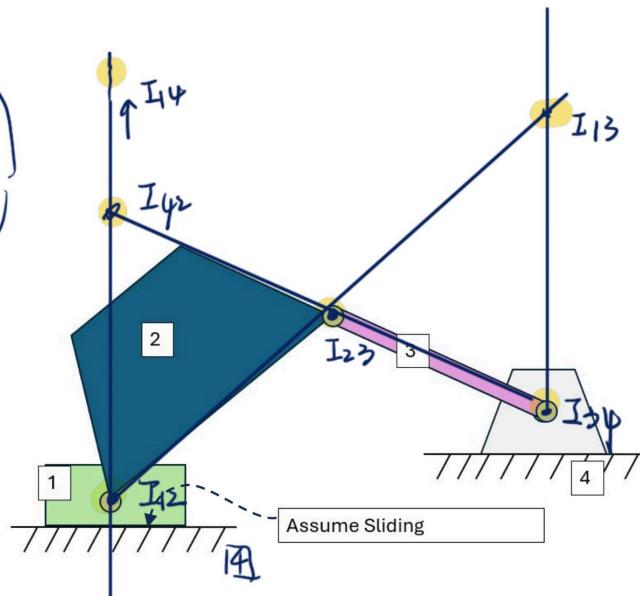
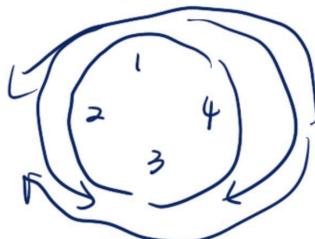
Mechanism 1

$$(1) C_3^z = 3 \text{ instant centers}$$

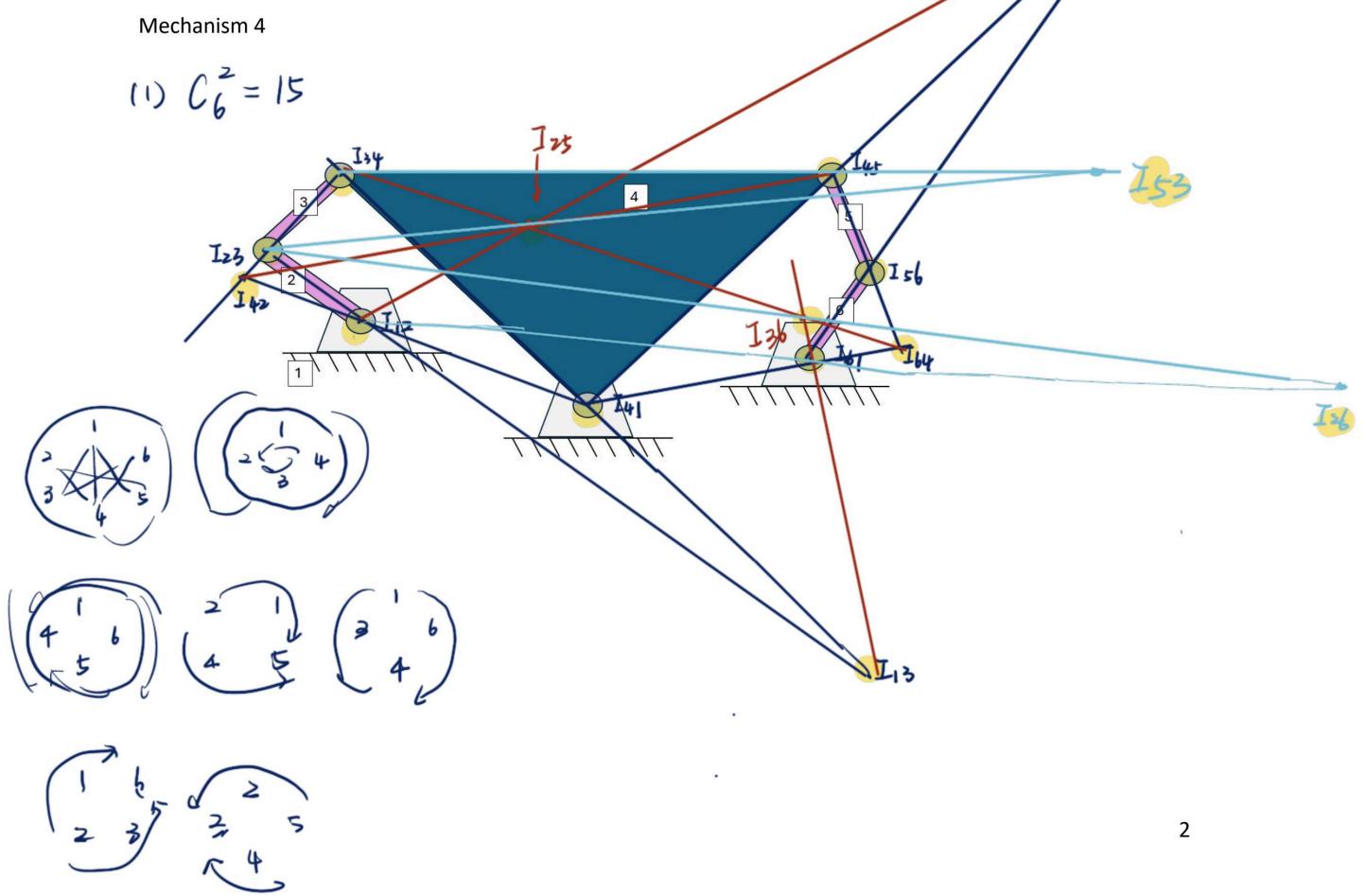
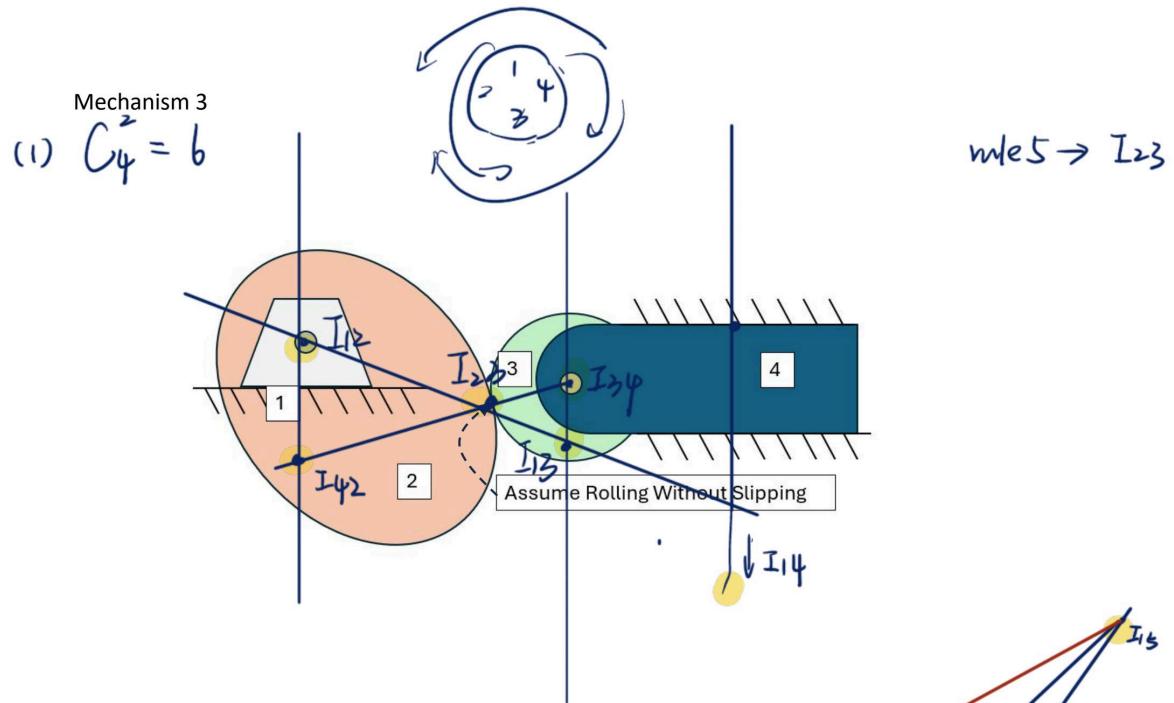


Mechanism 2

$$(1) C_4^z = 6$$



Questions assigned to the following page: [1.3](#), [1.5](#), and [1.4](#)



Questions assigned to the following page: [2.1](#), [2.2](#), [2.3](#), [2.5](#), and [2.4](#)

Problem 2 [12 pts]: Using Instant Centers

Consider the mechanism drawn below. The ultimate goal of this problem is to graphically illustrate and determine the magnitude and direction of the linear velocity at point C using instant centers. Assume that the input constant angular velocity ω_4 is known.

(a) Identify all instant centers for this mechanism. Follow steps (a) and (b) in Problem 1. [2 pts]

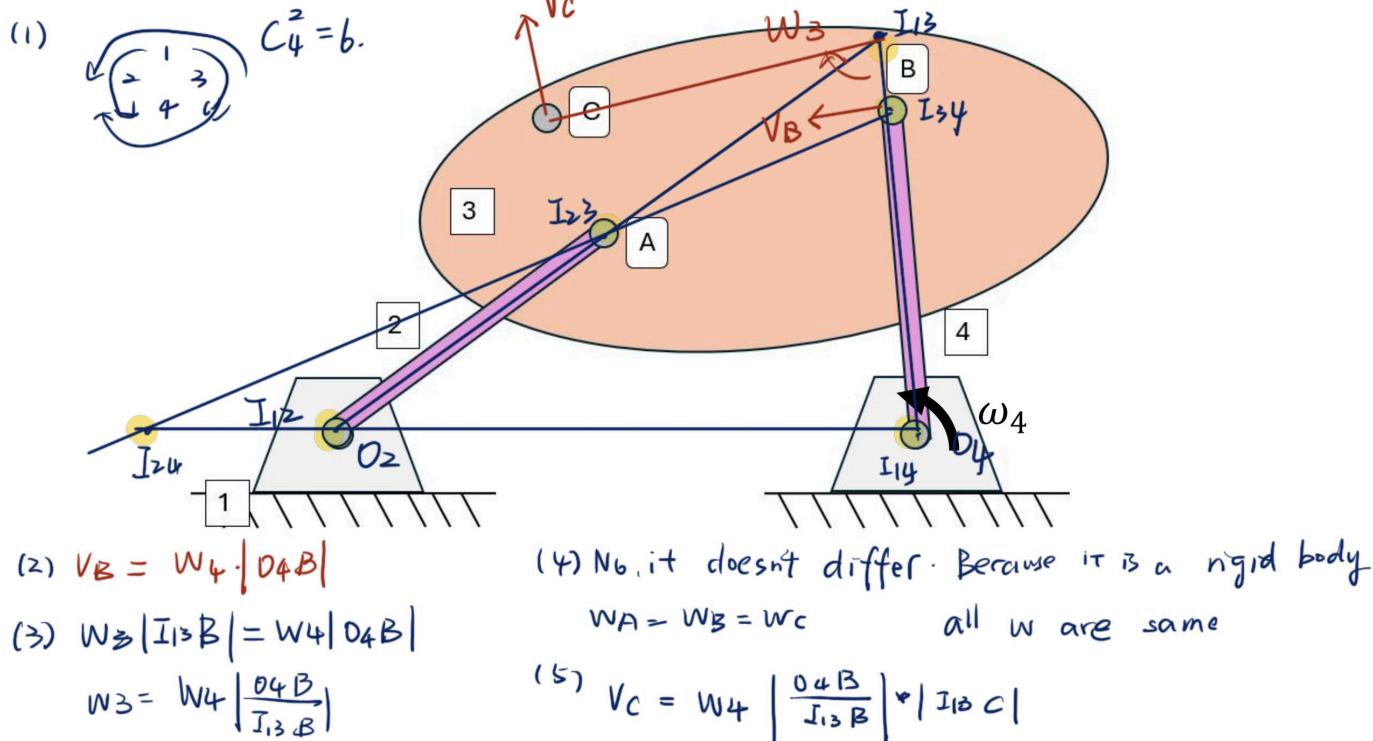
(b) Use geometry to draw $\overrightarrow{V_B}$ (velocity of point B) with its appropriate direction (make sure to indicate any known angles) and magnitude (length) in the figure. You can define the length of segments using $|XY|$ notation, for the distance between points X and Y [3 pts].

(c) Write a symbolic equation to solve for the angular velocity of the link ABC (let's call it ω_3) [2 pts].

(d) Does the angular velocity of link ABC differ with location on the link? Explain why. [1.5 pts]

(e) Define the magnitude and draw $\overrightarrow{V_C}$ (velocity of point C) with its appropriate direction in the figure. You must indicate the exact angle of this vector with respect to a known line (Hint: the line connecting to a particular instant center) [3.5 pts].

Show all work to reach your answers!



Question assigned to the following page: [3](#)

Select one of the following options:

- a) My answer was created by a Gen AI algorithm, and I have not modified it
- b) My answer was created by a Gen AI algorithm, and I have made some minor changes.
- c) My answer was created by a Gen AI algorithm, and I have made major changes.
- d) My answer was created solely by myself.
- e) If I used Gen AI, I used ___ (name of program).