PASS
PEER ASSISTED STUDY SESSIONS

MOCK EXAM
FOR PRACTICE ONLY

COURSE: MAAE 3004 **FACILITATOR:** JEFF HOUGH

It is **most beneficial** to you to write this mock midterm **UNDER EXAM CONDITIONS**. This means:

- Complete the midterm in 1.5 hour(s).
- Work on your own.
- Keep your notes and textbook closed.
- Attempt every question.

After the time limit, go back over your work with a different colour or on a separate piece of paper and try to do the questions you are unsure of. Record your ideas in the margins to remind yourself of what you were thinking when you take it up at PASS.

The purpose of this mock exam is to give you practice answering questions in a timed setting and to help you to gauge which aspects of the course content you know well and which are in need of further development and review. Use this mock exam as a ***learning tool*** in preparing for the actual exam.

Please note:

- Come to the PASS workshop with your mock exam complete. During the workshop you can work with other students to review your work.
- Often, there is not enough time to review the entire exam in the PASS workshop. Decide which questions you most want to review – the Facilitator may ask students to vote on which questions they want to discuss in detail.
- Facilitators do not bring copies of the mock exam to the session. Please print out and complete the exam before you attend.
- **Facilitators do not produce or distribute an answer key for mock exams.** Facilitators help students to work together to compare and assess the answers they have. If you are not able to attend the PASS workshop, you can work alone or with others in the class.

Good Luck writing the Mock Exam!!

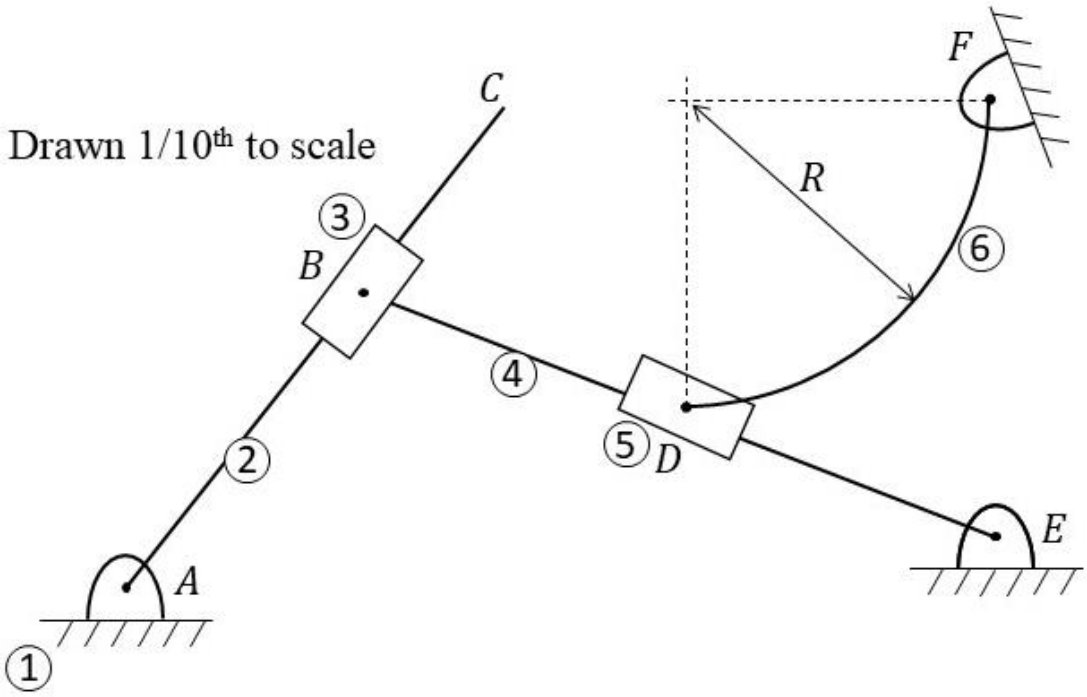
Dates and locations of mock exam take-up:

Tuesday, October 9th (6:00-8:00pm) ME 3275

Thursday, October 11th (6:00-8:00pm) ME 3275

Question 1:

Given that there is an input angular velocity of $\omega_{EB} = 1\frac{rad}{s}$ to the mechanism below, determine the following:



a) The velocity of point B_3.

a. 4.3 m/s right and down
$\perp AC$

b. 4.3 m/s left and down
$\perp EB$

c. 4.3 m/s, left and up
$\perp AC$

d. 4.3 m/s left and up $\parallel EB$

b) The velocity of point B_3.

a. 4.3 m/s, $\parallel BE$, up and to right
b. 1.3 m/s, $\perp BE$, down and right
c. 0.7 m/s, $\perp BE$, down and right
d. 4.3 m/s, $\perp BE$, down and right

c) The angular velocity of link 3.

a. 5.4 rad/s, CW
b. 10.2 rad/s, CCW
c. 2.7 rad/s, CW
d. 0.8 rad/s, CCW

d) The velocity of point C.

a. 7.4 m/s , $\parallel BE$, up and to right
b. 12 m/s $\perp BE$, down and right
c. 2.1 m/s $\perp AC$, down and right
d. 0.3 m/s$\perp BE$, down and right

e) The velocity of point D_4.

a. 2.1 m/s $\perp EB$, down and left
b. 4.4 m/s $\perp BE$, up and right
c. 8.2 m/s $\perp EB$, down and left
d. 1.2 m/s $\perp BE$, up and right

f) The velocity of point D_5.

a. 3.1 m/s ∥ EB, up and left
b. 10.5 m/s ∥ EB, down and right
c. 4.1 m/s ⊥ DF, down and right
d. 5.5 m/s ⊥ DF, down and right

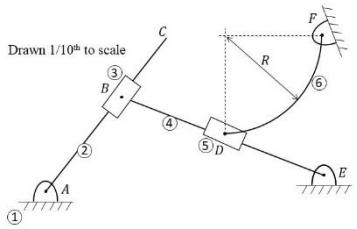
g) The angular velocity of link 6.

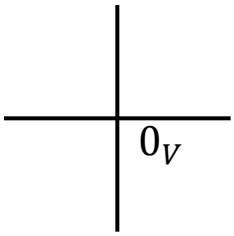
a. 20 rad/s CCW
b. 10 rad/s CCW
c. 5 rad/s CW
d. 1 rad/s CW

h) The angular velocity of link 5.

a. 2.7 rad/s CW
b. 5.5 rad/s CW
c. 1 rad/s CCW
d. 10 rad/s CCW

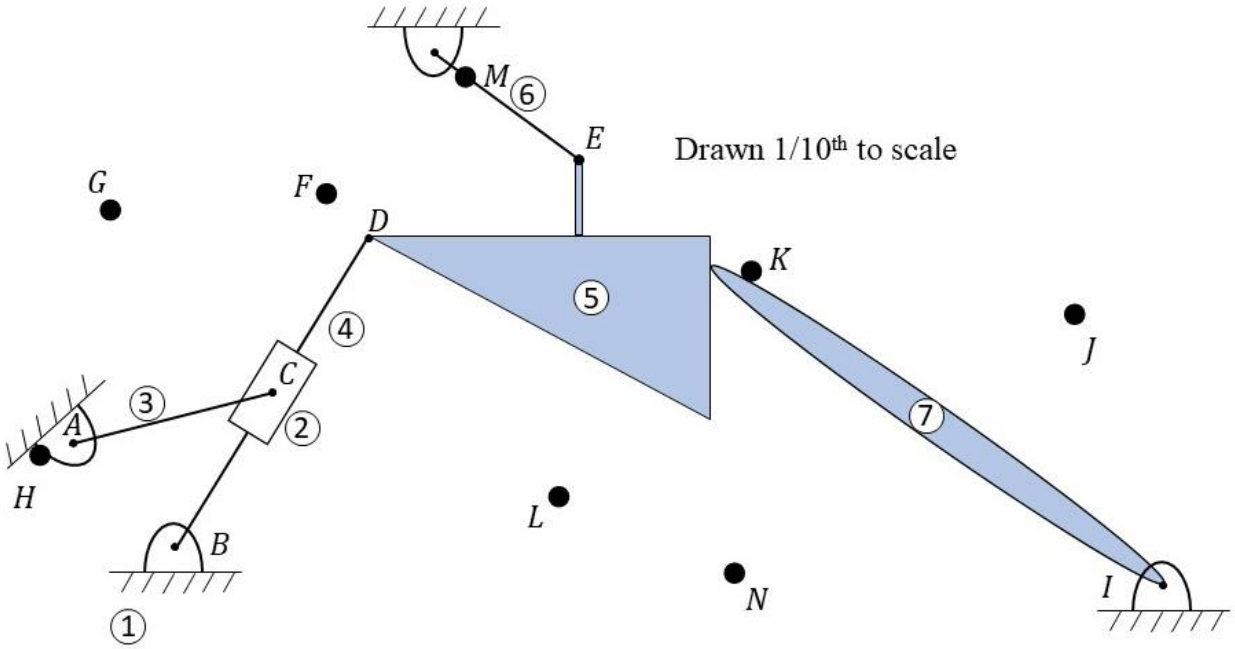
Recommended Scale: 2cm = 1m/s





Question 2:

Given the mechanism below, determine the following:



a) The total number of instant centers which should be present?

a. 18
b. 25
c. 21
d. 42

b) The location of P_{23}.

a. Point C
b. Point A
c. Point K
d. Point M

c) The location of P_{15}.

a. Point E
b. Point L
c. Point D
d. Point M

d) The location of P_{21}.

a. Point A
b. Point H
c. Point B
d. Point F

e) The location of P_{57}.

a. At infinity, left or rightwards
b. Point I
c. Point E
d. Point K

f) The location of P_{36}.

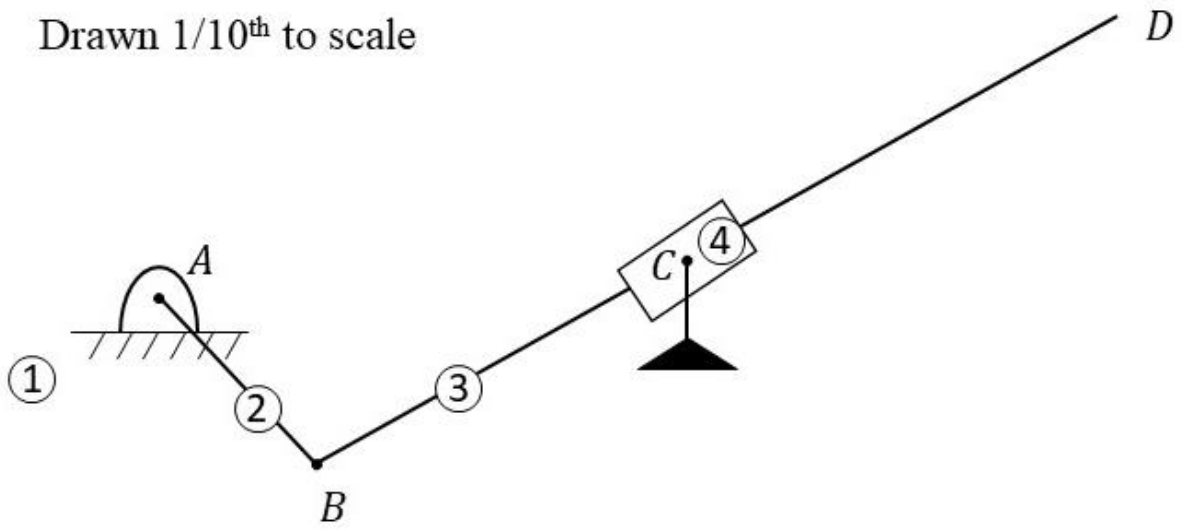
a. Point L
b. Point J
c. Point F
d. Point D

g) The angular velocity of link 6, given $\omega_3 = 1\, rad/s$.

a. 3.0 rad/s, CCW
b. 1.5 rad/s, CCW
c. 4.5 rad/s, CW
d. 6.0 rad/s, CW

Question 4:

On the page that follows, give the full velocity diagram for the mechanism below. Assume that $\omega_{AB} = 2.3\ rad/s$ CW.



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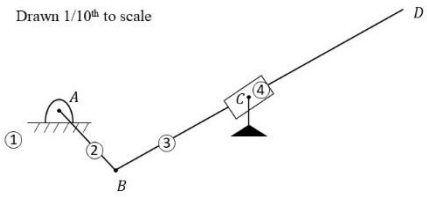
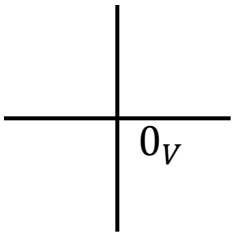
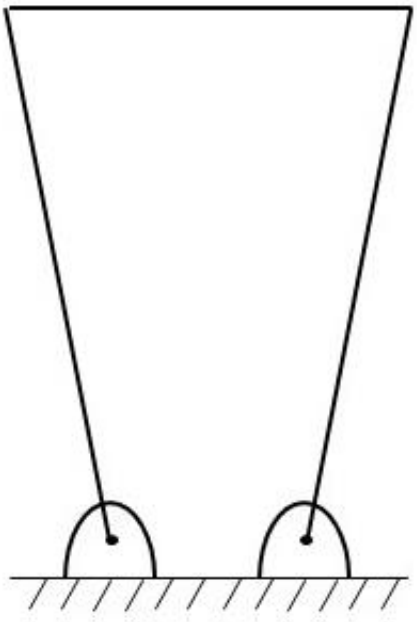
Recommended Scale: 10cm = 1m/s





Question 3:

a) What kind of mechanism is the following?



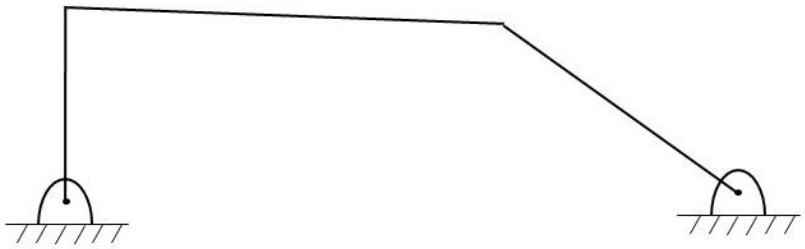
e. Double rocker

f. Crank rocker

g. Double crank

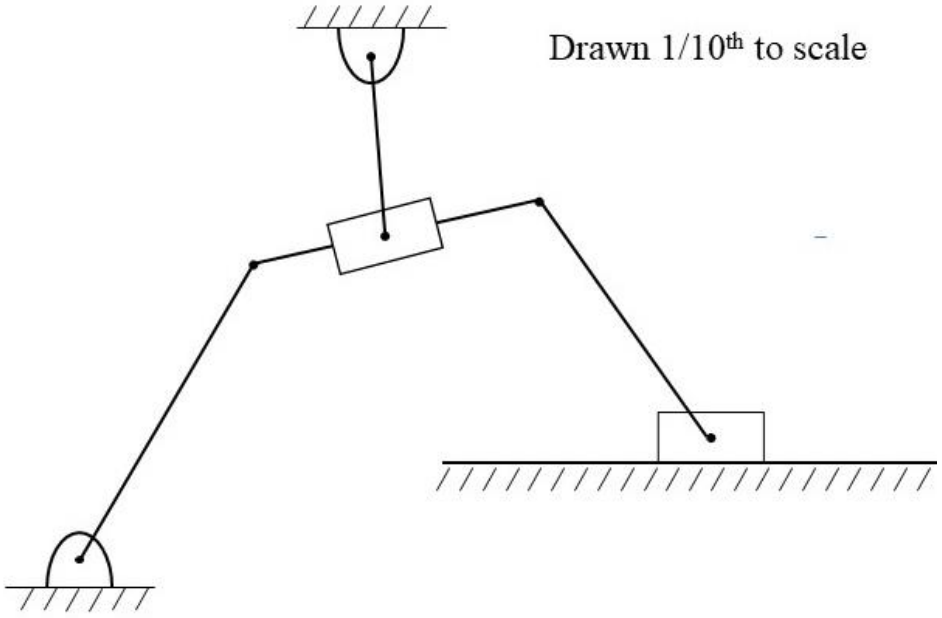
h. Structure

b) What kind of mechanism is the following?



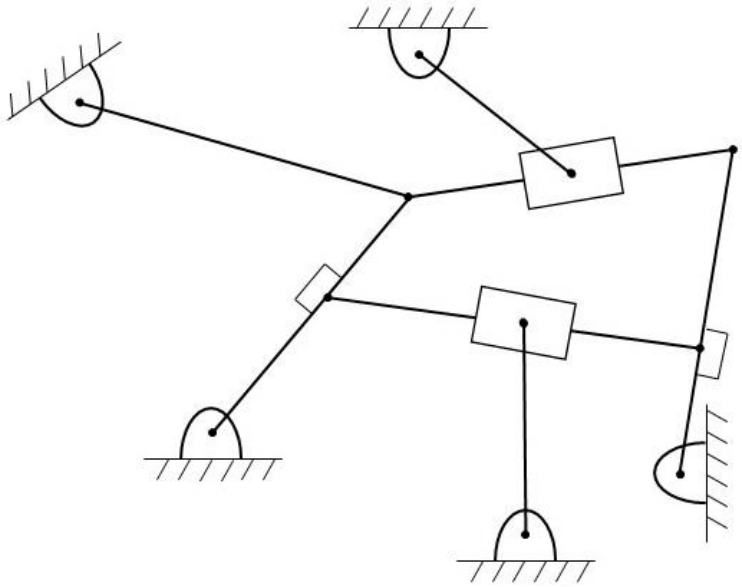
a. Double rocker
b. Crank rocker
c. Double crank
d. Structure

c) What is the mobility of the following mechanism?



a. -1
b. 0
c. 1
d. 2

d) What is the mobility of the following mechanism?



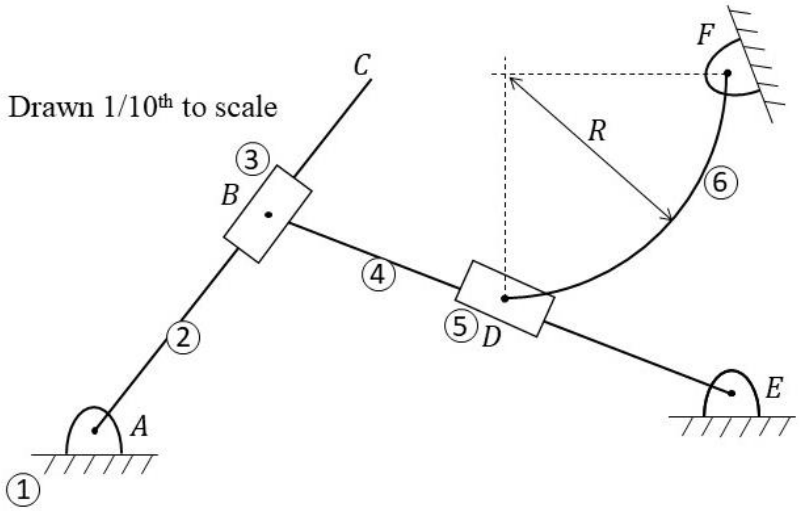
a. -1

b. 0

c. 1

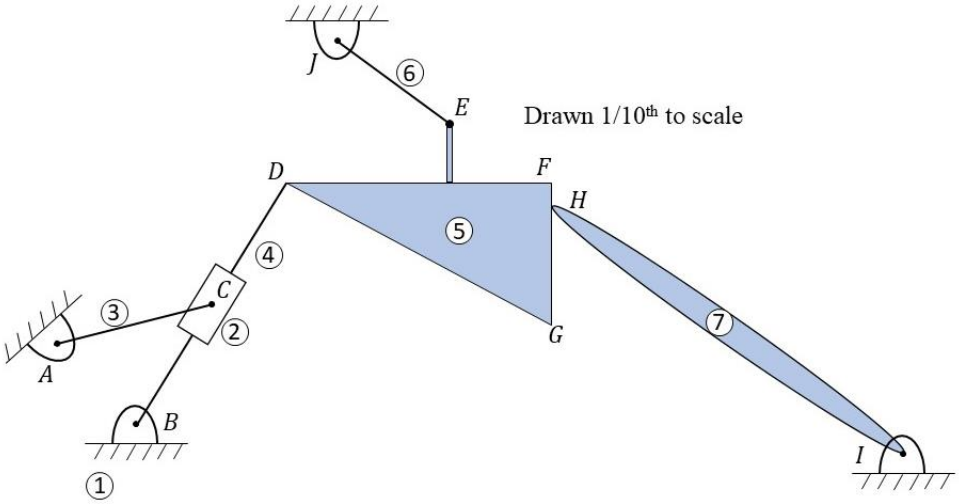
d. 2

e) The following would be **best** described as:



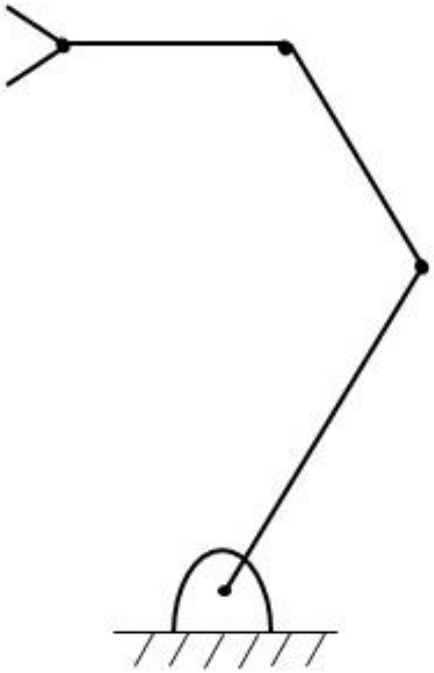
a. Kinematic chain
b. Mechanism
c. Linkage
d. Machine

f) The following would be **best** described as:



a. Kinematic chain
b. Mechanism
c. Linkage
d. Machine

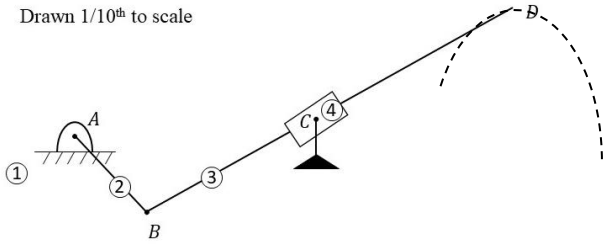
g) The following would be **best** described as:



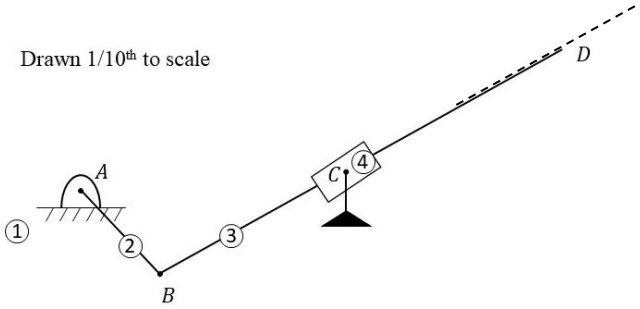
a. Kinematic chain
b. Mechanism
c. Linkage
d. Machine

h) Which of the following best describes the path of point D?

a)



b)



c)