TEST 1

Score		Reviewer	

Ⅰ. Fill in the blanks (Each blank is 1 point, the total is 15 points).

1. _____ is the motion unit and moves as a whole, _____ is the manufacture unit and cannot be divided into a smaller one.

2. If the two connected links have surface contact, we call the kinematic pair as a _____ , if the connection takes place only at a point or along a line, it is known as a _____ .

3. The conditions for a mechanism to have a determined motion is _____ _____ .

4. The number of instant centers of a planar six-bar mechanism is_____, and the number of absolute instant centers is_____.

5. According to the types of the two side links, the types of the revolute four-bar mechanisms can be divided into _____ , _____ , and _____ .

6. For a rocker-slider mechanism, when _____ is the driving link, the mechanism will have dead points. At the dead points, the pressure angle is_____and transmission angle is_____.

7. For a revolute four-bar mechanism, if the sum of the shortest and the longest links is greater than the sum of the remaining two links, we can get_____mechanism.

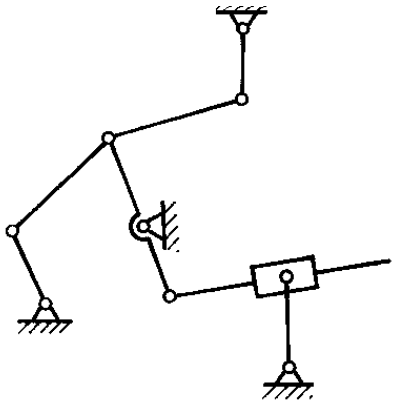
8. If the coefficient of travel speed variation K is bigger than 1, that means the mechanism has _____ characteristics.

Score		Reviewer	

Ⅱ. (12 points)

The mechanism is shown in the right figure.

1. Calculate the DOF.
2. If there are compound hinges, passive DOF or redundant constraints, please figure them out.
3. If the motion of the mechanism is determined, how many driving links should be there?

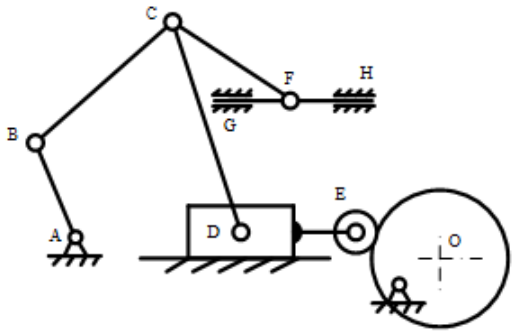


Score		Reviewer	

Ⅲ (14 points)

The mechanism is shown in the right figure.

1. Calculate the DOF.
2. If there are compound hinges, passive DOF or redundant constraints, please figure them out.
3. If AB is driving link, will the mechanism have determined motion?

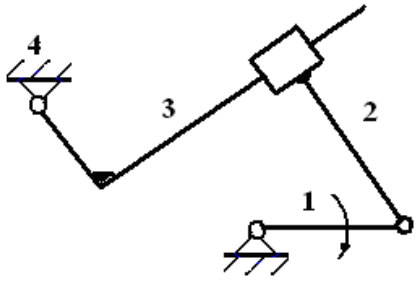


Score		Reviewer	

Ⅳ. (14 points)

The mechanism is shown below. The angular velocity ω_1 of link 1 is given.

1. Locate all instant centers for the mechanism.
2. Find the angular velocity ω_3 of link 3.
3. Find the angular velocity ω_2 of link 2.

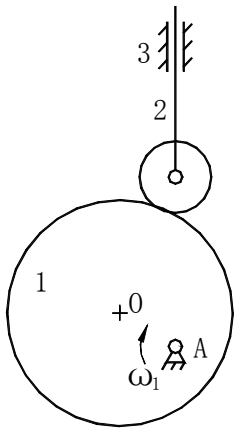


Score		Reviewer	

Ⅴ. (12 points)

The mechanism is shown below. The angular velocity ω_1 of link 1 is given.

1. Locate all instant centers for the mechanism.
2. Find the velocity v_2 of link 2.

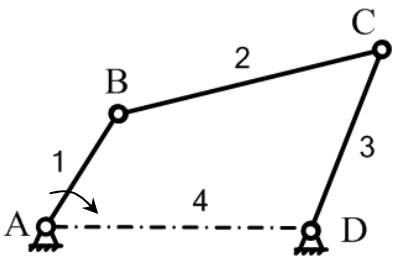


Score		Reviewer	

Ⅵ. (16 points)

The dimensions of a revolute four-bar linkage are given. Link AB is the driving link. AB＝28mm, BC＝65mm, CD=50mm, AD=70mm.

1. Determine the type of the linkage mechanism.
2. Determine the type of revolutes A, B, C and D.
3. Draw the pressure angle α and transmission angle γ.
4. Can this mechanism have dead points?
   Under what circumstance will it have dead points?
5. If CD is taken as the frame, determine the type of the linkage mechanism.

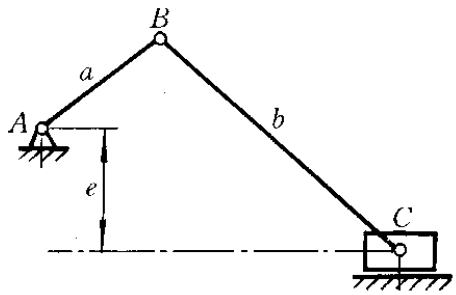


Score		Reviewer	

Ⅶ. (17 points)

One planar four-bar linkage is shown below. Link AB is the driving link.

1. Name the linkage mechanism.
2. Write out the condition for having crank of the mechanism.
3. Draw the pressure angle α and transmission angle γ.
4. Determine if it has quick return characteristic.
5. Can this mechanism have dead points? Under what circumstance will it have dead points?
6. If the coefficient of travel speed variation K=1.5, calculate the crank acute angle of two limiting positions θ.



TEST 2

Score		Reviewer	

Ⅰ. Fill in the blanks (Each blank is 2 point, the total is 16 points).

1. Instant center is the coincident point at which two links have the same ( ).

A. Relative velocity B. Absolute velocity C. Acceleration

2. If a mechanism had no quick return characteristic, the time ratio ( ).

A. K>1 B. K=1 C. K<1

3. Three plana links have three instant centers, and these three instant centers ( ).

A. coincident B. on a straight line C. don't on a straight line

4. At the dead points, the transmission angle of plana four bar mechanisms should( ).

A. γ＞0° B. γ=0° C. 90°>γ＞0° D. γ＞90°

5. In a mechanism, the independent motion unit is called ( ).

A. machine element B. link

6. If the crack was taken as driver in the crack-rocker mechanism, the minimum transmission angle can be obtained when ( ).

A. crack and coupler become collinear B. crack and frame become collinear

7. In plana mechanisms, one higher pair will introduce ( ) constrains.

A. 0 B. 1 C. 2 D. 3

8. Revolute 6 bar mechanism, the total Instant center is ( ).

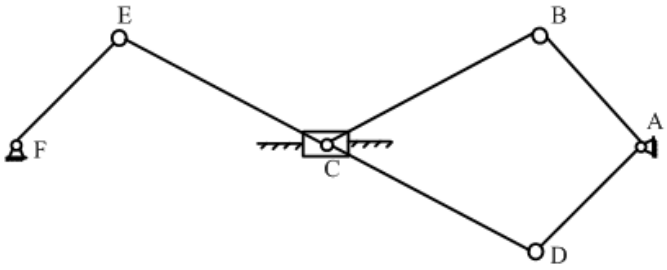
A. 6 B. 15 C. 30 D. 3

Score		Reviewer	

Ⅱ. (14 points)

The mechanism is shown in the right figure.

1. Calculate the DOF.
2. If there are compound hinges, passive DOF or redundant constraints, please figure them o
3. If the motion of the mechanism is determined, how many driving links should be there?

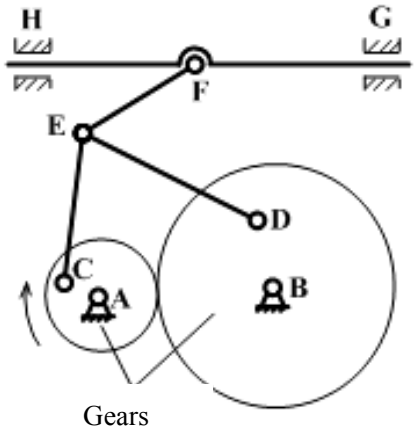


Score		Reviewer	

Ⅲ (14 points)

The mechanism is shown in the right figure.

1. Calculate the DOF.
2. If there are compound hinges, passive DOF or redundant constraints, please figure them out.



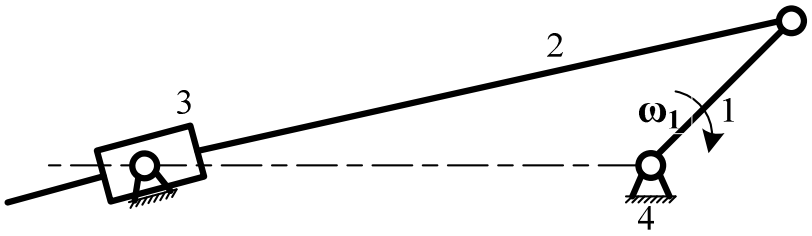
Gears

Score		Reviewer	

Ⅳ. (14 points)

The mechanism is shown below. The angular velocity ω_1 of link 1 is given.

1. Locate all instant centers for the mechanism.
2. Find the angular velocity ω_3 of link 3.

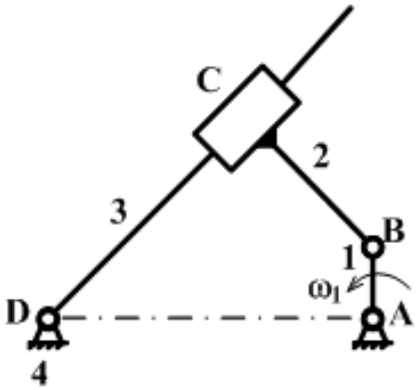


Score		Reviewer	

Ⅴ. (12 points)

The mechanism is shown below. The angular velocity ω_1 of link 1 is given.

1. Locate all instant centers for the mechanism.
2. Find ω_3.

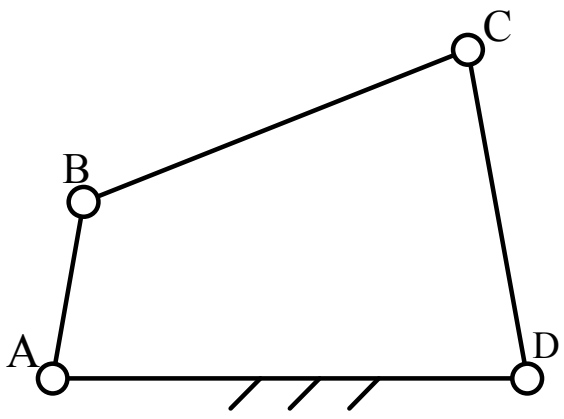


Score		Reviewer	

Ⅵ. (16 points)

The dimensions of a revolute four-bar linkage are given. Link AB is the driving link. AB＝30mm, BC＝70mm, CD=67mm, AD=80mm.

1. Determine the type of the linkage mechanism.
2. Determine the type of revolutes A, B, C and D.
3. Draw the pressure angle α and transmission angle γ.
4. Can this mechanism have dead points?
   Under what circumstance will it have dead points?
5. If CD is taken as the frame, determine the type of
   the linkage mechanism.



Score		Reviewer	

Ⅶ. (14 points)

One planar six-bar linkage is shown below. Link AB is the driving link, $l_{AB}=75\,\text{mm}$, $l_{BC}=55\,\text{mm}$, $l_{CD}=78\,\text{mm}$, $l_{AD}=70\,\text{mm}$.

1. Name the linkage mechanism ABCD.
2. Draw the pressure angle α and transmission angle γ.