X

Unit 11 - Week 9: Instant centre and building-block methods for designing compliant mechanisms

Assignment Week 9

The due date for submitting this assignment has passed. Due on 2018-03-28, 23:59 IST.
As per our records you have not submitted this assignment.

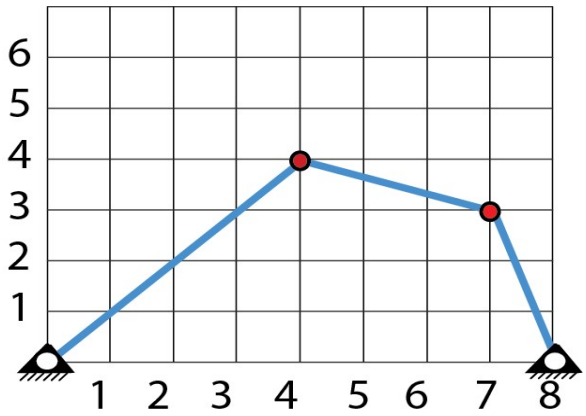
1) Identify the incorrect statement. ***1 point***

- Instant centre with respect to a stationary reference frame has zero velocity at any instant of time.
- The location of instant centre remains the same throughout the rigid body motion.
- The rigid body appears to rotate about the instant centre at a given instant of time.
- Directions of velocities of a minimum of two points on a rigid body are required to locate the instant centre.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The location of instant centre remains the same throughout the rigid body motion.

2) Locate the coordinates of the instant centre of the coupler link for the given configuration of the four-bar mechanism. ***1 point***



- (4,6)
- (6,6)
- (6,7)
- (7,2)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(6,6)

3) Examine the two statements and answer. ***1 point***

I. The semi-major axis of the compliance ellipsoid is the direction along which a point on the mechanism displaces with the largest magnitude under a unit load.

II. The semi-minor axis of the stiffness ellipsoid is the direction along which a point on the mechanism displaces with the smallest magnitude under a unit load.

- Only I is correct.
- Only II is correct.
- Both I and II are correct.
- Both I and II are incorrect.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Only I is correct.

4) Examine the two statements and answer. ***1 po***

I. The decomposition point is the location where the output of the first building block coincides with the input of the second building block.

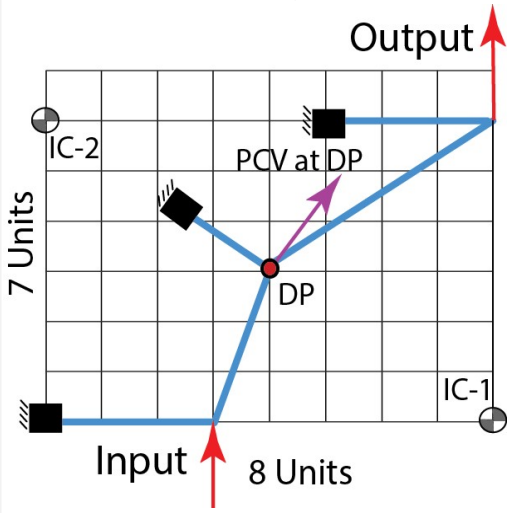
II. The Principal Compliant Vectors (PCV) from both building blocks match at the decomposition point.

- I is the assertion and II is the reason.
- II is the assertion and I is the reason.
- Both I and II are assumptions.
- Both I and II are inferences of a different assumption.

No, the answer is incorrect.
Score: 0

Accepted Answers:
II is the assertion and I is the reason.

5) The Geometric Advantage of the mechanism shown is… ***1 point***



- $\frac{5}{8}$
- $\frac{8}{5}$
- $\frac{\sqrt{5}}{8}$
- $\frac{8}{\sqrt{5}}$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$\frac{8}{5}$

6) A compliant dyad has two beams with lengths 4 and 8 units respectively, while the angle between them is 180 degrees. The centre of elasticity for the system is **1 point**

- 4 units.
- 6 units.
- 8 units.
- Does not exist.

No, the answer is incorrect.
Score: 0

Accepted Answers:
6 units.

7) The translational and rotational stiffness of compliant dyad are decoupled at the **1 point**

- Instant centre.
- Centre of elasticity.
- At the junction of attachment of two dyad arms.
- Centroid

No, the answer is incorrect.
Score: 0

Accepted Answers:
Centre of elasticity.

8) Mechanical advantage of a compliant mechanism can be larger than mechanism advantage of a rigid body mechanism… **1 point**

- if there is preload in any of its elastic members.
- If there is negative stiffness.
- Both A and B.
- It is not possible.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Both A and B.

9) The mechanical advantage of a compliant mechanism can be computed by which of following formula? **1 point**

- $MA = \frac{\Delta u_{in}}{\Delta u_{out}} - \frac{\Delta SE}{F_{in}\Delta u_{out}}$
- $MA = MA_r\left(1 - \frac{\Delta SE}{F_{out}\Delta u_{in}}\right)$
- $MA = \frac{\Delta u_{out}}{\Delta u_{in}}\left(1 - \frac{F_c}{F_{in}}\right)$
- All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
$MA = \frac{\Delta u_{in}}{\Delta u_{out}} - \frac{\Delta SE}{F_{in}\Delta u_{out}}$

10) The centre of elasticity coincides with the free end of the dyad when the coupling vector is a… **1 point**

- unit vector.
- null vector.
- basis vector.

None of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:
null vector.

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