Assignment Week 10

The due date for submitting this assignment has passed. Due on 2018-04-04, 23:59 IST. As per our records you have not submitted this assignment.

1) Which of the following represents the strain energy curve of a bistable element?

- Both of the above
- Neither of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Both of the above

2) Consider a flexure-based lever attached to a zero-free length spring of stiffness $k_1$ as shown in the figure. What is the stiffness $K$ of the balancing spring at the given instant?
3(\frac{EI}{IL^2} + \frac{4}{9}k_1)

2(\frac{EI}{IL^2} + \frac{4}{9}k_1)

(\frac{EI}{3L^2} + \frac{4}{27}k_1)

None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Second and fourth buckling mode shapes

3) A symmetric shape of bistable arch cannot be obtained by linear combination of

First and third buckling mode shapes
Second and fourth buckling mode shapes
Both of the above
None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Second and fourth buckling mode shapes

4) Assertion: The Critical point method used to find the force-displacement characteristics of bistable element gives approximate results.

Reasoning: The critical point uses only two points namely switching force point and switch-back point to predict the entire Force-displacement curve.

The statements in the assertion and reasoning are both correct and the reasoning is correct for the assertion.
The statements in the assertion and reasoning are both correct but the reasoning is not correct for the assertion.
The assertion is correct but not the reasoning.
The statements in assertion and reasoning are both incorrect.
No, the answer is incorrect.
Score: 0
Accepted Answers:
The assertion is correct but not the reasoning.

5) Mark the following statement as A if true and B if false.
   It is impossible to statically balance a mechanism without auxiliary bodies.
   
   - A
   - B

No, the answer is incorrect.
Score: 0
Accepted Answers:
B

6) Consider the statically balanced linkage shown in the figure

![Diagram of statically balanced linkage](attachment:image.png)

The condition for perfect static balancing of the given linkage is...

- \( k_1 l_2 = k_2 l_1 \)
- \( k_1 l_1 = k_2 l_2 \)
- \( k_1 = k_2 (l_1 + l_1) \)
- \( k_1 = k_2 (l_1 - l_2) \)

No, the answer is incorrect.
Score: 0
Accepted Answers:

7) In question 6, will the linkage be in equilibrium if the pivot at C is detached from the fixed frame?

   - No
   - Yes
   - May be
   - Insufficient information to conclude

No, the answer is incorrect.
Score: 0
Accepted Answers:
8) In question 6, is there a restriction on the length of CD for perfect static balance of the linkage?

- It cannot be larger than DA and DB.
- It cannot be smaller than DA and DB.
- It depends on DA, DB, and the two spring constants.
- There is no restriction.

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**
- There is no restriction.

9) Assertion: Perfect static balancing of a compliant mechanism can be achieved over its complete range of motion with a linear balancing spring.

Reasoning: A compliant mechanism can be modelled as a linear translational spring over its complete range of motion.

- The statements in the assertion and reasoning are both correct and the reasoning is correct for the assertion.
- The statements in the assertion and reasoning are both correct but the reasoning is not correct for the assertion.
- The assertion is correct but not the reasoning.
- The statements in assertion and reasoning are both incorrect.

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**
- The statements in assertion and reasoning are both incorrect.

10) Consider the kinetoelastic model of a bistable element shown in the figure.

If stiffness of torsional spring is zero, what is the value of $\theta$?

- $l_{i0} \cos \theta_{eq1} - l_{i0}$
- $\theta_{eq1}$
- $\pi \theta_{eq1}$
- None of the above
No, the answer is incorrect.
Score: 0
Accepted Answers: 
\( \theta_{eq} \)