Unit 7 - Week 5: Kinematics - 2

Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-10-21, 23:59 IST.

1) Choose True/False for the following assertion: "The Lie derivative of the Euler-Almansi strain tensor is the rate of deformation tensor." *1 point*

(a) True
(b) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a) True

2) Choose True/False for the following assertion: "The indicial notation for $\boldsymbol{b} = \boldsymbol{F}\boldsymbol{F}^T$ is given by $b_{ij} = F_{iI}F_{jJ}$." *1 point*

(a) True
(b) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
(b) False

3) Choose True/False for the following assertion: "The linearization of a tensor quantity, over the motion $\boldsymbol{\psi}$, in the direction of velocity vector is same as the material time derivative of the tensor." *1 point*

(a) True
(b) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a) True

4) Choose True/False for the following assertion: "Linearization of the Green-Lagrange strain tensor about the initial configuration results in the small strain tensor." *1 point*

(a) True
(b) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a) True

5) Choose True/False for the following assertion: "The indicial notation for $\boldsymbol{e} = \boldsymbol{F}^{-T}\boldsymbol{E}\boldsymbol{F}^{-1}$ is given by $e_{ij} = F^{-1}_{iI}E_{IJ}F^{-1}_{jJ}$." *1 point*

(a) True
(b) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
(b) False

For Questions 6 - 8 use the following:

A motion $\boldsymbol{x} = \boldsymbol{\psi}(\boldsymbol{X}, t)$ is described by the mapping
$x_1 = X_1 + atX_2$
$x_2 = bt^2X_1 + X_2$
$x_3 = X_3$
where $a = 1$ and $b = 1/2$ are constants.

6) The speed of a particle at time $t = 1$ initially located at $(0, 1, 0)^T$ is _____.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1
(Type: Numeric) 1.0

1 point

7) The magnitude of the acceleration of a particle at time $t = 1$ initially located at $(1, 0, 0)^T$ is _____.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1
(Type: Numeric) 1.0

1 point

8) The path, in the space, of a particle that was initially located at $(1, 2, 4)^T$ is _____

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: String) parabola
(Type: String) parabolic

1 point

9) For pure rotation, the determinant of the rate of deformation tensor is _____.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 0

1 point

10) The velocity field of a rigid body rotating about the x_3-axis is given by $\boldsymbol{v} = -\omega_1 x_2 \boldsymbol{e}_1 + \omega_2 x_1 \boldsymbol{e}_2 + \omega_3 \boldsymbol{e}_3$, where $\boldsymbol{\omega} = (\omega_1, \omega_2, \omega_3)^T$ denotes a constant angular velocity vector. Then, for $\boldsymbol{\omega} = (2, 2, 0)^T$, the magnitude of the acceleration field for a particle currently at $(1, 0, 0)^T$ is _____.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 4
(Type: Numeric) 4.0

1 point