Unit 5 - Week 3: Mathematical Preliminaries - 2

Course outline

How does an NPTEL online course work?

Week 0 : Prerequisite

Week 1: Introduction

Week 2: Mathematical Preliminaries -1

Week 3: Mathematical Preliminaries - 2

- Lec 7: Linearization and directional derivative, Tensor analysis - 1
- Lec 8: Linearization and directional derivative, Tensor analysis - 2
- Lec 9: Worked Examples - 1
- Lec 10: Worked Examples - 2
- Quiz : Assignment 3
- Feedback form
- Lecture Notes

Week 4: Kinematics - 1

Week 5: Kinematics - 2

Week 6: Kinetics - 1

Week 7: Kinetics - 2

Week 8: Hyperelasticity - 1

Week 9: Hyperelasticity - 2

Week 10: Linearization

Week 11: Discretization

Week 12: Solution Procedure

Live session

Assignment 3

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

Due on 2020-10-07, 23:59 IST.

1) The order of convergence of Newton-Raphson method (near the root) is

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 2

1 point

2) The value of $\nabla \cdot \boldsymbol{x}$ is

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 3
(Type: Numeric) 3.0

1 point

For Questions 3 - 6 use the following:
If $\boldsymbol{q}$ denotes the heat flux vector, k is the thermal conductivity and θ denotes the temperature field, then, according to Fourier heat conduction law $\boldsymbol{q} = -k\boldsymbol{\nabla}\theta$.
The temperature field is given by $\theta = 2x_1^2 + 2x_2^2$. The heat flux vector is given by $a_1\boldsymbol{e}_1 + a_2\boldsymbol{e}_2$.

3) Assuming $k = 2$, the coefficient a_1 at a point with coordinates $x_1 = 1$ and $x_2 = 0$ is given as $a_1 =$ _____

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) -8

1 point

4) Assuming $k = 2$, the coefficient a_2 at a point with coordinates $x_1 = 1$ and $x_2 = 0$ is given as $a_2 =$ _____.

Hint

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

1 point

5) Assuming $k = 1/\sqrt{2}$, the coefficient a_1 with coordinates $x_1 = 1/\sqrt{2}$ and $x_2 = 1/\sqrt{2}$ is given as $a_1 =$ _____

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) -2

1 point

6) Assuming $k = 1/\sqrt{2}$, the coefficient a_2 with coordinates $x_1 = 1/\sqrt{2}$ and $x_2 = 1/\sqrt{2}$ is given as $a_2 =$ _____.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) -2

1 point

For Questions 7 - 8 use the following:
Consider the velocity field $\boldsymbol{v} = x_i^2\boldsymbol{e}_i$. Consider a point $A = (1, 1, 0)$.

7) The value of the first invariant of the gradient of $\boldsymbol{v}$ is _____ .

Hint

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

1 point

8) The value of the third invariant of the gradient of $\boldsymbol{v}$ is _____.

Hint

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

1 point

9) Which of these theorems is used to transform the volumetric integral term to a surface integral term? *1 point*

- a. Stokes theorem
- b. Curl theorem
- c. Gauss divergence theorem
- d. none of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
c. Gauss divergence theorem

10) The volume of a closed three-dimensional body V can also be expressed as *0 points*

- a. $\int_{\partial B} n_x dA$
- b. $\int_{\partial B} n_x^2 dA$
- c. $\int_{\partial B} n_y dA$
- d. $\int_{\partial B} n_x n_y n_z dA$

No, the answer is incorrect.
Score: 0
Accepted Answers:
a. $\int_{\partial B} n_x dA$
c. $\int_{\partial B} n_y dA$