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NPTEL

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Courses » Phase field modelling: the materials science, mathematics and computational aspects

Announcements

Course

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Unit 8 - Week 7

Course outline

How to access the portal ?

Week-1

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Week 7

Module 10 -
Lecture 40 :
Explicit method
with PBC

Assignment 7

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

Due on 2018-09-19, 23:59 IST.

1) If a_1 , a_2 and a_3 denote the unit vectors of a 3D lattice, then the reciprocal lattice vector b_1 is given by: **1 point**

$$b_1 = 2\pi \frac{a_1 \times a_2}{a_3 \cdot (a_1 \times a_2)}$$

$$b_1 = 2\pi \frac{a_2 \times a_1}{a_3 \cdot (a_2 \times a_1)}$$

$$b_1 = 2\pi \frac{a_1 \times a_3}{a_2 \cdot (a_1 \times a_3)}$$

$$b_1 = 2\pi \frac{a_2 \times a_3}{a_1 \cdot (a_2 \times a_3)}$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$b_1 = 2\pi \frac{a_2 \times a_3}{a_1 \cdot (a_2 \times a_3)}$$

2) Consider a function $g(x)$. The evaluation of the second derivative $\frac{\partial^2 g}{\partial x^2}$ in the Fourier space would be: (\tilde{g} is the Fourier transform of g , k is the reciprocal lattice vector) **1 point**

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<p>Module 10 - Lecture 42 : Spectral techniques II</p>	<p><input type="radio"/> $-k^2 \tilde{g}$</p> <p>No, the answer is incorrect. Score: 0</p> <p>Accepted Answers: $-k^2 \tilde{g}$</p> <p>3) When the diffusion equation is solved using Fourier transforms, the boundary condition that is implicitly assumed is:</p> <p><input type="radio"/> Dirichlet <input type="radio"/> Neumann <input type="radio"/> Robin <input type="radio"/> Periodic</p>	
<p>Module 10 - Lecture 43 : Implicit spectral method</p>	<p><input type="radio"/> L^2</p> <p>No, the answer is incorrect. Score: 0</p> <p>Accepted Answers: <i>Periodic</i></p> <p>4) Stress acting on a material is a 1 point</p> <p><input type="radio"/> property tensor <input type="radio"/> field tensor <input type="radio"/> both (a) and (b) <input type="radio"/> not a tensor</p>	
<p>Module 11 - Lecture 44 : Scalars, vectors and tensors</p>	<p>No, the answer is incorrect. Score: 0</p> <p>Accepted Answers: <i>field tensor</i></p> <p>5) Diffusivity is a tensor with rank: 1 point</p> <p><input type="radio"/> zero <input type="radio"/> one <input type="radio"/> two <input type="radio"/> four</p>	
<p>Module 11 - Lecture 45 : Coordinate transformation</p>	<p>No, the answer is incorrect. Score: 0</p> <p>Accepted Answers: <i>two</i></p> <p>6) The number of components in a tensor of rank 4 (in 3D space) is : 1 point</p> <p><input type="radio"/> 16 <input type="radio"/> 27 <input type="radio"/> 81 <input type="radio"/> 9</p>	
<p>Module 11 - Lecture 46 : Transformation laws</p>	<p>No, the answer is incorrect. Score: 0</p> <p>Accepted Answers: <i>81</i></p> <p>7) According to Einstein summation convention, the dummy index/indices in the equation $y_{ij} = a_{ijkl}x_{kl}$ is/are: 1 point</p> <p><input type="radio"/> k</p>	
<p><input type="radio"/></p>	<p><input type="radio"/> k</p>	

Module 11 -
Lecture 47 : II
rank tensors and
Neumann
principle

- i
 i and j
 k and l

No, the answer is incorrect.

Score: 0

Accepted Answers:

k and l

Module 12 -
Lecture 48 :
Group theory

8) The number of times the transformation matrix is multiplied with a tensor to represent it in a new coordinate frame of reference is equal to the _____ of the tensor.

1 point

- trace
 determinant
 rank
 number of rows

No, the answer is incorrect.

Score: 0

Accepted Answers:

rank

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9) The trace of an $n \times n$ anti-symmetric matrix is equal to

1 point

- 1
 -1
 0
 n^2

No, the answer is incorrect.

Score: 0

Accepted Answers:

0

Quiz :
Assignment 7

10) According to Neumann principle, any property of a tetragonal crystal cannot have

1 point

- spherical symmetry
 cubic symmetry
 hexagonal symmetry
 tetragonal symmetry

No, the answer is incorrect.

Score: 0

Accepted Answers:

hexagonal symmetry

Assignment 7
solution

11) Which of the following options does not satisfy the definition of a group ?

1 point

- $\{1, 3, 5, 7\}$; operation = multiplication modulo 8.
 $\{0, i, -i, 1\}$; operation = multiplication
 $\{0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}\}$; operation = addition modulo 2π
 $\{1, i, -i, -1\}$; operation = multiplication

Week 8

Week 9

Week 10

Week 11

Week 12

No, the answer is incorrect.

Score: 0

Accepted Answers:

{0, i, -i, 1}; operation = multiplication

12) In addition to the four conditions that define a group, that is, closure, associativity, identity and inverse, if an operation (*) on its elements also obeys $(a*b) = (b*a)$, then the group is called a/an _____ group.
(Note : Please spell your answer correctly)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) abelian

(Type: String) commutative

1 point

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