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NPTEL

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

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FAQ

Unit 3 - Week 2

Course outline

How to access the portal ?

Week-1

Week 2

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Module 2 - Lecture 7 : Diffusion and chemical potential

○

Assignment 2

The due date for submitting this assignment has passed.
As per our records you have not submitted this   **Due on 2018-08-15, 23:59 IST.**
assignment.

1) Consider a binary system where two phases are co-existing in equilibrium. Which property of the phases should be same for maintaining the equilibrium?   ***1 point***

- ○ Free energy.
- ○ Enthalpy.
- ○ Chemical potential.
- ○ Enthalpy of mixing.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Chemical potential.

2) According to Fick's second law, if a composition profile has a convex curvature at a point, then the composition at that point _____ with time?   ***1 point***

- ○ Increases

Privacy & Terms
-

Score: 0

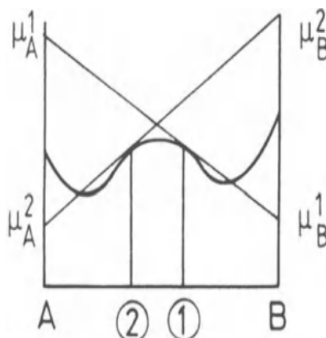**Accepted Answers:**
Decreases.

3) Movement of atoms in a binary diffusion couple <u>always</u> takes place   **1 point**
in such a way that

○ Composition is reduced to zero.

○ Composition gradient is maximized.

○ Composition gradient is evened out.

○ Chemical potential gradient is evened out.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Chemical potential gradient is evened out.

4) As shown in the figure, the chemical potential of A at composition 1 (μ_A^1) is greater than   **1 point**
at composition 2 (μ_A^2) (case A) and the chemical potential of B at composition 2 (μ_B^2) is greater than
at composition 1 (μ_B^1) (case B). So in this two cases the flux of A and B atoms are :

○ Case A: 2 to 1 and case B: 1 to 2.

○ Case A: 1 to 2 and case B: 2 to 1.

○
There will be flux, only if in case A: $\mu_B^1 - \mu_A^1 = 0$ and in case B: $\mu_A^2 - \mu_B^2 = 0$ conditions are
satisfied.

○ There will be no flux

No, the answer is incorrect.
Score: 0

Accepted Answers:
Case A: 1 to 2 and case B: 2 to 1.

5) According to Fick's first law, the direction of atomic flux is   **1 point**

○ Along the direction of concentration gradient.

○ Opposite to the direction of a concentration gradient.

○ Perpendicular to the direction of concentration gradient.

○ None of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Opposite to the direction of a concentration gradient.

6) The point at which $\frac{\partial^2 G}{\partial x^2}$ is zero (where x represents composition) on the free energy versus

composition curve is called a _____ point.

Module 3 - Lecture 14 : Thermodynamic property : composition dependence

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) spinodal

1 point

7) The dimensions of diffusivity are: *0 points*

○ LT^{-2}

○ ML^2T^{-1}

○ L^2T^{-2}

○ MLT^{-2}

Module 3 - Lecture 15 : Regions of stability

No, the answer is incorrect.
Score: 0

Accepted Answers:
L^2T^{-2}

Module 3 - Lecture 16 : Understanding spinodal region

8) The total distance moved by a carbon atom in γ-iron (for D = 2.5 x 10⁻¹¹ in SI units) for $t_1 =$ *1 point* 10 s is x_1 and $t_2 =$ 5 s is x_2, then, the ratio $\frac{x_1}{x_2}$:

○ $\frac{1}{\sqrt{2}}$

○ $\sqrt{2}$

○ 2

○ $\sqrt[3]{2}$

No, the answer is incorrect.
Score: 0

Module 2 - Tutorial 7

Accepted Answers:
$\sqrt{2}$

9) The constant which relates the concentration gradient and the atomic flux is :   *1 point*

○ Conductivity.

○ Diffusivity.

○ Mobility.

○ None of the above.

Quiz : Assignment 2

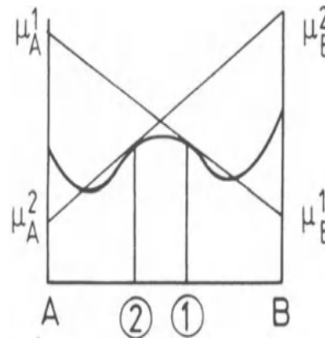**No, the answer is incorrect.**
Score: 0

Accepted Answers:
Diffusivity.

10) As shown in the figure, in certain cases, the diffusion takes place against composition **1 point**
gradient; in other words, the diffusivity becomes effectively negative. This for the following reason :

○ Mobility is negative.

○ Curvature of G vs x curve is negative.

○ Curvature of G vs x curve is positive.

○ None of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Curvature of G vs x curve is negative.

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