

Unit 11 - Week 9

Course outline
How does an NPTEL online course work?
Practice Assignment
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
<input type="radio"/> Lecture 41: Nucleation Part 4: Ostwald Step Rule
<input checked="" type="radio"/> Lecture 42: Spinodal Decomposition and Pattern Formation: Evolution of Structure through Dynamics Part 1
<input type="radio"/> Lecture 43: Spinodal Decomposition and Pattern Formation: Evolution of Structure through Dynamics Part 2
<input type="radio"/> Lecture 44: Ising Model and Other Lattice Models Part 1
<input checked="" type="radio"/> Lecture 45: Ising Model and Other Lattice Models Part 2
<input type="radio"/> Quiz : Assignment 9
<input type="radio"/> Assignment-9 Solutions
<input type="radio"/> Weekly Feedback
<input type="radio"/> Download Videos
Week 10
Week 11
Week 12
Live Session
Text Transcripts

Assignment 9

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

Due on 2020-11-18, 23:59 IST.

1) Which of the following statement(s) is(are) incorrect regarding spinodal decomposition? 1 point

- Stronger bonding or attraction among the same species than among the dissimilar species.
 It occurs throughout the bulk of the medium.
 It occurs in the presence of an activation barrier.
 The phase separation at lower temperatures is driven by the domination of enthalpic forces.

No, the answer is incorrect.
Score: 0

Accepted Answers:
It occurs in the presence of an activation barrier.

2) The entropy S of a system of N spins, which may align either in the upward or in the downward direction, is given by $S = -k_B N [p \ln p + (1-p) \ln(1-p)]$ 1 point

The probability of alignment in the upward direction is p . The value of p , at which the entropy is maximum, is

- (a) 0.3
 (b) 0.4
 (c) 0.5
 (d) 0.6

- (a)
 (b)
 (c)
 (d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(c)

3) Consider an infinite 1-D ferro-Ising chain with Hamiltonian, $H = -J \sum_i S_i S_{i+1}$; the first excited state of this chain is Degenerate. 1 point

- (a) True
 (b) False

- (a)
 (b)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a)

4) In case of one-dimensional ising model, disordered to ferromagnetic phase transition does not take place due to 1 point

- Insufficient number of neighbors
 High coupling constant
 Positive coupling constant
 Sufficient number of neighbors

No, the answer is incorrect.
Score: 0

Accepted Answers:
Insufficient number of neighbors

5) In case of 1D non-periodic ising model, the canonical partition function in the absence of field becomes for very large value of N 1 point

- (a) 1
 (b) $(\cosh \beta J)^N$
 (c) $(\cosh \beta J + \sinh \beta J)^N$
 (d) $(2 \cosh \beta J)^N$

- (a)
 (b)
 (c)
 (d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(d)

6) In the absence of magnetic field, the positive value of interaction energy J favors ferromagnetic configuration. 1 point

- True
 False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

7) If p be the momentum of the particle of mass 'm' at temperature T , then the value of $\langle |p| \rangle$ is 1 point

- (a) $\left(\frac{8mk_B T}{\pi}\right)^{1/2}$
 (b) $\left(\frac{8k_B T}{\pi m}\right)^{1/2}$
 (c) $\left(\frac{3k_B T}{\pi m}\right)^{1/2}$
 (d) $2mk_B T$

- (a)
 (b)
 (c)
 (d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a)

8) Consider an infinite 1-D ferro-Ising chain with Hamiltonian, $H = -J \sum_i S_i S_{i+1}$ is an example of gapped system. 1 point

- (a) False
 (b) True

- (a)
 (b)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(b)