Assignment 03

The due date for submitting this assignment has passed.

Due on 2021-03-16, 23:59 IST.

As per our records you have not submitted this assignment.

Assignment 03

1. The maximum value of \( f_{\text{w}}(y) \) under the constraint \( x = 1 \) is

\[ f_{\text{w}}(y) = \begin{cases} 
1 & \text{if } y = 1, \\
1.5 & \text{if } y = 2, \\
2 & \text{if } y = 3, \\
0.25 & \text{otherwise.} 
\end{cases} \]

No. the answer is incorrect. Score: 0

Accepted Answers: 1

2. The value of Lagrange multiplier for the minimization of \( f(x,y)=xy \) subject to the constraint \( y^2 = 1 \) is

\[ f(x,y) = xy \]

No. the answer is incorrect. Score: 0

Accepted Answers: 1

3. Assume that a drumstan makes fixed length steps to left and right with equal probability, the probability that a drumstan is located 3 steps to the right after performing 3 steps is given by

\[ P = \frac{1}{2} \]

No. the answer is incorrect. Score: 0

Accepted Answers: 1

4. Number of Lagrange multipliers in a minimization problem should be equal to the number of

- Objective functions
- System dimensions
- Variables
- Constraints

No. the answer is incorrect. Score: 0

Accepted Answers: Constraints

5. Systems forming a thermodynamic ensemble correspond to different

- Microstates of the system
- Configurations of molecules in the system
- Control variables
- Thermodynamic conditions

No. the answer is incorrect. Score: 0

Accepted Answers: Thermodynamic conditions

6. The appropriate thermodynamic function in the canonical ensemble is

- Entropy
- Internal energy
- Helmholtz free energy
- Gibbs free energy

No. the answer is incorrect. Score: 0

Accepted Answers: Helmholtz free energy

7. Control variables in the canonical ensemble is

- Number of molecules, pressure, and temperature
- Entropy, pressure, and temperature
- Number of molecules, volume, and temperature
- Number of molecules, volume, and internal energy

No. the answer is incorrect. Score: 0

Accepted Answers: Number of molecules, volume, and temperature

8. Which of the following is not true about thermodynamic ensembles?

- At least one of the control variables must be extensive
- All possible configurations of the system should be part of the ensemble
- Control variables must fluctuate among states of the ensemble around the equilibrium value
- Both temperature and entropy cannot be the control variables

No. the answer is incorrect. Score: 0

Accepted Answers: Control variables must fluctuate among states of the ensemble around the equilibrium value

9. Probability of a state of energy \( E \) in the canonical ensemble with partition function \( Z \) is defined as

\[ P(E) = \frac{1}{Z} e^{-\beta E} \]

No. the answer is incorrect. Score: 0

Accepted Answers: 0

10. For two closed systems A and B in close contact with partition function \( Z_1 \) and \( Z_2 \) respectively, the probability that system A has energy \( E_1 \) and system B has energy \( E_2 \) is given as

\[ P(E_1, E_2) = \frac{1}{Z_1 Z_2} e^{-\beta (E_1 + E_2)} \]

No. the answer is incorrect. Score: 0

Accepted Answers: 0