Unit 10 - Week 5

Assignment 5

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

Due on 2020-03-04, 23:59 IST.

1) The sum of all the microscopic form of energy is called   **2 points**

○ Total energy
○ Phase energy
○ System energy
○ Internal energy

No, the answer is incorrect.
Score: 0
Accepted Answers:
Internal energy

2) Statistical thermodynamics assumes the existence of atoms and molecules and provides explicit expressions for the macroscopic thermodynamic   **2 points**
quantities which are used to calculate the quantity of interest in molecular dynamics

○ True
○ False

No, the answer is incorrect.
Score: 0
Accepted Answers:
True

3) Wyckoff position is a point belonging to a set of points for which site symmetry groups are conjugate subgroups of the space group   **2 points**

○ True
○ False

No, the answer is incorrect.
Score: 0
Accepted Answers:
True

4) An isolated system having a constant number N of atoms occupying a volume V and a constant energy is called the microcanonical ensemble.   **2 points**

○ True
○ False

No, the answer is incorrect.
Score: 0
Accepted Answers:
True

5) The equation relating the entropy S to the quantity Ω, the number of real microstates (corrsponding to a given macrostate) is   **2 points**

○
$$\Omega = k_B \ln S$$
○
$$S = \frac{1}{k_B} \ln \Omega$$
○
$$S = k_B \ln \Omega$$
○
$$\Omega = \frac{1}{k_B} \ln S$$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$S = k_B \ln \Omega$

6) Complete the following equations: **2 points**

$$\left(\frac{\partial U}{\partial S} \right)_{V,N} = \_\_\_\_$$
$$\left(\frac{\partial U}{\partial V} \right)_{S,N} = \_\_\_\_$$

○
$-P$ and $-T$
○
T and $-P$
○
P and T
○
$-T$ and P

No, the answer is incorrect.
Score: 0
Accepted Answers:
T and $-P$

7) The expression for thermodynamic β in terms of Boltzmann's constant K_b and temperature T is   **2 points**

○
$$\frac{1}{K_b T}$$
○
$$K_b T$$
○
$$\frac{K_b}{T}$$
○
$$\frac{T}{K_b}$$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{1}{K_b T}$

8) Classical or Newtonian mechanics generally deals with the connections between the microscopic degrees of freedom and macroscopic   **2 points**
thermodynamic properties

○ True
○ False

No, the answer is incorrect.
Score: 0
Accepted Answers:
False

9) A crystal belongs to the space group $P4_1$ with $a = b = 0.9046nm$ and $c = 1.6714nm$. One of the atoms is in the Wyckoff position $4a$ **3 points**
with fractional coordinates $0.4169, 0.7330, 0.8359$. The actual cartesian coordinates of this atom to two decimal places are __X__ , __Y__ and __Z__

The values of x, y and z are:

○ x=1.40, y=0.28 and z= 0.36
○ x=0.38, y=1.39 and z= 0.66
○ x=0.38, y= 0.66 and z=1.39
○ x=1.39, y= 0.66 and z=0.38

No, the answer is incorrect.
Score: 0
Accepted Answers:
x=0.38, y= 0.66 and z=1.39