Unit 13 - Week 8

Assignment 8

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

Due on 2020-03-25, 23:59 IST.

1) The phase average of a quantity 'A' is $<A> = \frac{\int A(q,p)\rho(q,p,t)dpdq}{\int \rho(q,p,t)dpdq}$ **2 points**

- True
- False

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

2) The time average properties of a quantity 'A' is **2 points**

- $\lim_{\Delta t \to \infty} \Delta t \int_{t_0}^{t_0+\Delta t} A(q(t),p(t))dt$
- $\lim_{\Delta t \to 0} \frac{1}{\Delta t} \int_{t_0}^{t_0+\Delta t} A(q(t),p(t))dt$
- $\lim_{\Delta t \to 0} \Delta t \int_{t_0}^{t_0+\Delta t} A(q(t),p(t))dt$
- $\lim_{\Delta t \to \infty} \frac{1}{\Delta t} \int_{t_0}^{t_0+\Delta t} A(q(t),p(t))dt$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\lim_{\Delta t \to \infty} \frac{1}{\Delta t} \int_{t_0}^{t_0+\Delta t} A(q(t),p(t))dt$

3) Which of the following is not true for microcanonical ensemble? **2 points**

- E, V, N constant
- System is isolated.
- It has a specific total Energy
- The temperature of the system is fixed

No, the answer is incorrect.
Score: 0
Accepted Answers:
The temperature of the system is fixed

4) The average kinetic energy of gas molecules with known temperature is? **2 points**

- kT
- $3kT$
- $\frac{3}{2}kT$
- $\frac{2}{3}kT$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{3}{2}kT$

5) For an isolated system, every microstate is equally probable **2 points**

- True
- False

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

6) For canonical ensemble, which of the following is true? **2 points**

- $\rho \propto exp\left(\frac{-H(p,q)}{k_bT}\right)$
- $\rho \propto exp\left(\frac{-k_bT}{H(p,q)}\right)$
- $\rho > exp\left(\frac{-k_bT}{H(p,q)}\right)$
- $\rho < exp\left(\frac{-k_bT}{H(p,q)}\right)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\rho \propto exp\left(\frac{-H(p,q)}{k_bT}\right)$

7) The relation between the number of microstates $\Omega(E)$ for an ideal gas of N monoatomic molecules in a volume V is related to energy E :? **2 points**

- $\Omega(E) \propto E$
- $\Omega(E) \propto E^N$
- $\Omega(E) \propto E^{\frac{N}{2}}$
- $\Omega(E) \propto E^{\frac{3N}{2}}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\Omega(E) \propto E^{\frac{3N}{2}}$

8) In a canonical ensemble, a system A of fixed volume is in contact with a large reservoir B.Then ____ **2 points**

- A can exchange only energy with B
- A can exchange only particles with B
- A can exchange neither energy nor particles with B
- A can exchange both energy and particles with B

No, the answer is incorrect.
Score: 0
Accepted Answers:
A can exchange only energy with B

9) In classical statistical mechanics, when the system is in thermal equilibrium, the equipartition theorem relates the temperature of a system to its average energies. **2 points**

- True
- False

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

10) In the following expression, P_r is **2 points**

$$P_r = \frac{exp(-\beta E_r)}{\sum_r exp(-\beta E_r)}$$

- the pressure at temperature r
- the probability that the system evolves from the current energy to the energy E_r
- the probability of finding the temperature so that the energy is E_r
- the probability of finding the system with energy E_r

No, the answer is incorrect.
Score: 0
Accepted Answers:
the probability of finding the system with energy E_r

11) $ln(N!)$ for large N is **2 points**

- $N\ ln(N) - N$
- $N\ ln(N)$
- N
- 0

No, the answer is incorrect.
Score: 0
Accepted Answers:
$N\ ln(N) - N$

12) If the Helmholtz energy is written as **1 point**

$$A = -k_bT\ ln(Q_N(V,T))$$

Then Q

- is called the Quotient
- is the ratio of the Energy of the system to the maximum energy it can attain
- is called the Partition function
- Is a constant with temperature

No, the answer is incorrect.
Score: 0
Accepted Answers:
is called the Partition function