Unit 12 - Week 7

Assignment 7

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

Due on 2020-03-18, 23:59 IST.

1) In statistical mechanics, a semi-classical derivation of the entropy that does not take into account the indistinguishability of particles, yields an expression for the entropy which is not extensive. This leads to a paradox known as the Gibbs paradox. *2 points*

- True
- False

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

2) The _____ of a system is defined to be the difference between the kinetic and potential energies of the system expressed as a function of positions and velocities. *2 points*

- Lagrangian
- Hamiltonian
- Total Energy
- None of the above

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

3) True or False: *2 points*

For the Gamma (Γ) function,

$$x\Gamma(x) = \Gamma(x+1)$$

- True
- False

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

4) The total number of possible states for a single particle with an energy less than E^* is *2 points*

$$\phi_{<E^*} = \frac{\pi}{6}\left(\frac{E^* 8mV^{\frac{2}{3}}}{h^2}\right)^{\frac{2}{3}}$$

- True
- False

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

5) The Lagrangian of a system is defined to be the sum of the kinetic and potential energies expressed as a function of positions and their conjugate momenta. *2 points*

- True
- False

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

6) Complete the Hamilton's equations below: *2 points*

$$\frac{dp}{dt} = \_\_\_\_\_ \, , \quad \frac{dp}{dt} = \_\_\_\_\_$$

- $-\frac{\partial H}{\partial q}, \frac{\partial H}{\partial p}$
- $-\frac{\partial H}{\partial q}, -\frac{\partial H}{\partial p}$
- $\frac{\partial H}{\partial q}, -\frac{\partial H}{\partial p}$
- $\frac{\partial H}{\partial q}, \frac{\partial H}{\partial p}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$-\frac{\partial H}{\partial q}, \frac{\partial H}{\partial p}$

7) True or False: *2 points*

$$\Gamma(x+1) = \Gamma!$$

- True
- False

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

8) What is the expression for hamiltonian formulation from the Lagrangian ? *2 points*

- $H(p,r) = \Sigma_{i=1}^{N} p_i . \dot{r}_i + L(r,\dot{r})$
- $H(p,r) = \Sigma_{i=1}^{N} p_i . \dot{r}_i - L(r,\dot{r})$
- $H(p,r) = \Sigma_{i=1}^{N} \dot{p}_i . r_i - L(r,\dot{r})$
- $H(p,r) = \Sigma_{i=1}^{N} \dot{p}_i . r_i + L(r,\dot{r})$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$H(p,r) = \Sigma_{i=1}^{N} p_i . \dot{r}_i - L(r,\dot{r})$

9) A Legendre transform is used to switch between Lagrangian formulation and Hamiltonian formulation _____ *2 points*

- True
- False

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

10) _____ ensemble represents an isolated system. *2 points*

- μVT
- NVT
- NVE
- NPT

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

11) NVT ensemble is also called _____ ensemble *2 points*

- grand canonical
- isolated
- micro canonical
- canonical

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