Unit 14 - Week 12

Assignment 12

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

Due on 2020-12-09, 23:59 IST.

1) For a random walk model of polymer, the mean square end to end distance $\langle R^2 \rangle$ of a chain of N segments with segment length ℓ is given by (where C_∞ is Flory's characteristics ratio) *1 point*

(a) $\langle R^2 \rangle = C_\infty N$

(b) $\langle R^2 \rangle = C_\infty N\ell$

(c) $\langle R^2 \rangle = C_\infty \ell^2$

(d) $\langle R^2 \rangle = C_\infty N\ell^2$

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(d)

2) The radius of gyration (R_g) for a sphere of radius R will be *1 point*

(a) $\frac{R}{2}$

(b) $\frac{R}{\sqrt{2}}$

(c) $\frac{3R}{5}$

(d) $\sqrt{\frac{3}{5}}R$

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(d)

3) For a two-dimensional excluded volume chain, the value of the Flory exponent will be *1 point*

- 3/7
- 0
- 1/2
- 3/4

No, the answer is incorrect.
Score: 0
Accepted Answers:
3/4

4) According to Liouville's theorem any phase space function A evolves as (here, H corresponds to the Hamiltonian of the system) *1 point*

(a) $\frac{dA}{dt} = \{A, H\}$

(b) $\frac{dA}{dt} = [A, H]$

(c) $\frac{dA}{dt} = \{H, A\}$

(d) $\frac{dA}{dt} = [H, A]$

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a)

5) Liouville operator L is *1 point*

- Anti-Hermitian operator
- Unitary operator
- Hermitian operator
- Non-Unitary operator

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

6) We are unable to calculate total energy at each timestep of molecular simulation when we use *1 point*

- Velocity Verlet algorithms
- Leap frog algorithms
- Position Verlet algorithms
- Predictor-corrector algorithms

No, the answer is incorrect.
Score: 0
Accepted Answers:
Leap frog algorithms

7) The interaction potential energy between charge and induced dipole varies with the separation between them (r) as *1 point*

(a) $\frac{1}{r}$

(b) $\frac{1}{r^2}$

(c) $\frac{1}{r^3}$

(d) $\frac{1}{r^4}$

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(d)

8) While performing MD simulation in Canonical ensemble which of the following relation holds between momentum fluctuation ($\sigma_{p^2}^2$) and momentum (p) *1 point*

(a) $\frac{\sigma_{p^2}^2}{\langle p^2 \rangle^2} = \frac{2}{3}$

(b) $\frac{\sigma_{p^2}^2}{\langle p^2 \rangle^2} = \frac{1}{3}$

(c) $\frac{\sigma_{p^2}^2}{\langle p^2 \rangle} = \frac{2}{3}$

(d) $\frac{\sigma_{p^2}^2}{\langle p^2 \rangle} = \frac{5}{3}$

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(a)

9) Suppose, we have a system having temperature $T(t)$ at time t and the temperature at which the system needs to bring is T_{ref}. To achieve the required temperature we can rescale the velocities of the particles by multiplying λ , where λ is *1 point*

(a) $\sqrt{T_{ref}}$

(b) $\sqrt{T_{ref} T(t)}$

(c) $\sqrt{T(t) / T_{ref}}$

(d) $\sqrt{T_{ref} / T(t)}$

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(d)

10) If p be the momentum of the particle of mass 'm' at temperature T, then the value of $\langle p^2 \rangle$ is *1 point*

(a) $2mk_BT$

(b) $3mk_BT$

(c) $4mk_BT$

(d) mk_BT

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(b)