# Unit 13 - Week 11



## Assignment 11

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

**Due on 2020-12-02, 23:59 IST.**

1) In the absence of any correlations, pair correlation function becomes *1 point*

- 1
- 0
- 2
- Undefined

No, the answer is incorrect.
Score: 0
Accepted Answers:
*1*

2) Calculate the following integration for a system consisting of $N$ number of molecules and $r$ denotes the distance from the origin where one molecule is located: $\int_0^\infty \rho g(r) 4\pi r^2 dr = ?$ *1 point*

(provided all the quantities carry their usual meaning)

(a) 1

(b) $N-1$

(c) 0

(d) Information is not sufficient

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

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

3) Which of the following order is correct? *1 point*

(a) **Liouville equation** $\rightarrow$ **BBGKY** $\xrightarrow{equilibrium}$ **YBG** $\xrightarrow{kirkood\ approximation}$ **BG equation**

(b) **Liouville equation** $\rightarrow$ **YBG** $\xrightarrow{equilibrium}$ **BBGKY** $\xrightarrow{kirkood\ approximation}$ **BG equation**

(c) **BBGKY** $\rightarrow$ **Liouville equation** $\xrightarrow{equilibrium}$ **YBG** $\xrightarrow{kirkood\ approximation}$ **BG equation**

(d) **Liouville equation** $\rightarrow$ **BBGKY** $\xrightarrow{equilibrium}$ **BG equation** $\xrightarrow{kirkood\ approximation}$ **YBG**

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

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

4) Static structure factor is related to radial distribution function as *1 point*

(a) $S(k) = \rho \int dr e^{-ikr} g(r)$

(b) $S(k) = 1 + \rho \int dr e^{-ikr} g(r)$

(c) $S(k) = 1 + \frac{\rho}{2} \int dr e^{-ikr} g(r)$

(d) $S(k) = 1 + \rho \int dr g(r)$

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

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

5) The correct relation between total energy ($\bar{E}$) and radial distribution function (g(r)) is *1 point*

(a) $\frac{\bar{E}}{Nk_BT} = \frac{\rho}{2k_BT} \int_0^\infty u(r) g(r) 4\pi r^2 dr$

(b) $\bar{E} = \frac{3}{2} + \frac{\rho}{2k_BT} \int_0^\infty u(r) g(r) 4\pi r^2 dr$

(c) $\frac{\bar{E}}{Nk_BT} = \frac{3}{2} + \frac{\rho}{2k_BT} \int_0^\infty u(r) g(r) 4\pi r^2 dr$

(d) $\frac{\bar{E}}{Nk_BT} = \frac{3}{2} + \int_0^\infty u(r) g(r) 4\pi r^2 dr$

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

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

6) For hard sphere system with diameter the pair correlation function is in the limit of $r < \sigma$ *1 point*

- 0
- 1
- >1
- <1

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

7) For liquid arbitrary any molecule $A_2$, the pair distribution function shows the first peak at (provided A-A bond length x Å and van der Waals diameter of molecule $A_2$ is y Å) *1 point*

(a) x Å

(b) x+y Å

(c) y Å

(d) (x+y)/2 Å

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

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

8) Which of the following best represents the behaviour of a polymer chain: *1 point*

- Long straight line
- Random walk
- Curved surface
- Cuboid

No, the answer is incorrect.
Score: 0
Accepted Answers:
*Random walk*

9) For a system consisting of a polymer in a good solvent, which of the following is/are not true? *1 point*

- Solvent and polymer will like each other.
- The effective interactions between the monomers will be repulsive.
- Polymer will collapse.
- There will be maximum contact between polymer and solvent.

No, the answer is incorrect.
Score: 0
Accepted Answers:
*Polymer will collapse.*

10) The radius of gyration ($R_g$) for an infinitely thin disk of radius $R$ will be *1 point*

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

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

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

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

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

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