

Roll No.
CHE2612
B.Sc., Semester Second,
Examination, 2021-2022
CHEMISTRY
PAPER - Second
(Physical Chemistry)

[Time : 2 Hrs.]

[Maximum Marks : 60]

Note : This Question paper contains two sections. Section A Contains Eight short answer type Questions. Attempt any 04 questions from this section. Each question carries 7.5 marks. Section B contains four long answer type questions. Attempt any 02 question from this section. Each question carries 15 marks.

SECTION - A
(Short Answer Type Questions)
(4×7.5=30)

Note: Attempt any 04 questions out of 08 given.

1. Discuss the postulates of kinetic theory of gases. Explain its importance.

2. The average speed of gas molecules is 400m/s at 300K. Calculate its root mean square speed at the same temperature.
3. Derive the Bragg's equation.
4. Discuss the different types of unit cells.
5. what are emulsions. How are they classified?
6. Write a short note on Hardy Schulze law.
7. The half-life period for the first order decomposition of H_2O_2 is 360 minutes at 380°C . The energy of activation of a reaction is 200kJ mol^{-1} . Calculate the time required in minutes for 75 percent decomposition at 450°C . <https://www.ssjuonline.com>
8. The reaction $2\text{N}_2\text{O}_5(\text{g}) \rightarrow 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$ is forming NO_2 at the rate of $0.0076 \text{ mol L}^{-1}\text{s}^{-1}$ at time t. (a) What is the rate of change of $[\text{O}_2]$ at time t? (b) What is the rate of change of $[\text{N}_2\text{O}_5]$ at time t? (c) What is the rate of reaction at Time t?

SECTION - B
(Long Answer Type Questions)
(2×15=30)

Note: Attempt any 02 questions out of 04 given.

9. (a) Calculate the mean free path in a sample of pure oxygen gas at 27°C and 1.0 atm (Given. $R=0.0821$, atm Mol⁻¹K⁻¹).
- (b) Calculate the collision frequency for an oxygen gas under same condition. The diameter of an oxygen molecule is 300pm. (Given $R=8.314$ J K⁻¹ mol⁻¹)
10. Discuss.
- (a) *law of constancy of interfacial angles*
- (b) *law of rationality of indices*
- (c) *law of symmetry*
11. Write a short note on physical, mechanical, optical and electrical properties of colloids.
12. Discuss the different methods for determining the order of the reaction.