



**National Officers Academy**  
**Mock Exams for CSS-2022**  
**March 2022 (Mock-8)**  
**CHEMISTRY, PAPER-I**

<b>TIME ALLOWED: THREE HOURS</b>	<b>PART-I (MCQS)</b>	<b>MAXIMUM MARKS = 20</b>
<b>PART-I(MCQS): MAXIMUM 30 MINUTES</b>	<b>PART-II</b>	<b>MAXIMUM MARKS = 80</b>

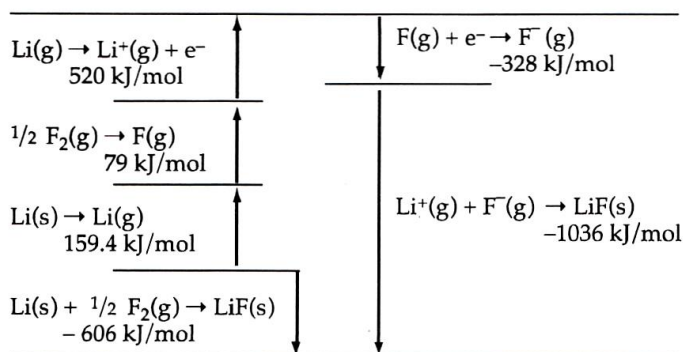
**NOTE:**

- i. **Part-II** is to be attempted on the separate **Answer Book**.
- ii. Attempt **ONLY FOUR** questions from **PART-II**. **ALL** questions carry **EQUAL** marks.
- iii. Write Q. No. in the Answer Book in accordance with Q. No. in the Q. Paper.
- iv. **Use of Calculator is allowed.**

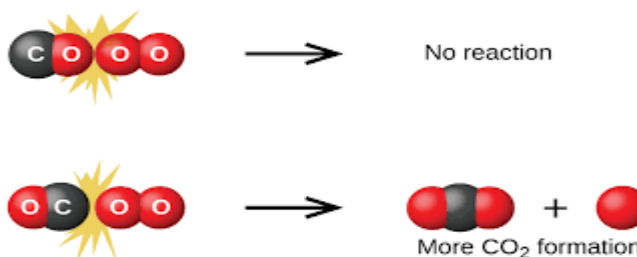
**SUBJECTIVE PART — PART-II**

- Q. No. 2.** (a) Calculate the atomic radius of mono-electronic systems using Bohr model. (10)  
 (b) What is a normalized function? How it is important in quantum mechanics? (4)  
 (c) Differentiate between Quantum mechanics and classical mechanics. (6)

- Q. No. 3.** (a) Calculate lattice energy of LiF from Born-Haber cycle: (12)



- (b) What is effective and futile collision? What are the conditions precedent for effective collision? In the figure given below, which is effective, and which is futile collision? Answer it in the light of collision theory. (8)



- Q. No. 4.** (a) Apply valence bond theory to explain the formation of SO<sub>3</sub>, NH<sub>4</sub> and Oxygen molecule. (12)  
 (b) Predict the shapes of following molecules by the aid of VSEPR theory (8)  
 SF<sub>6</sub>, PCl<sub>5</sub>, PCl<sub>3</sub>, HCHO, SbF<sub>3</sub>, HgCl<sub>2</sub>, H<sub>2</sub>O, NH<sub>3</sub>

- Q. No. 5.** (a) Discuss Warner's theory in detail. (10)  
 (b) Give a brief account of stereochemistry of coordination compounds. (4)  
 (c) Derive a relation between temperature and activation energy. (6)
- Q. No. 6.** (a) What is Lowry Bronsted concept? How it is different from Lewis's concept? (5)  
 (b) How weak electrolytes deviate from Debye Huckel theory. (5)  
 (c) Discuss chemistry of corrosion. How it can be inhibited? (10)

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*Best of Luck for CSS-2022*