



National Officers Academy
Final Mock Exams for CSS-2021
January 2021
CHEMISTRY, PAPER-I

TIME ALLOWED: THREE HOURS PART-I(MCQS): MAXIMUM 30 MINUTES	PART-I (MCQS) PART-II	MAXIMUM MARKS = 20 MAXIMUM MARKS = 80
NOTE: <ul style="list-style-type: none">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. All the parts (if any) of each Question must be attempted at one place instead of at different places.iv. Write Q. No. in the Answer Book in accordance with Q. No. in the Q. Paper.v. No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.vi. Extra attempt of any question or any part of the question will not be considered.vii. Use of calculator is allowed.		

SUBJECTIVE PART — PART-II

- Q. 2.** (a) Derive Schrodinger wave equation for a particle in 1-D box and write down the expression for energy and wave function. (10)
(b) Write down the properties of well-behaved function. (4)
(c) Give a brief account of photoelectric effect. (6)
- Q. 3.** (a) Prove that: $CP-CV=R$ (12)
(b) Give a brief account of transition state theory indicating its advantages over collision theory. (8)
- Q. 4.** (a) Apply valence bond theory to explain the formation of H₂O, NH₃ and HCHO. (12)
(b) Predict the shapes of following molecules by the aid of VSEPR theory:
SF₆, PCl₅, PCl₃, HCHO, SbF₃, HgCl₂, H₂O, NH₃ (8)
- Q.5.** (a) Discuss crystal field theory of coordination compounds in detail. (10)
(b) Give a brief account of John-Teller theorem. (6)
(c) How NaCl can be purified by application of common ion effect? (4)
- Q. 6.** (a) Write a brief note on theory of acid-base indicators. (5)
(b) How buffers maintain pH of a solution? (5)
(c) What is electrophoresis? Give its principle and discuss its applications in biochemistry. (10)

Best of Luck for CSS-2021