



FEDERAL PUBLIC SERVICE COMMISSION
COMPETITIVE EXAMINATION-2022
FOR RECRUITMENT TO POSTS IN BS-17
UNDER THE FEDERAL GOVERNMENT

<u>Roll Number</u>

CHEMISTRY, PAPER-I

TIME ALLOWED: THREE HOURS	PART-I (MCQS)	MAXIMUM MARKS = 20
PART-I(MCQS): MAXIMUM 30 MINUTES	PART-II	MAXIMUM MARKS = 80
<p>NOTE: (i) Part-II is to be attempted on the separate Answer Book.</p> <p>(ii) Attempt ONLY FOUR questions from PART-II. ALL questions carry EQUAL marks.</p> <p>(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.</p> <p>(iv) Write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.</p> <p>(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.</p> <p>(vi) Extra attempt of any question or any part of the question will not be considered.</p> <p>(vii) Use of calculator is allowed.</p>		

PART-II

- Q. 2.** (a) Derive Schrodinger wave equation for particle in one dimensional box. (10)
- (b) Discuss Heisenberg's Uncertainty principle. (05)
- (c) What is corrosion? How it can be prevented? (05) **(20)**
- Q. 3.** (a) What is Stereoisomerism? Discuss it with reference to coordination complexes. (08)
- (b) Define and explain Jahn-Teller theorem. (06)
- (c) Write a short note on column chromatography. (06) **(20)**
- Q. 4.** (a) What is Valence Bond theory? How does this theory explains the structure of inorganic molecules? (08)
- (b) Define and explain the phenomenon of resonance in inorganic compounds. (06)
- (c) Write some general characteristics of actinides. (06) **(20)**
- Q. 5.** (a) What is photoelectric effect? How quantum mechanics explains this effect? (08)
- (b) What is wave-function? Discuss its interpretation given by Born. (06)
- (c) What are fuel cells? Discuss their working with suitable examples. (06) **(20)**
- Q. 6.** (a) What are electron-deficient compounds? Discuss bond in such compounds. (07)
- (b) Define and explain the VSEPR model to explain the geometry of inorganic substances. (07)
- (c) Discuss variation in oxidation states of lanthanides. (06) **(20)**
- Q. 7.** (a) What is Nernst equation? Explain it. (08)
- (b) Define and explain Kohlrausch's law. (07)
- (c) Write a short note on Arrhenius equation. (05) **(20)**
- Q. 8.** (a) What is crystal field theory? How does this theory explain the geometry of complexes? (08)
- (b) Explain Lewis theory of acids and bases. (06)
- (c) Write a short note on thin layer chromatography. (06) **(20)**