



FEDERAL PUBLIC SERVICE COMMISSION
COMPETITIVE EXAMINATION-2020
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) Write two equations of state for real gases and compare them highlighting their important features. (10)
- (b) (i) Explain Heisenberg's uncertainty principle. (05)
- (ii) Discuss Born's interpretation of wave function. (05) (10) **(20)**
- Q. 3.** (a) Explain the Kohlrausch law. Why do the real solution should deviate from the law? (10)
- (b) Compare Langmuir's and Freundlich's adsorption isotherms. (10) **(20)**
- Q. 4.** (a) Explain the Arrhenius equation. Also highlight its applications and limitations. (10)
- (b) Explain various acid-base theories. What are hard and soft acids and bases? (10) **(20)**
- Q. 5.** (a) Make a comparison of column chromatography and thin layer chromatography (TLC) by highlighting merits and demerits of the both. (10)
- (b) Explain Werner's theory of coordination complexes. Give examples from d-block transition metals. (10) **(20)**
- Q. 6.** (a) Give a comprehensive classification of various chromatographic techniques. Also mention potential application of each. (10)
- (b) (i) What is Hydrogen bonding. Explain. (05)
- (ii) Describe Hybridization in p-block elements. (05) (10) **(20)**
- Q. 7.** (a) Explain crystal Field Theory (CFT) for d-block elements. (10)
- (b) Write an extensive essay on types of chemical bonding giving examples. (10) **(20)**
- Q. 8.** Write short notes on the following: (5 each) **(20)**
- (i) Liquid junction potential
- (ii) Potentiometry
- (iii) Collision theory of Chemical reactions.
- (iv) Transition state theory.