



**FEDERAL PUBLIC SERVICE COMMISSION**  
**COMPETITIVE EXAMINATION-2020**  
**FOR RECRUITMENT TO POSTS IN BS-17**  
**UNDER THE FEDERAL GOVERNMENT**

Roll Number

**CHEMISTRY, PAPER-I**

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

**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.

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