



**FEDERAL PUBLIC SERVICE COMMISSION**  
**COMPETITIVE EXAMINATION-2022**  
**FOR RECRUITMENT TO POSTS IN BS-17**  
**UNDER THE FEDERAL GOVERNMENT**  
**CHEMISTRY, PAPER-I**

Roll Number

<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>
<p><b>NOTE:</b> (i) <b>Part-II</b> is to be attempted on the separate <b>Answer Book</b>.</p> <p>(ii) Attempt <b>ONLY FOUR</b> questions from <b>PART-II</b>. <b>ALL</b> questions carry <b>EQUAL</b> 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) <b>Use of calculator is allowed.</b></p>		

**PART-II**

- Q. 2.** Define the following terms and give suitable examples **(20)**
1. Aromaticity
  2. Conjugation
  3. Inductive effect
  4. Irvine-enamine Tautomerism
  5. Intramolecular Hydrogen Bonding
- Q. 2.** Write down Preparations of Alkanes and Aldehydes. Also, give specific examples of addition reactions of alkenes with special reference to Markonikav and anti-Markonikav rule. **(20)**
- Q. 2.** (a) Starting from acetylene how you can prepare 1-Octyne. **(20)**  
(b) Write down the condition for the conversion of 2-Octyne to cis 2-Octene
- Q. 2.** Write the structural formula of your choice for all the structural isomers with the molecular formula C<sub>4</sub>H<sub>6</sub>. Also explain cis, trans, E, Z, and syn, anti geometrical isomerism. **(20)**
- Q. 2.** Phenol is more acidic than methyl alcohol. Explain in detail. Also, draw resonating structures of phenoxide ion. **(20)**
- Q. 2.** (a) Describe the instrumentation of the IR spectrophotometer in detail. **(20)**  
(b) What are the Basic Principles of IR Spectroscopy?
- Q. 2.** (a) What is the chemical shift? What are the factors affecting chemical shift? **(20)**  
(b) Describe the instrumentation of NMR spectroscopy?

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