

**CHEMISTRY, PAPER-II**

**FEDERAL PUBLIC SERVICE COMMISSION  
COMPETITIVE EXAMINATION FOR  
RECRUITMENT TO POSTS IN BPS-17 UNDER  
THE FEDERAL GOVERNMENT, 2010**

Roll Number

**CHEMISTRY, PAPER-II**

<b>TIME ALLOWED:</b>	<b>(PART-I) 30 MINUTES</b>	<b>MAXIMUM MARKS:20</b>
	<b>(PART-II) 2 HOURS &amp; 30 MINUTES</b>	<b>MAXIMUM MARKS:80</b>

- NOTE:** (i) First attempt **PART-I (MCQ)** on separate **Answer Sheet** which shall be taken back after **30 minutes**.  
(ii) **Overwriting/cutting of the options/answers will not be given credit.**  
(iii) **Scientific Calculator is allowed.**

**PART – I (MCQ)**  
**(COMPULSORY)**

**Q.1. Select the best option/answer and fill in the appropriate box on the Answer Sheet. (20)**

- (i) Which of the following substituent deactivates benzene ring and is o, p-directing?  
(a)  $\text{NH}_2$  (b)  $\text{Cl}$  (c)  $\text{OCH}_3$  (d)  $\text{OH}$
- (ii) Which of the following is most readily nitrated?  
(a) Toluene (b) Benzaldehyde (c) Nitrobenzene (d) Benzoic Acid
- (iii) Ketones can be prepared by reaction of Grignard reagent with:  
(a) Acid Amides (b) Acid Chloride (c) Carboxylic Acid (d) Epoxides
- (iv) Which of the following statements about the order of reaction is true?  
(a) The order of a reaction can only be determined by experiment.  
(b) A second order reaction is also bimolecular  
(c) The order of reaction must be a positive integer  
(d) The order of reaction increases with increasing temperature.
- (v) Polysaccharides yield many monosaccharides on:  
(a) Hydration (b) Oxidation (c) Reduction (d) Hydrolysis
- (vi) Which of the following is not aromatic?  
(a) Benzene (b) cyclooctatetraene (c) Pyridine (d) Phenol
- (vii) Which of the following is most basic?  
(a)  $\text{H}_2\text{O}$  (b)  $\text{NH}_3$  (c)  $\text{CH}_3\text{NH}_2$  (d)  $\text{CH}_3\text{OH}$
- (viii) Which of the following has lowest pH?  
(a)  $\text{CH}_3\text{COOH}$  (b)  $\text{CF}_3\text{COOH}$  (c)  $\text{ClCH}_2\text{COOH}$  (d)  $\text{Cl}_3\text{C COOH}$
- (ix) The equilibrium of two readily interconvertible isomers is called:  
(a) Stereoisomerism (b) Metamerism (c) Tautomerism (d) Polymorphism
- (x) Which of the following compounds exhibit geometrical isomerism?  
(a) 1-Pentene (b) 2-Pentene (c) 2-methyl –2-Pentene (d) 2-methyl –2-Butene
- (xi) Which of the following gives a tertiary alcohol when treated with Grignard reagent:  
(a)  $\text{HCHO}$  (b)  $\text{CH}_3\text{CHO}$  (c)  $\text{C}_3\text{H}_5\text{CHO}$  (d)  $\text{CH}_3\text{COCH}_3$
- (xii) Which of the following tests is not used to identify aldehydes?  
(a) Tollen's test (b) Benedict solution test (c) Fehling solution test (d) Ammonia test
- (xiii) Which is incorrect about alkaloids?  
(a) Naturally Occurring (b) Possess a hetrocyclic ring  
(c) Exhibit biological action (d) acidic in nature
- (xiv) Which of the followings will not give iodoform test:  
(a) Acetone (b) Ethylalcohol (c) Benzaldehyde (d) Acetaldehyde
- (xv) The reaction of aniline with bromine water gives:  
(a) o-bromoaniline (b) p-bromoaniline (c) 2,4-dibromoaniline (d) 2,4,6-tribromoaniline
- (xvi) The reaction of tripalmitin, with sodium hydroxide is called:  
(a) Hydrolysis (b) Saponification (c) Esterification (d) Combustion
- (xvii) Which one is not Petrochemical?  
(a) Naphthalene (b) Mineral Oil (c) Wax (d) Table Salt
- (xviii) Chemical adsorption:  
(a) is exothermic (b) is irreversible (c) takes place at high temp. (d) All of these

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- (xix) The most commonly used absorbent for chromatographic separation of organic compounds is:  
 (a) Activated charcoal (b) Fuller's Earth (c) Alumina (d) Silica gel
- (xx) Grignard reagent is:  
 (a) Organo Zinc halide (b) Organo cadmium bromide  
 (c) n-Butyl Lithium (d) Organo Magnesium halide

**PART – II**

<b>NOTE:</b>	<p>(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>. All questions carry <b>EQUAL</b> marks.</p> <p>(iii) Extra attempt of any question or any part of the attempted question will not be considered.</p>
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- Q.2.** (a) What is mesomerism? Give the conditions necessary for mesomerism. (10)  
 (b) What is intramolecular and intermolecular hydrogen bonding? Illustrate with examples. (6)  
 (c) Indicate the type of hybridization of carbon atom in the following: (4)  
 (i) Formaldehyde (ii) Dimethylether (iii) Hydrogen Cyanide (iv) Acetylene
- Q.3.** (a) What is Diazotisation reaction? How will you prepare following via Diazotisation reaction? (14)  
 (i) Phenol (ii) Chlorobenzene (iii) Phenyl ethyl ether (iv) any dye  
 (b) Discuss the action of nitrous acid on secondary and tertiary amines. (6)
- Q.4.** (a) How will you synthesize following? Give reaction conditions and mechanism. (16)  
 (i) Acetaldehyde from Ethanol (ii) Benzaldehyde from Benzene  
 (iii) Cyanohydrin from acetaldehyde (iv) Salicyldehyde from Phenol  
 (b) What is the difference between clemmensen and wolff-kishner reduction? (4)
- Q.5.** (a) Discuss the structure of Grignard Reagent. (4)  
 (b) How these compounds can be prepared via Grignard Reagent? (16)  
 (i) 2-Butanol (ii) Ethane (iii) Acetic Acid (iv) Ethyl thiol
- Q.6.** (a) Explain the difference between: (16)  
 (i) Homopolymer and Copolymer  
 (ii) Addition Polymerization and Condensation Polymerization  
 (iii) Monosaccharide and Polysaccharide  
 (iv)  $\alpha$ -D-glucose and  $\beta$ -D-glucose  
 (b) Write the structure of monomers from which each of the following would be formed: (4)  
 (i) PVC (ii) Teflon (iii) Nylon 6 (iv) PAN
- Q.7.** (a) Hydrolysis of Ethylacetate by sodium hydroxide is done by taking different initial concentration. What will be the rate of this reaction? (6)  
 (b) A second order reaction has equal concentrations of reactants and is 25% completed in 20 minutes. How much time is required to complete the reaction by 75%? (10)  
 (c) Express the rate of reversible decomposition of Phosphorus pentachloride into Phosphorous trichloride and chlorine in terms of reactants and products. (4)
- Q.8.** How would you prepare the following compounds from benzene? Name each reaction as well. (20)  
 (i) Acetophenone (ii) Bromobenzene (iii) Maleic anhydride (iv) Toluene  
 (v) Benzaldehyde

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