

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2018

SECOND YEAR (BATCH 2016-19)

CHEMISTRY (Honours)

Date : 21/05/2018

Time : 11.00 am – 1.00 pm

Paper : IV [Gr-B]

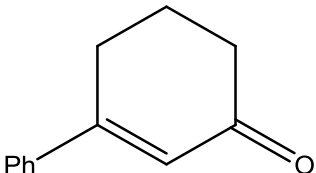
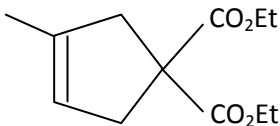
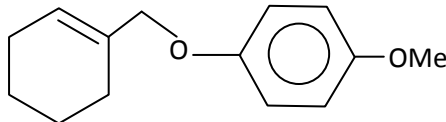
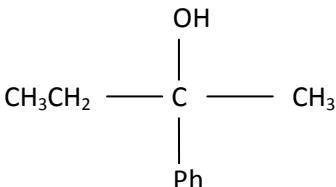
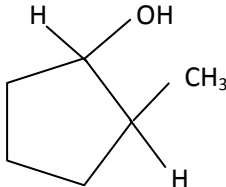
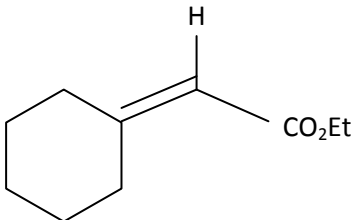
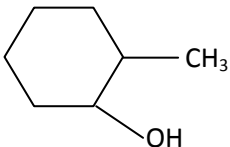
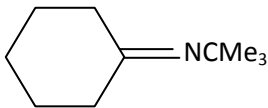
Full Marks : 35

[Use one Answer Book for Unit I and another Answer Book for Unit II, III & IV]

(Attempt one question from each Unit)

Unit I

[10 marks]

1. a) Use Reformatsky reaction to synthesise $\text{PhC(Me) = C(Me)COOH}$. Why Mg can't be used in place of Zn in the synthesis? 3
- b) Write retrosynthesis of the following molecules and hence state the corresponding forward synthesis with proper reagents and conditions (**any two**). (2½+2½)
- (i)  (ii)  (iii) 
- c) Carry out the following conversion using an organometallic compound: 2
 $\text{PhCOOH} \rightarrow \text{PhCOMe}$
2. a) Write only the retrosynthesis of the following molecules: ½ × 4
- (i)  (ii) 
- (iii) Benzyl methyl ether ; (iv) Phenyl ethyl ether
- b) Synthesise the following compound using Wittig reaction (show mechanism for Wittig reaction): 2
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- c) Synthesise each of the following starting from cyclohexanone: 3
- (i)  (ii) 
- d) Prepare $\text{Me}_2\text{CHCH}_2\text{COCH}_3$ from: 3
- (i) A carboxylic acid and
(ii) A nitrile

UNIT-II

[9 marks]

3. a) Why does 'hydroxyl amine' show both oxidising and reducing properties? Write one reaction in support of each property. [3]
b) Melting point of Boron (2076°C) is much higher than that of Aluminium (660°C). Explain. [2]
c) The hydrolysis products of NCl_3 and PCl_3 are different. Explain. [2]
d) The molecular formula of nitric acid is HNO_3 while that of phosphoric acid is H_3PO_4 . Explain. [2]
4. a) What are the structures of trimer and tetramer of cyclophosphazene? Explain the bonding in cyclophosphazenes. [1+1+2]
b) Aqueous solution of borax behaves as a buffer —Explain. [2]
c) State and explain the number of moles of NaOH required to neutralise one mole of each of trimetaphosphoric acid and tripolyphosphoric acid separately using phenolphthalein indicator. [3]

UNIT-III

[8 marks]

5. a) What is meant by catenation? The catenation power of carbon is highest —Explain. [2]
b) Sulphuric acid and telluric acid are differently formulated. Comment on the statement. [2]
c) What happens when $(\text{NH}_4)_2\text{S}_2\text{O}_8$ is added to a weakly acidic solution of MnSO_4 in presence of a few drops of AgNO_3 . [2]
d) Discuss the structure of S_4N_4 . [2]
6. a) Dithionic acid may not be regarded as polythionic acid. Explain with structural features. [2]
b) Write with equation what happens when : SO_2 gas is passed into an aqueous suspension of pyrolusite. [2]
c) What is Wackenroder solution? [2]
d) ' PbO_2 is a strong oxidising agent' —Justify with a proper chemical reaction. [2]

UNIT-IV

[8 marks]

7. a) Explain why N_3^- is considered as a pseudohalide. [2]
b) Iodine can form I_3^- ion but fluorine cannot form F_3^- ion. Justify the statement. [2]
c) Give balanced ionic equation for the hydrolysis of ICl_3 in aqueous sodium hydroxide solution. [2]
d) Iodine shows different color in different solvents — Explain why? [2]
8. a) Discuss the bonding in XeF_2 using molecular orbital concept. [3]
b) Complete the reaction : $\text{XeF}_2 + \text{CsF} \rightarrow \text{A} \xrightarrow[\Delta]{50^\circ\text{C}} \text{B} + \text{C}$ [2]
c) Give the structure and hybridisation of Xe in XeO_2F_2 . [1.5+1.5]

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