

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FIFTH SEMESTER EXAMINATION, DECEMBER 2017

THIRD YEAR [BATCH 2015-18]

INDUSTRIAL CHEMISTRY [Honours]

Date : 16/12/2017

Time : 11 am – 1 pm

Paper : V[Gr-B]

Full Marks : 50

[Use a separate Answer Book for each Unit]

## Unit – I

(Answer any four questions)

[4×5]

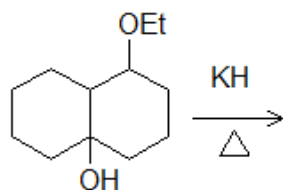
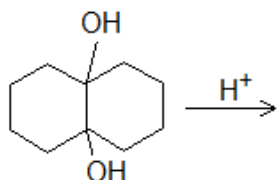
1. Distinguish between Advection & Percolation. Mention the major sources of Dissolved oxygen (DO) in water. What is Chemical Oxygen Demand (COD)? How can it be measured? [2+1+1+1]
2. Define 'Incineration' and 'Landfill'. What is 'Grit Removal' in sewage treatment? [(1.5+1.5)+2]
3. Mention the importance of a maturation river. Define Non-Purgeable Organic Carbon (NPOC). What is C & D debris? [2+1+2]
4. What are the major sources of wastewater in municipal areas? Give a brief account of trickling filter. How does it work? [2+2+1]
5. What is MIC? Name the disaster which happened out of escape of this gas. What is teratogenesis? Illustrate how elemental mercury affects human being. [1+1+1+2]
6. Enumerate various sources of radioactive wastes. State how such wastes are managed. [2+3]

## Unit – II

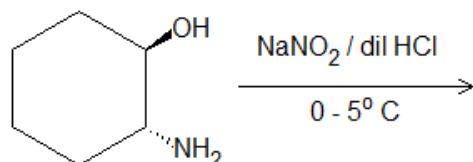
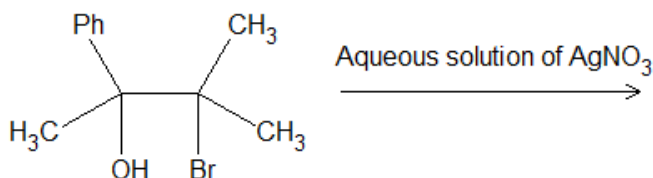
(Answer any four questions)

[4×5]

7. Predict the products with proper mechanism. 2+3



8. Carry out the following reactions with proper mechanism. 2+3



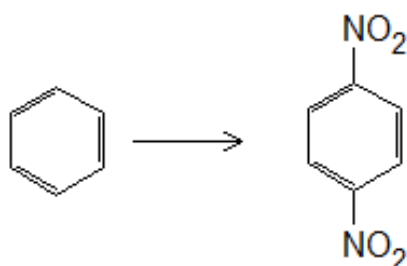
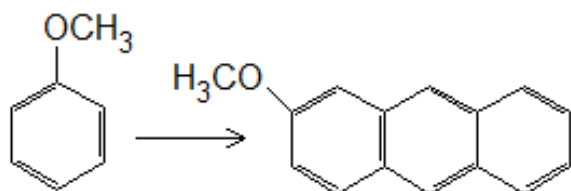
9. Draw the possible conformations of 2-methyl butane as a function of rotation about  $C_2 - C_3$  bond and draw the energy profile diagram labelling energy maximum as well as minimum conformers. 5
10. (i) Why ethylene glycol exist exclusively in gauche conformation in solution?  
 (ii) 1,2-dichloro ethane exist as anti conformation in solution whereas 1,2-difluoro ethane exist as gauche conformation in both aqueous and gaseous medium. Explain properly. 2+3
11. (i) Briefly describe Bayer angle strain theory and its drawbacks.  
 (ii) Why cis 1,2-dimethylcyclohexane exist as non resolvable dl-pair in solution? 3+2
12. (i) Draw the stable chair conformation of 1-methyl-1-phenylcyclohexane and explain it.  
 (ii) Draw the stable conformations of cis-1,4-di-tert-butylcyclohexane and trans-1,3-di-tert-butylcyclohexane. 3+2

### Unit – III

(Answer any two questions)

[2×5]

13. Carry out the following transformations. 3+2



14. a) Describe the methods for separation of primary, secondary and tertiary amines.  
 b) Write the mechanism for reduction of nitrobenzene by metal in acidic and neutral medium. 3+2
15. a) Describe Bardhan-Sengupta synthesis of phenanthrene in details.  
 b) Napthalene on sulfonation reaction at  $80^\circ C$  gives  $\alpha$ -product whereas at higher temperature ( $160^\circ C$ )  $\beta$ -product is formed. 2+3

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