RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [BATCH 2015-18]

B.A./B.Sc. SECOND SEMESTER (January – June) 2016

Mid-Semester Examination, March 2016

Date : 17/03/2016

INDUSTRIAL CHEMISTRY (Honours)

Time : 11 am – 1 pm

Paper : II

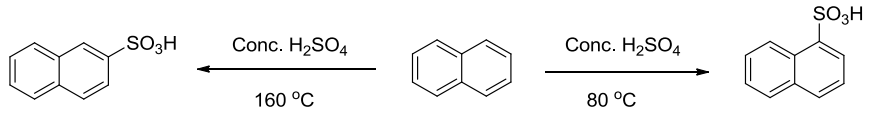
Full Marks : 50

[Use a separate Answer Book for each group]

Group – A

Answer any two questions : [2×5]

1. a) Explain the following observation. [2]



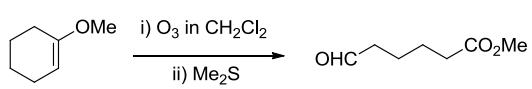
b) Predict the product with stereochemistry (if applicable) of the following reactions.

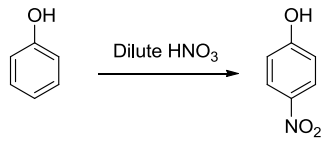
i) Fumaric Acid $\xrightarrow{Br_2 \text{ in } CCl_4}$

ii) 

[2×1·5]

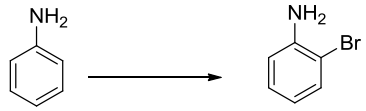
2. a) Provide the detailed mechanism for the following transformations [2×2]

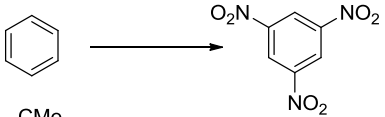
i) 

ii) 

b) Between cis- and trans-2-butene which one undergoes hydrogenation in faster rate and why? [1]

3. Complete the following conversions (more than one step) [2+1+2]

i) 

ii) 

iii) 

Group – B

Answer any three questions : [3×5]

4. Draw and explain how a thermophile works as a detector of photochemical reaction.

5. A certain system absorbs 3×10^8 quanta of light/sec. On irradiation for 20 min 0.03 mole of the reactant was found to have reacted. Calculate the quantum yield for process. Comment on the result.

6. Draw the Jablonski diagram showing each state and processes. State Franck-Condon principle and explain its role in Jablonski diagram.

7. Derive Michaelis – Mention equation for an enzyme catalysed reaction.

8. Explain Steady state principle. Derive the overall rate equation for a parallel reaction where reactant A is simultaneously converted to B and C and the rate constants are K_1 and K_2 respectively. [2+3]

9. Zero order reaction must be multistepped- discuss critically. Derive the rate equation for an n-th order reaction and prove that for a first order reaction $t_{0.75} = 2t_{0.5}$. [2+3]

Group – C

Answer <u>any two</u> questions : [2×5]

10. a) The conductance (Λ_M) of ammine complexes of Pt(IV) chloride [concentration of the solution is 0·001M] are as follows 523, 404, 229, 97 and 7 respectively. From the following data suggest the formulation of the complexes with reason. [2·5]
    b) Can a chemical species behave as a ligand without any electron pair or pairs? Comment on. [1·5]
    c) Write the name of the compound according to IUPAC nomenclature. $[PtCl_2(C_2H_4)(NH_3)]$. [1]

11. a) Define 1^{st} order and 2^{nd} order innermetallic complexes with examples. [2]
    b) Classify the following two ligands with justification. CO, H_2O. [2]
    c) Write the name of the compound according to IUPAC nomenclature. $[(NH_3)_5Cr–OH–Cr(NH_3)_5]Cl_5$. [1]

12. a) Both hydrazine and ethylenediamine have two donor atoms but they behave differently. Explain. [2]
    b) Is there any relation between the pH of the medium and the flexidentate character of EDTA? Explain. [2]
    c) Write the name of the compound according to IUPAC nomenclature. $[Br_4ReReBr_4]^{2-}$. [1]

Group – D

Answer <u>any three</u> questions : [3×5]

13. With a neat sketch explain the layout of a panel board.

14. Write short notes on the following
    a) Accuracy of Instruments
    b) Errors normally encountered in measuring instruments
    c) Repeatability
    d) Linearity
    e) Drift

15. Name at least 3 inferential methods of level measurement and explain the principle of head type level measurement.

16. Explain the principle of Head type flow measurement and name at least two primary elements which uses this principle to generate differential pressure.

17. What do you mean by Dynamic characteristics of instruments and what are the terms which define this characteristics.

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