



UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 2nd Semester Examination, 2021

GE2-CHEMISTRY

Full Marks: 40

ASSIGNMENT

*The figures in the margin indicate full marks.
All symbols are of usual significance.*

Use Separate Answer Scripts for each Section

SECTION-A

PHYSICAL CHEMISTRY

Answer any *two* questions

10×2 = 20

1. (a) What is Heat Capacity? 2
 - (b) Derive the relation, $C_p = R + C_v$ for 1 mole of an Ideal gas. 4
 - (c) What do you mean by Joule-Thomson Effect and Inversion Temperature? 4

 2. (a) Describe the Carnot's Cycle for establishing the maximum convertibility of heat into work. 5
 - (b) A Carnot engine working between 0°C and 100°C takes up 840 joules from high temperature reservoir. Calculate the work done and efficiency. 4
 - (c) Define Entropy. 1

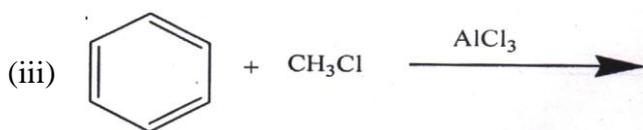
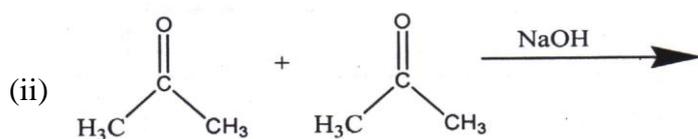
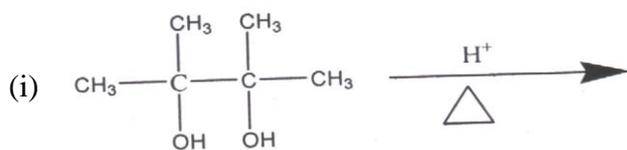
 3. (a) Establish the relation: $K_p = K_x P^{\Delta n}$ 2
 - (b) Discuss the factors influencing Chemical Equilibrium. 4
 - (c) What is Le Chatelier's Principle? With the help of Le Chatelier's Principle, work out the conditions which would favour the formation of ammonia: 2+2
- $$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g}) : \Delta H = -99.38 \text{ kJ}$$
4. (a) Derive a relationship between the hydrolysis constant K_h of a salt of weak base and strong acid, dissociation constant of the base K_b and Ionic Product of water K_w . Also calculate the pH of the system. 5
 - (b) Discuss the factors on which the degree of ionization depends. 3
 - (c) What is Common Ion effect? 2

SECTION-B
ORGANIC CHEMISTRY

Answer any *two* questions

10×2 = 20

5. (a) Give evidence to prove that the O-H bond of the alcohol is cleaved rather than the C-OH bond of the acid during esterification. 2
- (b) Arrange the following alcohols in the order of increasing pK_a values giving appropriate reasons: 3
- CH_3-CH_2OH , $(CH_3)_2CH-OH$, $(CH_3)_3C-OH$
- (c) What are geminal diols and vicinal diols? Write the structure of a stable geminal diol and explain its stability. 2+3
6. (a) 2, 4, 6-trinitro phenol is called picric acid. Though it is a phenolic compound, why is it called an acid? 3
- (b) What happens when Benzene diazonium chloride solution is added to hot dilute sulphuric acid? 2
- (c) What is Malaprade reagent? 1
- (d) Discuss the factors that affect SN^1 and SN^2 reactions. 4
7. (a) Write short notes on: 2×3 = 6
- (i) Cannizaro Reaction
- (ii) Benzoin Condensation
- (iii) Friedel-Crafts Alkylation.
- (b) Discuss the stereochemical consequences of SN^1 and SN^2 reactions. 3
- (c) Why are the boiling points of carbonyl compounds less than those of alcohols from which they are made? 1
8. (a) What is the importance of Corey's Reagent in Organic Chemistry? 1
- (b) Discuss the following reactions with proper mechanism: 3×3 = 9



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