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B.Sc./3rd Sem (H)/CHEM/22(CBCS)

2022

3rd Semester Examination

CHEMISTRY (Honours)

Paper : GE 3-T

[Chemical Energetics, Equilibria,
Organic Chemistry - II]

(CBCS)

Full Marks : 40

Time : Two Hours

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

Group - A

Answer any *five* questions.

2×5=10

1. What do you mean by adiabatic flame temperature?
2. How benzene can be prepared from acetylene?
3. Differentiate primary, secondary and tertiary alcohols.
4. State and explain the laws of thermochemistry.
5. What is buffer capacity? In what condition this value becomes maximum?

P.T.O.

(2)

6. Write the mechanism of nitration of benzene.
7. At 25°C temperature calculate the pH of $10^{-8}(M)$ $NaOH$ solution.
8. Write a short note on Fries rearrangement.

Group - B

Answer any *four* questions.

5×4=20

9. (a) At 0°C temperature 18gm ice transferred into steam at 100°C. Calculate the change of entropy.
($L_f = 80 \text{ cal g}^{-1}$, $L_v = 540 \text{ cal g}^{-1}$).
(b) Synthesize *n*-propylbenzene from benzene. 3+2=5
10. (a) Write the conditions for a reaction to be spontaneous.
(b) How do you synthesize 1°, 2° and 3° alcohol by using Grignard reagent? 2+3=5
11. (a) What happens when potassium chloride solution is added to a saturated lead chloride solution?
(b) How do you synthesize phenol from Cumene? 3+2=5
12. (a) $\frac{1}{2}N_2(g) + \frac{3}{2}H_2(g) = 2NH_3(g)$

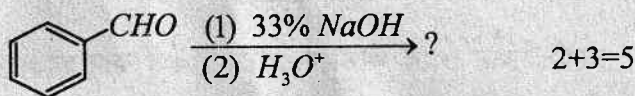
In which temperature k_p and k_c value of this reaction will be equal?

(3)

(b) Derive the expression of $C_p - C_v$ from thermodynamics. 3+2=5

13. (a) Define "solubility product".

(b) Write the product with mechanism.



14. (a) What is inversion temperature?

(b) What is meant by Ipso substitution? 2+3=5

Group - C

Answer any **one** question. 10×1=10

15. (a) Write a short note on (any **two**) : (2½×2)+5=10

(i) Friedel-Craft's alkylation

(ii) Pinacol-pinacolone rearrangement

(iii) Wolff-Kishner reduction

(b) Prove that for the adiabatic ideal gas
 $PV^\gamma = \text{Constant}$. (2.5×2)+5=10

16. (a) Calculate the *pH* of 1 lt. 0.2 mole NH_4Cl and 0.1 mole NH_4OH buffer solution.

(b) Write the Le-Chatelier's principal.

(c) Write short note on Wittig reaction. 6+1+3=10

P.T.O.