

2019

CHEMISTRY

[Generic Elective-A]

Paper – II

Full Marks : 60

Time : 3 hours

Answer all questions

The figures in the right-hand margin indicate marks

GROUP – A

1. Answer any *nine* questions : 2 × 9

- (a) Define average bond energy.
- (b) Define standard enthalpy of formation. Mathematically represent for the formation of $C_6H_6(l)$.

- (c) Write two characteristics of equilibrium constant.
- (d) Establish the relationship between K_p and K_c in $SO_{2(g)} + O_{2(g)} \rightleftharpoons SO_{3(g)}$
- (e) What is the relationship between K_{sp} and S in $Ag_3(PO_4)$?
- (f) What is the pH of $10^{-8}M$ HCl ?
- (g) Why allylchloride is more reactive towards substitution than vinylchloride ?
- (h) How fluorobenzene is prepared from aniline ?
- (i) What happens when benzene reacts with isopropyl chloride in the presence of anhydrous $AlCl_3$?
- (j) How benzene is prepared from acetylene ?
- (k) How R-NC is formed from R-Cl ?
- (l) What happens when ethylbenzene is oxidised with alk. $KmnO_4$.

GROUP – B

Answer all questions : 14 × 3

2. (a) Derive the temperature dependence Kirchoff's equation. 7
- (b) State and express third law of thermodynamics. 4
- (c) Write notes on integral and differential enthalpies of solution. 3
- Or*
- (a) What is equilibrium constant? Establish the relationship between K_p , K_c and K_u . 7
- (b) How will you distinguish ΔG and ΔG° . 3
- (c) If K_p for the reaction
 $A + B \rightleftharpoons C + D$ is 'X' then what is the value of K_c in " $MC + MD \rightleftharpoons MA + MB$ ". 4
3. (a) What is degree of ionization? How Ostwald's dilution law is expressed for weak acid and bases. 7

- (b) What is common-ion effect? How dissociation of H_2S is affected by adding HCl? 4
- (c) Calculate the pH of 0.1 M CH_3COOH with 2% dissociation. 3
- Or*
- (a) What is degree of hydrolysis? Calculate the pH of salts of weak acid and strong base. 7
- (b) Write notes on solubility and solubility product. 4
- (c) Explain the buffer action of equimolar solution of H_2CO_3 and Na_2CO_3 . 3
4. (a) How benzene is prepared from phenol, benzoic acid and benzene Sulphonic acid? 6
- (b) With proper justification, explain the formation $(CH_3)_3C-O-CH_3$ by Williamson's synthesis. 6
- (c) Write the mechanism of sulphonation in benzene. 2

(5)

Or

- (a) With proper energy level diagram and stereo-chemistry explains S_N1 and S_N2 reaction. 4 + 4
- (b) Distinguish Sandmeyer and Gattermann reaction. 3
- (c) Explain how nitrosubstituents accelerates the nucleophilic substitution of chlorobenzene. 3
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