

Total No. of Questions : 9]
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**UGC (CBCS) IInd Semester
(New) Examination**

1403

B.Sc. CHEMISTRY

**(Chemical Energetics, Equilibria and Functional
Group Organic Chemistry)**

(Core)

Paper : CHEM CC 202

Time : 3 Hours]

[Maximum Marks : 50

Note :- Attempt *five* questions in all, selecting *one* question from each Section. Section E is compulsory. All questions carry marks.

Section-A

1. (a) Define state function and path function with suitable example.
- (b) Why heat to neutralisation of a strong acid with a strong base is constant ?
- (c) Explain standard state.

4,4,2

CH-603

(1)

Turn Over

2. (a) Explain standard enthalpy of formation and what is its application ?
(b) Derive Kirchhoff's equation. 5,5

Section-B

3. (a) Derive the law of chemical equilibrium thermodynamically.
(b) Discuss the effect of change of pressure on chemical equilibrium. 5,5
4. (a) How the solubility product help in detection of cations of second and third group of qualitative analysis ? Explain.
(b) How will you explain that salts of weak acid and strong bases are alkaline in nature ? 5,5

Section-C

5. (a) Discuss the mechanism of nitration of benzene.
(b) Discuss the stereo chemistry of unimolecular nucleophilic substitution (S_N^1) reactions in alkylhalide.
(c) Complete the reactions and balance :
(i) When toluene is treated with chromyl chloride in carbon tetrachloride solution.
(ii) When toluene is treated with alk. $KMnO_4$. 4,4,2

6. (a) Explain with mechanism "Friedal Craft acylation".
- (b) What is benzyne ? Write nucleophilic aromatic substitution through Benzyne. 5,5

Section-D

7. (a) Using resonance explain that phenols are acidic in nature.
- (b) Write the mechanism of Reimer Tiemann reaction. 5,5
8. (a) How will you differentiate primary, secondary and tertiary alcohol using LUCAS test ?
- (b) Discuss the mechanism of Pinacol-pinacolone rearrangement. 5,5

Section-E

Compulsory Question

9. Multiple choice/True-False/Fill in the blanks :
- (i) Pressure is intensive property. (True/False)
- (ii) Mathematical form of the first law of thermodynamics when q is heat supplied and w is work done by the system is

- (iii) Relationship between decrease in Gibb's free energy and electrical energy is
- (iv) For a system in equilibrium, what is value of ΔG
- (v) Boiling point of alkyl halides are greater than alkanes due to
- (vi) Phenols give yellow precipitate with bromine water. (True/False)
- (vii) Iodoform is formed when acetone reacts with iodine and sodium hydroxide. (True/False)
- (viii) Phenols are produced upon hydrolysis of benzene diazonium salts. (True/False)
- (ix) Bond angle in dimethyl ether is more than water. (True/False)
- (x) Write structure of 3° alcohol with molecular formula $C_4H_{10}O$. 1×10=10