

Ex/SC/CHEM/UG/CORE/TH/13/2023

B. SC. CHEMISTRY EXAMINATION, 2023

(5th Semester, CBCS)

CHEMISTRY (CORE)

PAPER: CORE/CHEM/TH/13

Time : Two Hours

Full Marks : 40

(20 marks for each unit)

Use a separate answer script for each unit.

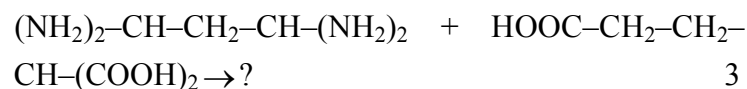
UNIT - 5131 - P

1. Freundlich adsorption isotherm may be treated as truncated Langmuir isotherm – Justify or criticise. 3
2. How can you determine area of the head group of a fatty acid? $2\frac{1}{2}$
3. Explain why bays are formed at the junction of a river and a sea. $2\frac{1}{2}$
4. What is electro-osmosis? 2
5. Define oligomer with an example. 2
6. Show the polymer formed by the reaction of the following monomers. Is the resulting polymer linear or

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[2]

branched/cross-linked?



7. Discuss about cationic polymerization. 2
8. (i) Discuss about a simplified representation of the process of synthesis of nanoparticles. 2
(ii) Bare nanoparticles cannot exist – explain. 2+1

UNIT - 5132 - P

Attempt any *four* questions.

9. (a) Write down the relationship between *Chemical and electrochemical potential* of Zn^{2+} ions at electrode-solution interface. What are the units of them in IUPAC? 3
(b) Why KCl or NH_4NO_3 salt is used in salt-bridge? 3+2
10. Write down the respective half cell reactions and cell reaction of the following cell.
 $\text{Zn(s)} \mid \text{ZnCl}_2(\text{aq}) \mid \text{Hg}_2\text{Cl}_2(\text{s}) \mid \text{Hg(l)} \mid \text{Pt(s)}$
(i) What is the role of *Pt* here?
(ii) Is this cell 'a cell without transference'? Give reason/s in support of your answer. 3+2

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11. Represent the galvanic cell for the cell reaction : $\text{Fe}^{3+}(\text{aq}) + \text{Ag(s)} = \text{Fe}^{2+}(\text{aq}) + \text{Ag}^+(\text{aq})$. The *equilibrium constant* for the reaction is 0.531 at 298 K. Calculate $E^0_{\text{Ag}^+(\text{aq})/\text{Ag(s)}}$ when $E^0_{\text{Fe}^{3+}(\text{aq})/\text{Fe}^{2+}(\text{aq})} = -0.0441 \text{ V}$ at 298 K. 5
12. What would be the value of $E^0_{\text{Fe}^{3+}(\text{aq})/\text{Fe}}$ at 298 K When $E^0_{\text{Fe}^{3+}(\text{aq})/\text{Fe}^{2+}(\text{aq})} = 0.771 \text{ V}$ and $E^0_{\text{Fe}^{2+}(\text{aq})/\text{Fe}} = 0.441 \text{ V}$ at 298 K. 5
13. The standard reduction potential for the electrodes Cu^{2+}/Cu and Ni^{2+}/Ni are +0.3336 V and –0.240 V respectively at 298 K. Construct the galvanic cell and identify anode & cathode. Calculate its standard emf at 298 K. 5
14. Write brief notes on primary & secondary reference electrodes with suitable examples. 5

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