



QP – 225

III Semester B.Sc. Examination, April/May 2021
(CBCS) (F + R) (2015-16 and Onwards)
CHEMISTRY – III

Time : 3 Hours

Max. Marks : 70

- Instructions :**
- The question paper has **two** Parts. Answer **both** the Parts.
 - Write diagrams and chemical equations **wherever** necessary.

PART – A

Answer **any eight** of the following. **Each** question carries **two** marks : (8×2=16)

- Explain the effect of catalyst on the rate of reaction.
- Define half-life period. Write the relationship between half life period and order of reaction.
- Calculate the work done when 2 moles of ideal gas undergoes isothermal reversible expansion from 10 dm³ to 100 dm³ (R = 8.314 JK⁻¹mol⁻¹).
- State any two forms of II law of thermodynamics.
- Give two examples of autocatalysis.
- How polyacrylonitrile is synthesised ?
- Mention the applications of Ellingham diagram.
- What happens when glycol is heated with HIO₄ ? Explain with reaction.
- Explain preparation of glycerol from oil and fats.
- Explain Pechmann reaction.
- How diethylether is prepared by using William ether synthesis ?
- Give an example for a) simple fertilizer b) mixed fertilizer.

P.T.O.



PART – B

Answer **any nine** of the following. Each question carries **six** marks : (9×6=54)

13. a) Derive an expression of second order kinetics when $a = b$.
b) Write Arrhenius equation and explain the terms. (4+2)
14. a) Determine the order of reaction by integral method.
b) Define Kirchoff's equation. Write the mathematical form. (4+2)
15. a) Derive the relationship between C_p and C_v .
b) Calculate the free energy change for the reaction for which equilibrium constant is 8.9×10^{-5} at 25°C ($R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$). (4+2)
16. a) Derive Gibbs-Helmholtz equation.
b) Write integrated form of Clausius-Clapeyron equation. Explain the terms. (4+2)
17. a) Mention four characteristics of catalyst.
b) Write the mathematical form of Freundlich adsorption isotherm and indicate the terms. (4+2)
18. a) Explain extraction of Uranium from its ore.
b) Write any one method for preparation of diborane. (4+2)
19. a) Explain hydroboration-oxidation method for preparing propylalcohol.
b) How are thiols prepared from alcohols ? (4+2)
20. i) Explain Meerwin-Ponndorf-Verely (MPV) reduction.
ii) Justify alcohols have acidic character.
iii) Explain esterification reaction. (2+2+2)
21. a) Explain with reaction, conversion of phenol to (i) aspirin (ii) methyl salicylate.
b) What happens when ethylene oxide (epoxyethane) reacts with ammonia ? Write with reaction. (4+2)



22. a) Explain Darzen's reaction.
b) Name the product formed when epoxide undergoes reduction with LiAlH_4 .
Write the reaction. (4+2)
23. a) How is urea manufactured ?
b) Define heat capacity at constant pressure and write its mathematical form. (4+2)
24. a) Explain extraction of plutonium from nuclear waste.
b) What are organometallic compounds ? Give example. (4+2)
25. a) What are thermoplastics and thermosetting plastics ? Give example.
b) Write two functions of phosphorous present in fertilizer. (4+2)