

(Pages : 4)

R – 3119

Reg. No. :

Name :



Second Semester B.Sc. Degree Examination, September 2023

First Degree Programme under CBCSS

Chemistry

Complementary Course for Physics

CH 1231.1 : PHYSICAL AND INDUSTRIAL CHEMISTRY

(2020 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** question carries **1** mark

1. State first law of thermodynamics.
2. For an equilibrium reaction, the forward reaction is exothermic. Discuss the effect of temperature in such reactions.
3. Discuss the Arrhenius concept of Acids and bases.
4. What are conventional solar cells?
5. Define Ignition Point.
6. What is the difference between LPG and LNG?
7. What is cracking in petroleum?

P.T.O.

8. Write the name of the ore of (a) titanium and (b) cobalt.
9. Sodium acetate solution in water is slightly basic. Why?
10. What is the principle of distillation?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions from the following. **Each** question carries **2** marks.

11. What is the enthalpy of the formation? What will be the standard enthalpy of a pure element?
12. Write Kirchoff's equation in thermodynamics. What are its applications.
13. Compare the bond energies of single, double and triple bonds.
14. Explain the smelting process.
15. Explain the term degree of hydrolysis.
16. Explain Van Arkel Process.
17. State and explain the Lewis theory of acids and bases.
18. A solution of acetic acid ($pK_a = 4.75$) has a pH of 6.75. Find the ratio of acid to its conjugate base.
19. Why LPG is commonly used for domestic purposes when compared with CNG?
20. Explain the photosynthesis process.
21. Classify the petroleum product based on carbon range.
22. Discuss the use of hydrogen as fuel.



(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions from the following. **Each** question carries **4** marks.

23. Discuss the common methods used for the preparation of metal from concentrated ore.
24. How coal is classified according to its carbon content?
25. What are buffer solutions? How they are classified? Give their applications.
26. Discuss the metallurgy of thorium.
27. Write a short note on nanostructured solar cells.
28. Why solar energy and its harvesting became more important?
29. Explain briefly the bond energies and bond dissociation energies.
30. Write a short note on the usage and depletion of petroleum products.
31. Explain the term metallurgy and what are its general principles.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions from the following. **Each** question carries **15** marks.

32. (a) Derive the relationship between the equilibrium constant and Gibbs free energy.
- (b) Explain briefly on Pearson HSAB principle.
- (c) Derive the relationship between K_p and K_c .

(5+5+5)



33. (a) What is the enthalpy change of reaction for the reaction between chlorine and ethane that produces chloroethane and hydrogen chloride gases?
Given

Bond	Enthalpy (kJ/mol)
C-H	413
C-C	347
Cl-Cl	239
H-Cl	427
C-Cl	339

- (b) Explain the enthalpy of (i) neutralization (ii) solution, and (iii) hydration. (6+9)
34. (a) Discuss the principle behind Electrometallurgy.
(b) Write a short notes on the preparation of (i) aluminium and (ii) sodium.
(5+10)
35. Derive the relationships between K_h and K_w for salts of (a) strong acid – strong base, and (b) Strong acid - weak base.

(2 × 15 = 30 Marks)

