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Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, APRIL 2021

Sixth Semester

Core Course—EQUILIBRIUM AND KINETICS

(Common for B.Sc. Chemistry Model I, Model II, B.Sc. Petrochemicals,
B.Sc. Chemistry Environment and Water Management)

[2013 – 2016 Admissions]

Time : Three Hours

Maximum Marks : 60

Part A

Answer all questions.

Each question carries 1 mark.

1. What is an intensive property? Give one example.
2. State third law of thermodynamics.
3. Define chemical potential.
4. What is meant by deliquescence?
5. What is congruent melting point?
6. Write down Arrhenius equation.
7. Define the term chemical equilibrium.
8. Explain the term homogeneous catalysis.

(8 × 1 = 8)

Part B

Answer any six questions.

Each question carries 2 marks.

9. Differentiate between Irreversible process and Reversible process.
10. Derive an expression for the work done by an ideal gas in a reversible isothermal expansion.
11. What is the physical significance of entropy?
12. What are the factors that effect the value of equilibrium constant?
13. What is Pattinson's process?
14. Explain the term simple eutectic.
15. How much useful work can be done by a carnots engine that works between 300 K and 550 K if the heat supplied is 1600 KJ.

Turn over

16. Obtain the equation for finding rate constant of a first order reaction.
17. Illustrate the term opposing reaction with a suitable example.
18. Explain Autocatalysis.

(6 × 2 = 12)

Part C

*Answer any **four** questions.*

Each question carries 4 marks.

19. Derive the relation between C_p and C_v .
20. Derive Gibbs-Datum equation.
21. Discuss the phase diagram of water system.
22. Obtain the relation between K_p and K_c .
23. Give an account of transition state theory.
24. K for a second order reaction has a value of $5.7 \times 10^{-5} \text{ L mol}^{-1} \text{ s}^{-1}$ at 298 K and value of $1.64 \times 10^{-4} \text{ L mol}^{-1} \text{ s}^{-1}$ at 313 K. Calculate Arrhenius parameters.

(4 × 4 = 16)

Part D

*Answer any **two** questions.*

Each question carries 12 marks.

25. (a) Derive Clausius-Clayperon equation for Liquid-vapour equilibrium.
(b) What are its applications?
26. Derive Vont Hoff reaction isotherm.
27. Draw and discuss the phase diagram for sodium sulphate-water system.
28. (a) What is meant by chain reaction?
(b) Use the concept of steady state approximation in HBr reaction.

(2 × 12 = 24)