E 5840 (Pages : 2) Reg. No.............................

Name...............................

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2017

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 Admission onwards]

Time : Three Hours
Maximum Marks : 60

Part A

Answer all the eight questions.
Each question carries 1 mark.

1. Write the relation between C_p and C_v.

2. What is inversion temperature?

3. Define chemical potential.

4. Write the relation between K_p and K_c.

5. Write an example of simple eutectic system.

6. Give the reduced phase rule.

7. Write Michaelis-Menten equation.

8. Write the rate law for the first order reaction.

$(8 \times 1 = 8)$

Part B

Answer any six questions.
Each question carries 2 marks.

9. Differentiate between reversible and irreversible process.

10. State and explain first law of thermodynamics.

11. Entropy is regarded as a measure of disorder of the system. Justify.

12. Calculate the efficiency of a Carnot engine operating between 300 K and 500 K.

13. Sketch and label the phase diagram of sulphur system.

14. Discuss the application of phase rule to desilverisation of lead.

15. Explain, why the hydrolysis of an ester in the presence of dilute acid follows first order kinetics.

Turn over

16. At 25° C the half-life of decomposition of N_2O_3 is 5.7 hour and is independent of the initial pressure of N_2O_5. Calculate rate constant.

17. Write a note on steady state treatment.

18. 10 moles of an ideal gas are expanded from 3 dm^3 to 18 dm^3 isothermally at 450 K. Calculate the entropy change of the system.

$(6 \times 2 = 12)$

Part C

Answer any four questions.

Each question carries 4 marks.

19. Explain Joule-Thomson experiment and define Joule-Thomson co-efficient.

20. Describe the phase diagram of acetic acid water-chloroform system.

21. State third law of thermodynamics. Explain its significance.

22. Derive Gibbs-Duhem equation.

23. Explain Collision theory.

24. Describe any *two* methods used to determine the order of a reaction.

$(4 \times 4 = 16)$

Part D

Answer any two questions.

Each question carries 12 marks.

25. Compare the phase diagram of ferric chloride - water system and sodium sulphate - water system.

26. What is meant by heterogenous catalysis? Explain unimolecular and bimolecular surface reactions.

27. (a) State Carnot's theorem.

    (b) Derive the expression for the efficiency of a Carnot engine.

28. Derive Clausius-Clapeyron equation.

$(2 \times 12 = 24)$