LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **CHEMISTRY**

THIRD SEMESTER – **NOVEMBER 2012**

# CH 3504/3500 - THERMODYNAMICS

 Date : 15/11/2012 Dept. No. Max. : 100 Marks

 Time : 9:00 - 12:00

**PART – A**

**Answer ALL questions: (10 x 2 = 20 marks)**

1. Define isothermal and isobaric processes.

2. Define the adiabatic process.

3. What is meant by calorific value?

4. Define heat of transition.

5. What is the need for the second law of thermodynamics?

6. Define the term efficiency of an engine.

7. State the law of mass action.

8. What is a homogenous mixture?

9. Give the Van’t Hoffs isotherm. Explain the terms.

10. What are the exceptions to third law of thermodynamics?

**PART – B**

**Answer any EIGHT questions: (8 x 5 = 40 marks)**

11. Derive Vander Walls equation of state.

12. Compare Wrev and Wirrev.for an isothermal process.

13. Derive the Kirchoff’s equation.Give its application.

14. State Hess’s law of constant heat of summation and explain its application.

15. For a certain gas Cp = 8.58. J mol-1 Two moles of the gas are expanded adiabatically from an initial

 temperature of 20oC to a final temperature of -45.4oC. Calculate the work done.

16. Explain the method for the determination of enthalpy of combustion.

17. Explain the thermodynamic principle of the working of refrigerator.

18. Derive the equation for the entropy of mixing of gases at constant temperature.

19. Derive the relationship between Kp and Kc.

20. Derive Van’t Hoffs isochore.

21. Discuss the dissociation of ammonia by applying Le-chatlier principle.

22. Explain the Nernst heat theorem.

**PART – C**

**Answer ANY FOUR questions: (4 x 10 = 40 marks)**

23. a) Explain the postulates of the kinetic theory of gases. (5)

 b) Discuss Joule Thompson effect. (5)

 24. a) Discuss the thermodynamics of Carnot cycle. (5)

 b) Explain the bond energy. (5)

25. a) Derive Gibbs Helmholtz equation. (5)

 b) Discuss the criteria for spontaneous process. (5)

26. a) Explain the properties of equilibrium constant. (5)

 b) Calculate the equilibrium constant for a equilibrium reaction at 310K

 whose ΔGo value at this temperature is 30 kJ mol-1. (5)

27. a) Apply law of mass action for the formation of HI. (5)

 b) Explain the factors which alter the state of equilibrium for the above

 reaction. (5)

28. a) Explain Lewis Randall formulation of third law. (5)

 b) How will you determine the absolute entropy of oxygen gas? (5)

**$$$$$$$**