



B.Sc. DEGREE EXAMINATION – CHEMISTRY

SECOND SEMESTER – **APRIL 2019**

CH 2507– THERMODYNAMICS

Date: 10-04-2019
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

Part-A

Answer **ALL** the questions:

(10 x2 = 20)

1. State the Ist law of Thermodynamics.
2. What are state functions?
3. What is Inversion temperature?
4. Define Bond energy.
5. What is heat of transition?
6. Mention the limitations of I law of Thermodynamics.
7. Show that $dG = VdP - SdT$.
8. State Lechatlier principle.
9. Mention the importance of Hess's law of constant heat of summation.
10. State III law of Thermodynamics

Part-B

Answer any **EIGHT** questions:

(8 x5 = 40)

11. Give the postulates of kinetic theory of gases.
12. Give the differences between Isothermal and Adiabatic process.
13. What is Joule Thomson effect? Give its significance.
14. How will you determine Calorific value using Bomb Calorimeter?
15. Explain the terms (i) Heat of hydration. (ii) Heat of solution.
16. Discuss the working of Refrigerator
17. Heat supplied to Carnot engine is 1897.8 kJ. How much useful work can be done by the engine which works between 0°C and 100°C?

18. Discuss the Criteria for spontaneity.
19. Derive vant'hoff isotherm.
20. Discuss the dissociation of N_2O_4 .
21. Calculate the standard free energy of formation of $H_2O(l)$. The standard enthalpy of formation of ($H^{\circ}f$) of $H_2O(l)$ is $-286.2kJ$ and standard entropies of $H_2(g), O_2(g)$ and $H_2O(l)$ are $130.60, 205.01$ and $70.29 JK^{-1}mol^{-1}$ respectively.
22. Give the exceptions of III law of Thermodynamics.

Part-C

Answer any **FOUR** questions:

(4 x10 =40)

- 23.(a) Derive vanderWaal's equation of state. (7)
- (b) What are exact differentials? (3)
24. Derive the relationship between C_p and C_v . (10)
- 25.(a) Discuss the applications of Bond energy. (8)
- (b) What are standard states? (2)
- 26.(a) Derive an expression to calculate the efficiency of heat engine using Carnot's cycle. (6)
- (b) Derive Gibb's –Helmholtz equation (4)
27. Give the applications of Lechatlier principle.
- 28.(a) Derive an expression to explain the equilibrium constant. (5)
- (b) Explain Nernst Heat theorem. (5)

