20100426

QP CODE: 20100426

Reg No : .....

Name : .....

BSc DEGREE (CBCS) EXAMINATION, MARCH 2020

Sixth Semester

Core course - CH6CRT11 - PHYSICAL CHEMISTRY - III

B.Sc Chemistry Model I,B.Sc Chemistry Model III Petrochemicals,B.Sc Chemistry Model II Industrial Chemistry

2017 Admission Onwards

A2BA4183

Time: 3 Hours Marks: 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. What is an intensive property? Give an example.
2. What is meant by internal energy? Is it possible to find its absolute value.
3. When does the Joule-Thomson coefficient become zero in the adiabatic expansion of a gas through a small orifice?
4. What is Carnot's theorem ?
5. State the third law of thermodynamics.
6. Give the conjugate bases of the following: (a) H2SO4; (b) HCO-3.
7. Give an example each for acidic and basic buffers.
8. State the phase rule. Give the mathematical representation of phase rule.
9. What is a condensed system?
10. Explain chain reactions and parallel reactions with a suitable example.
11. Give an example each to illustrate (i) opposing reactions, (ii) parallel reactions and (iii) consecutive reactions.
12. Give the Michaelis-Menten equation and explain the terms.

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Show that Cp-Cv = R for one mole of an ideal gas.
14. Derive an expression for the maximum work obtainable from the isothermal expansion of n moles of perfect gas.
15. Explain why internal energy is a state function while work is not.
16. Why was there a need for introduction to second law of thermodynamics? Illustrate with a suitable example.
17. Find the change in free energy when the system undergoes reversible change of pressure as well as temperature.
18. The $\Delta H°$ and $\Delta G°$ at 298 K for the reaction $NO(g) + ½\ O_2\ (g) \rightleftharpoons NO_2(g)$ are -56.48 kJ mol^{-1} and -34.85 kJ mol^{-1} respectively. Calculate the Kp values at 298 K and 598 K.
19. Calculate the pH of a mixture containing 0.01 M acetic acid and 0.03 M sodium acetate solutions. pKa of acetic acid = 4.8.
20. Write a short note on hydrolysis of salts.
21. Derive Arrhenius equation and explain its significance.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Define standard enthalpy of formation. Taking a suitable example, prove that the standard enthalpy of a compound is equal to its standard enthalpy of formation.
23. Find the entropy of mixing of non reacting gases at different conditions of T and P.
24. Discuss the phase diagram of ferric chloride-water system
25. Explain the significance of Eyring equation in the activated complex theory in relating the thermodynamic parameters of activation.

(2×10=20)