QP CODE: 22100916

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Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, APRIL 2022

Sixth Semester

CORE COURSE - CH6CRT11 - PHYSICAL CHEMISTRY - III

Common for B.Sc Chemistry Model I, B.Sc Chemistry Model II Industrial Chemistry & B.Sc Chemistry Model III Petrochemicals

2017 Admission Onwards

248BB378

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. What is an intensive property? Give an example.
2. Define path function. Give an example.
3. What happens to the internal energy of a system if (a) work is done on the system and (b) work is done by the system?
4. Explain how thermodynamic scale of temperature was developed?
5. Explain giving reasons the efficiency of a steam engine can be increased by superheated steam.
6. What is meant by a Bronsted base ?
7. Distinguish between the terms average rate and instantaneous rate for a reaction.
8. All four phases of sulphur cannot coexist in equilibrium under any condition. Why?
9. What is meant by congruent melting point? Give an example of a binary condensed system involving formation of a compound with congruent melting point.
10. Derive Arrhenius equation and explain its significance.
11. What is meant by activated complex?
12. Give an example each to illustrate (i) opposing reactions (ii) parallel reactions and (iii) consecutive reactions.

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. How can maximum amount of the work during isothermal expansion of a gas be obtained?

14. What is Joule - Thomson effect? Justify that during this process, enthalpy of the system remains constant.

15. 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.

16. Explain the entropy criteria for reversible and irreversible processes.

17. Derive thermodynamically the relationships $\Delta G = RT \ln(P_2/P_1) = RT \ln (V_1/V_2)$

18. Calculate Kp for the reaction: $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$, at 298 K given that the standard free energy of formation of SO_2 and SO_3 are respectively -71.79 and -88.52 kcal mol^{-1}.

19. Explain the buffer action of ammonium acetate.

20. Obtain a relationship between the degree of hydrolysis of a salt of a strong acid and a weak base and its hydrolysis constant.

21. Explain the mechanism of enzyme catalysis

(6×5=30)

Part C

*Answer any **two** questions.*

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

22. Explain the term Heat capacity. Derive the expression for heat capacity at constant volume and that at constant pressure. Derive the relationship between them.

23. Explain the third law of thermodynamics and its applications.

24. Discuss the phase diagram of a simple eutectic sytstem with reference to lead-silver system. Explain its relevance with the pattinson's process.

25. Explain the significance of Eyring equation in the activated complex theory in relating the thermodynamic parameters of activation.

(2×10=20)