QP CODE: 20100426

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

EBDD0449

Time: 3 Hours Marks: 60

Part A

*Answer any **ten** questions.*

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

1. Define an isolated system. Give an example.
2. Define isobaric process and isochoric process.
3. Give the relationship between the internal energy change and enthalpy change in a process.
4. Why thermodynamic scale of temperature is considered more basic than the ideal or perfect gas scale of temperature?
5. What is meant by residual entropy?
6. What character does HNO3 show when it is dissolved in anhydrous HF ?
7. Define ionic product of water. What is its value at 298 K.
8. What is metastable equilibrium?
9. Explain the term 'incongruent melting point'.
10. Explain the influence of temperature on reaction rate on the basis of collision theory.
11. Define activation energy of a reaction.
12. What is meant by a catalytic poison?

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. Show that maximum work is produced in a reversible isothermal expansion of a gas.
14. What is Joule - Thomson effect? Derive that Joule - Thomson coefficient.
15. Derive relationship between heat of reaction at constant pressure and that at constant volume.
16. Explain how entropy changes take place in a reversible process and in an irreversible process. What do you conclude about the entropy change of universe?
17. 1 Calculate the change in the energy for 2 moles of H_2 warmed at constant volume from 25^oC to 50^oC. Given that for the gas near room temperature C_V is constant and is about 5 cal/deg.
18. The equilibrium constant Kp for a reaction is 3.0 at 673 K and 4.0 at 773 K. Calculate the value of ΔH^0 for the reaction.
19. Derive the Henderson's equation for the pH of an acidic buffer.
20. Derive an expression for the hydrolysis constant of a salt of weak acid and a strong base.
21. Explain chain reactions and parallel reactions with a suitable example.

(6×5=30)

Part C

*Answer any **two** questions.*

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

22. Derive expressions for w, q, ΔU and ΔH when an ideal gas undergoes (a) isothermal reversible expansion, and (b) isothermal irreversible expansion.
23. Describe the Carnot 's cycle and derive an expression for the efficiency of a heat engine.
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. Discuss the Lindemann theory of unimolecular reactions with special reference to the use of steady state approximation.

(2×10=20)