DHANALAKSHMI SRINIVASAN COLLEGE
OF ARTS & SCIENCE FOR WOMEN
(AUTONOMOUS)
(For Candidates admitted from 2019-2020 onwards)

PG DEGREE EXAMINATIONS APRIL - 2021

M.Sc., - CHEMISTRY

PHYSICAL CHEMISTRY- II

Time: 3 Hrs   Max.Marks: 75

PART - A

CHOOSE THE CORRECT ANSWER   (10X1=10)

1. The ground state energy of helium atom according to variation the theorem is
   a) -77.48 eV   b) -110.28 eV   c) -2.32 au   d) -3.12 au

2. The term symbols for 2p1 electron are
   a) 2p1, 2p1/2   b) 2p1/2, 2p3/2   c) 2p3/2, 2p1   d) 2p1/2, 2p2

3. The transference number of an ion
   a) is always positive   b) is always negative
   c) can be positive as well as negative   d) is always zero

4. Variation of molar conductivity with concentration of strong electrolyte is given by Huckel-Onsager equation expressed as
   a) $\wedge_M = \wedge_\alpha - b\sqrt{c}$ b) $\wedge_\alpha = \wedge_M - b\sqrt{c}$ c) $\wedge_M = b\sqrt{c} - \wedge_\alpha$ d) None of these

5. Which of the following is an example of homogeneous catalysis?
   a) Enzyme catalysis   b) Hardening of animal and vegetable oils
   c) Herber's process   d) Cracking of heavy oils for a synthesis of gasoline

6. The rate determining step of Michaelis-Menten kinetics is
   a) The Complex formation step   b) The product formation step
   c) The complex dissociation step to produce products   d) None of the above

7. For an idea gas the free energy of mixing is given by
   a) $\Delta G_{mix} = \Sigma \chi_i \ln \chi_i / RT$ b) $\Delta G_{mix} = \Sigma \chi_i \ln \chi_i - RT$
   c) $\Delta G_{mix} = \Sigma \chi_i \ln \chi_i + RT$ d) $\Delta G_{mix} = RT \Sigma \chi_i \ln \chi^i$

8. The total vapour pressure of an ideal gas is given by
   a) $P = x_i / p_i$ b) $P = x_i + p_i$ c) $P = \Sigma p_i$ d) $P = x_i - p_i$

9. What is Miller indics of a plane which makes intercepts 2a, 3b, 2c?
   a) 2 : 3 : 2   b) 3 : 2 : 3   c) 2 : 2 : 3   d) 3 : 2 : 2

10. The total number of space group in a crystal is
    a) 7   b) 14   c) 32   d) 230

PART- B

ANSWER ALL THE QUESTIONS   (5X7=35)

11. a) Write short notes on slater type orbitals.

(OR)

b) Discuss Hellman-Feynman theorem.

12. a) What is Debye-Huckel theory.

(OR)

b) Discuss about Evans diagrams.

13. a) Discuss ultrasonic absorption techniques.

(OR)

b) Write notes on Langmuir-Hinshelwood mechanism.

14. a) Write short notes on Maxwell relations.

(OR)

b) Discuss the free energy change of mixing.

15. a) Explain the Braggs law.

(OR)

b) Write short notes on phase problem.

PART-C

ANSWER ANY THREE QUESTIONS   (3X10=30)

16.   (i) Explain the LACO-MO.

(ii) Write notes on selection rule.

17. Derive Butler-Volmer equation.

18.   (i) What is meant by homogeneous catalysis.

(ii) Explain the Michaelis-Menten kinetics

19. Derive Clausius-Clapeyron equation

20. Write short notes on:

        (i) Miller Indices   (ii) Laue equation

        (iii) Fourier Transform   (iv) space groups