

(6 pages)

Reg. No. :

Code No. : 20320 E Sub. Code : CMCH 31

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL, 2025.

Third Semester

Chemistry – Core

PHYSICAL CHEMISTRY – I

(For those who joined in July 2021 and 2022 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer

- The volume of an ideal gas is
(a) zero (b) 3
(c) 1 (d) 22.41 L/mol
- The SI unit of coefficient of viscosity of the liquid is
(a) Kgm^{-1} (b) Kgms
(c) $\text{Kgm}^{-1}\text{s}^{-1}$ (d) Kgms^{-1}
- Raoult's law equation is
(a) $P_{\text{solution}} = X_{\text{solvent}} \cdot P^{\circ}_{\text{solvent}}$
(b) $P_{\text{solution}} = X^{\circ}_{\text{solvent}} \cdot P^{\circ}_{\text{solvent}}$
(c) $P_{\text{solution}} = X_{\text{solution}} \cdot P_{\text{solution}}$
(d) $P^{\circ}_{\text{solution}} = X^{\circ}_{\text{solution}} \cdot P^{\circ}_{\text{solution}}$
- The liquids with high vapour pressure have
(a) higher boiling point
(b) lower boiling point
(c) higher freezing point
(d) lower freezing point
- The three dimensional network of imaginary lines connecting atoms is called as
(a) unit cell (b) space lattice
(c) lattice point (d) lattice energy
- It is a point defect which is caused by a vacant position that is generated in a crystal lattice due to the atoms or ions moving out from the interior
(a) Schottky defect (b) Frenkel defect
(c) Metallic crystal (d) Miller indices

7. The difference between two actual atomic mass and the predicted mass is known as
(a) mass defect (b) nuclear stability
(c) average life period (d) half life period
8. Which of the following is not an magic number
(a) 2 (b) 8
(c) 20 (d) 81
9. Which one of the following stops sight offer the source of excitatory radiation is switched off?
(a) Phosphorescence
(b) Chemi luminescence
(c) Fluorescence
(d) Photo sensitization
10. It is a process of initiating a reaction through the use of a substance capable of absorbing right and transferring the energy to the desired reactants
(a) Phosphorescence
(b) Photo sensitization
(c) Fluorescence
(d) Chemi luminescence

Page 3 Code No. : 20320 E

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) List out the postulates of kinetic theory of gases.
Or
(b) Discuss on the types of molecular velocity.
12. (a) Explain : Effect of vapour pressure on boiling point.
Or
(b) Write a note on fractional distillation.
13. (a) Device Bragg's equation.
Or
(b) Explain : Energy band theory of insulators.
14. (a) Explain : Shell model.
Or
(b) Discuss on C¹⁴ dating.

Page 4 Code No. : 20320 E
[P.T.O.]

15. (a) Explain : Kinetics of decomposition of hydrogen iodide.

Or

(b) Discuss on quantum yield of photo chemical reaction.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) (i) Describe on the deviation from ideal gases. (6)

(ii) Define Collision frequency. (2)

Or

(b) (i) Explain : Molecular basics of heat capacity. (6)

(ii) Define : Compressibility factor. (2)

17. (a) (i) Derive Gibbs – Duhem - Margules equation. (6)

(ii) Define : Non-ideal solution. (2)

Or

(a) (i) Explain : Azeotropic distillation. (5)

(ii) Write a note on ideal solution. (3)

Page 5 Code No. : 20320 E

18. (a) Define space lattice, unit cell, lattice energy, interfacial angles.

Or

(b) Explain :

(i) Energy band theory of semi-conductors. (6)

(ii) Write a note on Frenkel defects.

19. (a) Discuss on nuclear fission and nuclear fusion.

Or

(b) Explain : Nuclear reactors.

20. (a) Discuss on photo sensitization and its importance. (8)

Or

(b) (i) How will you determine the quantum yield. (5)

(ii) Write a note on fluorescence. (3)

Page 6 Code No. : 20320 E