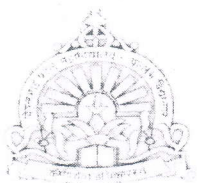
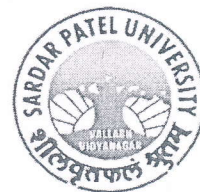


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VALLABH VIDYANAGAR-388120



B. Sc. SEMESTER – III INTERNAL EXAMINATION
US03MACHE02 – Physical Chemistry

24/09/2025, Wednesday
Time: 2:45 pm to 4:45 pm

Total Marks : 30

Note: Figures to the right indicate marks of the question.

Q.-1 Write the most appropriate answer from the following multiple-choice questions. [06]

- 1 For an ideal gas, the value of compressibility factor (Z) is
(a) $Z=0$ (b) $Z=1$ (c) $Z < 1$ (d) $Z > 1$
- 2 Which of the following gas is most easily liquefiable and shows maximum deviation from ideality?
(a) CO_2 (b) NO_2 (c) H_2 (d) He
- 3 If the reaction is carried out at constant pressure heat released or absorbed is equal to
(a) ΔE (b) zero (c) one (d) ΔH
- 4 The Freezing point of 1% solution of lead nitrate in water will be
(a) 0°C (b) 1°C (c) 2°C (d) below 0°C
- 5 The ratio of number of moles of a constituent and the total number of moles present in a mixture is called.....
(a) mole fraction (b) molality (c) molarity (d) normality
- 6 The degree of dissociation $\alpha = \dots\dots$
(a) Λ_c / Λ_m (b) Λ^0 / Λ (c) Λ / Λ^0 (d) Λ_m / Λ_c

Q.-2 Define Critical temperature and Calculate the excluded volume per molecule. [06]

OR

Q.-2 State the main Postulates of Kinetic molecules theory of gases. [06]

Q.-3 Justify "The work done on a simple mechanical system is equal to the change in its energy." [06]

OR

Q.-3 The standard heat of formation of gaseous NH_3 is -11.02 Kcal/mole at 298K and constant pressure, Heat capacities of gaseous N_2 , H_2 and NH_3 are respectively 6.96, 6.89 and 8.38 cal/deg.moles. Calculate the ΔH_{398}^0 and ΔH_{773}^0 for the reaction. [06]

Q.-4 Derive the equation relating depression in freezing point and concentration of non-volatile solute. [06]

OR

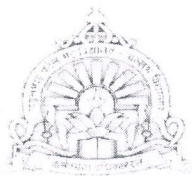
Q.-4 Derive the equation relating lowering of vapour pressure and concentration of non-volatile solute. [06]

Q.-5 What is electrolysis? Explain electrolysis of HCl solution by considering three compartments [06]

OR

Q.-5 Explain Van't Hoff Factor. Derive the relation between Van't Hoff Factor and degree of dissociation. [06]





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Bachelor of Science (Semester III) Quiz - 2025
US03MACHE02 – Physical Chemistry

24/09/2025, Wednesday

Time: 20 minutes

Total marks :15

Q-1 Fill in the blanks with the appropriate answer given in the bracket. (08)

- The excluded volume per molecules is ($4 \times \frac{4}{3} \pi r^3 / 4 \times \frac{4}{3} \pi r^2$)
- Sulphur dioxide can be liquefied at if pressure is 1atm. ($-8^\circ\text{C} / -8^\circ\text{F}$)
- From Kirchhoff's equation factors affects the heat of reaction. (Volume / Temperature)
- If reaction is carried out of a constant volume heat absorbed is equal to ($\Delta E / \Delta H$)
- "The relative lowering of vapour pressure is equal to the mole fraction of the non-volatile solute."
This is the statement of (Raoult's law / Henry's law)
- has the minimum freezing point. (1molal CaCl_2 solution / 1molal NaCl solution)
- The unit of conductance is ($\Omega^{-1} \text{ m}^{-1}$ / Siemens)
- If for a solution of an electrolyte, t_- is the transference number of the anion then the transference number of cation is equal to ($1 + t_- / 1 - t_-$)

Q-2 State whether the following statement is true or false. [Tick mark in the box] (07)

- The Boyle temperature is same for different gases. ()
- Mass is not an intensive property. ()
- An isobaric process $dP=0$. ()
- The colligative properties of dilute solutions depend on the no. of particles of the solute. ()
- Static method is used to measure the Vapour pressure Lowering. ()
- Molal conductance of an electrolyte increases with increase in dilution. ()
- Activity is the ratio of activity coefficient to the concentration. ()

