

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION

SUMMER SEMESTER, 2018-2019

DURATION: 1 Hours 30 Minutes

FULL MARKS:75

Chem 4241: Chemistry**Programmable calculators are not allowed. Do not write anything on the question paper.**There are **4 (four)** questions. Answer any **3 (three)** of them. Figures in the right margin indicate marks.

1. a) Define Colligative properties. Why are they so called? Name them. 6
b) Deduce an expression relating the molecular weight of a solute with the lowering of vapour pressure of a dilute solution. Define vapour pressure and boiling point 10
c) Suppose 36.4 gm urea is dissolved in 200gm of water at 50°C. The lowering of vapour pressure is 15mm of Hg. Calculate the molecular weight (MW) of urea when the vapour pressure of water at 50°C is 92mm of Hg. 9
2. a) State and discuss Henry's law in the dissolution of gases in liquids. Show the effect of temperature on dissolution of gases in liquid through equation. 8
b) Show the importance of Critical Solution Temperature (CST) in the dissolution of liquid in liquid. Draw and explain CST diagram of Triethylamine- water system. 9
c) Determine the molarity (m) of a solution containing 86.53g of Na₂CO₃ per litre of the solution in water at 20°C. The density of the solution at this temperature is 1.0816gm.ml. Calculate also the molality (m) of the solution. 8
3. a) What are the fundamental particles of an atom? Briefly describe them. 6
b) Discuss Bohr's theory of hydrogen atom. What modifications were proposed by Sommerfeld and why? 10
c) Derive the equation for calculating the Energy of electron in the orbit of hydrogen atom and calculate energy of the electron in the 4th Orbit. 9
4. Write short notes on the following (any four): 4x6.5
 - a) Henry's law
 - b) AUFBAU principle
 - c) Hybridization
 - d) Boiling Point and Vapour Pressure
 - e) Isotopes and Isobars