ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION SUMMER SEMESTER, 2015-2016

DURATION: 1 Hour 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.

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a) Define and classify solutions. Name the units of concentration and define Molarity(M) and Normality(N) with examples. 2+2+5

b) What is critical solution temperature (CST)? Draw and explain the CST diagram for the phenol-water system. 3+7

c) 20gm of NaCl (MW=58.5) is dissolved in 100mL of water. Find the molarity(M) and molality(m) of the solution. The density of the solution is equal to 1.06gm/mL 6

a) What are the fundamental particles of an atom? Describe them in brief. 6

b) Discuss Bohr's theory of hydrogen atom. Derive an equation to find out the radius of orbits in a hydrogen atom. 4+8

c) Derive De Broglie's equation and explain the dual nature of electrons. 7

Write short notes on the followings: 5×5

a) Effect of temperature on dissolution of gases in liquid.

b) Quantum Number.

c) AUFBAU principle.

d) Rate Constant and Order of a reaction.

e) Sommerfeld's modification.

a) Derive a relationship between elevation of boiling point solvent and molecular weight of the dissolved non-electrolyte solute in the solvent 12

b) Explain why the boiling point of a liquid rises when a non-electrolyte solute is dissolved in it and the dissolution of solids in liquids is usually endothermic. 6

c) The vapour pressure of ether at 250C is 445mm of Hg. When 6.5gm of a solute "X" is dissolved in 50gm ether (MW=74) , the vapour pressure of the solution becomes 410mm of Hg. What is the molecular weight(MW) of "X" ? 7