B.Sc. Engg. / HD CSE 2nd Semester — 25 August 2017 (Morning)

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

MID SEMESTER EXAMINATION — **SUMMER SEMESTER, 2016-2017**

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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1. a) Explain the terms Order, Molecularity, Rate and Rate constant of a reaction with examples. — 8
   b) Derive the integrated kinetic equation for a first order reaction A----------→P and prove that a first order reaction is never complete. — 8+3
   c) The half-life period for a first order reaction is 69.3min at 27^0C and 34.7min at 37^0C. Find out the energy of activation (Ea) of the reaction. — 6

2. a) What do you understand by 'equilibrium constant'? Derive relationship between Kp and Kc for a gaseous reaction at equilibrium. — 10
   b) Show how the change of pressure and temperature affect a gaseous reaction according to LeChatelier principle with examples. — 8
   c) At 60°C and total pressure of 1atm 1 mole $N_2O_4(g)$ is dissociated 50% into two moles $NO_2(g)$. Calculate the value of Kp and Kc for the reaction. — 7

3. Write short notes on the followings: — 5×5
   a) Effect of temperature on dissolution of gases in liquid.
   b) Activation Energy.
   c) Molarity (M) and Normality (N).
   d) Critical solution temperature (CST).
   e) Henry's law and it's application.

4. a) What are Colligative properties? Why are they so called? What is an ideal solution? — 6
   b) Derive a relationship between lowering of vapour pressure of solvent and molecular weight of the dissolved non-electrolyte solute in the solvent — 12
   c) The vapour pressure of ether at 25^0C 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