



AUTUMN MID-SEMESTER EXAMINATION-2018

CHEMISTRY (CH-1007)

Time: 1.5 Hours

Full Marks: 20

Answer any FOUR questions including question No.1 which is compulsory.

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.

1. *Answer all questions of Q # 1*
- (a) What is the central idea of steady state approximation method? 1
- (b) Differentiate between poison and retarder. 1
- (c) For a reaction, the value of ΔH is 2 times that of ΔS . Predict the spontaneity of the reaction at 298 K. $\Delta S = 0.05$ KJ/mol. 1
- (d) 10 moles of an ideal gas are expanded from 10 lit to 50 lit. at 298K. Find the Gibb's free energy change for this process. 1
- (e) For a reaction $A \rightarrow P$; half life time ($t_{1/2}$) is 5 min when the concentration of reactant is 5 mol/lit. If the concentration of the reactant is increased to 50 mol/lit, $t_{1/2}$ remains same. Find the order of the reaction. 1
2. (a) Discuss Lindemann's time lag theory for unimolecular reactions. 2.5
- (b) Reaction rate increase with temperature- explain. 2.5
3. (a) 10 lit. of gas A is mixed with 20 lit. of gas B at NTP. Assuming the ideal behavior of the gases, calculate the entropy change in the process. 2.5
- (b) Vapor pressures of water at 100 °C and 110 °C are 750 mm and 850 mm of Hg respectively. Calculate the molar heat of vaporization of water between 100 °C and 110 °C. 2.5
4. (a) Show that the rate of an enzyme catalyzed reaction does not depend on the $[S]$, when K constant and "S" is substrate. 2.5
- (b) Slowest step is the rate determining step---Justify the statement based on the mechanism of a consecutive reaction. 2.5
5. (a) Deduce Gibb's-Duhem equation for chemical potential. 2.5
- (b) Free energy change for a given reaction is -90 KJ at 25 °C and -85 KJ at 35 °C. Calculate the change in enthalpy for the reaction at 30 °C. 2.5