BOWEN UNIVERSITY, IWO, OSUN STATE

FACULTY OF SCIENCE

DEPARTMENT OF CHEMISTRY AND INDUSTRIAL CHEMISTRY

2018/2019 SECOND SEMESTER EXAMINATION

Course code: ICH 110 Course Title: Introductory Industrial Chemistry I Credit: 2

Date: 01/06/2019 Time Allowed: 2 hours

Instructions: (a) Answer question ONE and any other two questions

(b) Start to answer each question on a fresh page

Question 1 carries 30 marks while questions 2, 3 and 4 carries 20 marks each.

Question 1

(a) Describe an Industrial Chemist with respect to his background training and role. **5 marks**

(b) Discuss major factors affecting chemical industries in Nigeria **5 marks**

(c) What are the stages in anatomy of chemical manufacturing plant? Highlight their significance **10 marks**

(d) Suppose that at different temperatures we start NO and Br_2 each at 0.50mol/L. The concentration of NOBr is found to be 0.14mol/L. What is the value of equilibrium constant, K_c at this temperature? **10 marks**

Question 2

(a) Briefly describe major categories of industrial chemicals with at least two examples. **6 marks**

(b) Why is it that silver and tungsten are not good catalysts? **4 marks**

(c) The rate constant K for the alkaline hydrolysis of ethyliodine was measured at various temperatures below:

T (°C)	15	30	60	90
$K \times 10^3 (dm^3mol^{-1}s^{-1})$	0.0507	0.335	5.13	11.9

Use the graphical method to calculate activation energy and the frequency factor/collision of the reaction.

Hint: Use Arrhenius equation to obtain (A & E_a) Take R = 8.314$Jmol^{-1}K^{-1}$ **10 marks**

Question 3

(a) Highlight major importance of chemical industries **5 marks**

(b) The solubility product of silver chloride at 25°C is $4.9\times 10^{-16} mol^2dm^{-6}$. Calculate the solubility of silver chloride in grams per liter in i. Water ii. 0.50$moldm^3$ HCl **5 marks**

(c) Calculate activation energy for the reaction: $C_2H_5I + OH^- \longrightarrow C_2H_5OH + I^-$ If $K = 2.83 \times 10^{-2}\ dm^3mol^{-1}s^{-1}$ at 290K and $K = 6.70\ dm^3mol^{-1}s^{-1}$ at 330K, hence what is the rate of constant at 300K? **8 marks**

(d) Differentiate between reversible and irreversible processes **2 marks**

Question 4

(a) Highlight major advantages of batch process over continuous process. **6 marks**

(b) With the aid of diagrams, describe steady and unsteady state operations of Continuous process **4 marks**

(c) With the aid of diagrams, describe various pattern of fluid flow **6 marks**

(d) Differentiate between adsorption and active sites in heterogeneous catalysis **4 marks**