



CRAWFORD UNIVERSITY
COLLEGE OF NATURAL AND APPLIED SCIENCES
DEPARTMENT OF INDUSTRIAL CHEMISTRY
HARMATTAN EXAMINATION 2024/2025

COURSE CODE: ICH 321

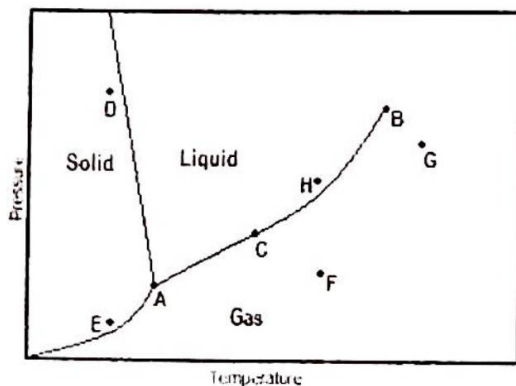
COURSE TITLE: APPLIED CHEMICAL THERMODYNAMICS AND KINETICS

UNITS: 3

TIME ALLOWED: 2 ½ HRS

DATE: FEBRUARY, 2025

INSTRUCTIONS: Answer Question 1 and any other three



1) Consider the one component phase diagram and answer the following questions:

(a) What are points A, B and C called on the phase diagram. (3 marks)

(b) What phase changes would occur when:

(i) Temperature is increased at points A, D, C, E, F and H

(ii) Pressure is reduced at points A, B, C, E and H

(iii) Pressure is increased at points A, C and G (7 marks)

(c) Calculate the degree of freedom at points A, B, C, D, E, F, G and H. (8 marks)

(d) Give one example each of a chemically distinct and physically distinct phase. (2 marks)

(e) Define the following: (i) Sublimation (ii) Critical point (iii) Triple point (iv) Fusion (4 marks)

2(a) Derive the rate law for relaxation time. (8 marks)

(b) List the possible methods of initiating a temperature jump (4 marks)

3(a) Explain the four colligative properties. (8 marks)

(b) Give the equation for two colligative properties. (4 marks)

4(a) State the four laws of thermodynamics (8 marks)

(b) Explain why salt is added to roads during winter (4 marks)

5(a) Write short notes on i) Autocatalysis ii) Heterogeneous catalysis iii) Homogeneous catalysis iv) Biocatalysis (8 marks)

(b) Write short notes on the limiting cases for consecutive reactions and sketch their respective rate curves (4 marks)

6 (a) Write short notes on the following (i) Zeroth order reactions (ii) First order reactions (iii) Second order reactions (iv) Unimolecular reactions (12 marks)