CRAWFORD UNIVERSITY
COLLLEGE OF NATURAL AND APPLIED SCIENCES
DEPARTMENT OF INDUSTRIAL CHEMISTRY.
SECOND TERM EXAMINATION 2021/2022.

COURSE TITLE: UNIT OPERATIONS **COURSE CODE : ICH 322**
UNITS: 2 **TIME ALLOWED: 2 HOURS**
DATE: April, 2022
INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS.

1a (i) what is distillation? (1 mark)
(ii) Differentiate between unit operation and unit process (2 marks)
b) Calculate the specific weight, density and specific gravity of one liter of a liquid which weighs 7N (3 marks)
ii) Schematically, describe the Operating Principles of distillation (7 marks)
iii) Differentiate between overhead and bottom product (2 marks)

2 (a) Distinguish between solid and fluid (2 marks)
b) Mechanics of fluid is extremely important in many areas of engineering and science: Discuss (8 marks)
c) Differentiate between the following terms: (i) fluid kinematics (ii) fluid dynamics (iii) fluid in motion (iv) fluid static (v) re-crystallization. (5 marks)

3(a) Explain five types of fluid (5 marks)
b) Calculate the dynamic viscosity of an oil, which is used for lubrication between a square plate of size 0.8m x 0.8m and an inclined plane with angle of inclination 30°.
Given: The weight of the square plate to be 300N, with velocity and thickness of 0.3m/s and 1.5mm respectively. (10 marks)

4a) what is viscosity? (2 marks)
(b) Differentiate between the below term as relate to fluid flows :(i) Laminar versus Tubulent flow (ii) compressible versus incompressible flow (iii) unforced versus forced flow (iv) Steady versus unsteady flow (8 marks)
(c) Write briefly on the below terms: (i) commination (ii) froth flotation (iii) liquid –liquid Extraction (iv) Frasch process (v) flotation process. (5 marks).

5(a). Define the term "industrial processes" (1 mark)
b) Discuss four (4) chemical processes that would yield important basic materials for the Society. (8 marks)
c) Calculate the surface tension in a soap bubble of 40mm diameter when the inside pressure is 2.5N/m2 above atmospheric pressure (6 marks)
6(a) What is mechanics? (1 mark)
b).write briefly on the following (i) hydrodynamic (ii) gas dynamic and (iii) aerodynamic (6 marks)
c). Fluids and their movement are essential for many of the processes which are fundamental to Chemical Engineering, Discuss (8 mark)

GOODLUCK