BOWEN UNIVERSITY, IWO, OSUN STATE
COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE
INDUSTRIAL CHEMISTRY PROGRAMME
2022/2023 SESSION B.SC DEGREE FIRST SEMESTER EXAMINATION

Course Code: CHM 303 **Courses Title:** Physical Chemistry Practical 2
Date: Thursday, 16/02/2023 **Credit Unit:** 1 **Time Allowed: 1h**
INSTRUCTION: ANSWER ALL QUESTIONS

QUESTION ONE (19 MARKS)

a. Consider the measurement of the viscosity of glycerol using the falling ball method. Given that the diameter of the ball obtained using a Vernier Caliper was 0.454 cm and its weight was 2.5 g. Fill in the values in the blank space in the Table.

Exp	Wt of empty cylinder g)	Wt of cylinder + glycerol (g)	Wt of glycerol (g)	Volume of glycerol cm^3	Density of glycerol (gcm^{-3})	Time taken to fall through the vessel (s)	Height of liquid cm
1	92.5	170.8		87.5		0.45	6.0
2	92.5	171.9		86.9		0.42	6.0

4 **marks**

b. Calculate
   i. the velocity of the metal. **3 marks**
   ii. The density of the metal **3 marks**

c. From the above Table, calculate
   i. The velocity of the free falling metal. **3 marks**
   ii. The density of glycerol **3 marks**
   iii. The fluidity of glycerol. **3 marks**

QUESTION TWO (12 MARKS)

a. What is the upper consolute temperature? **3 marks**
b. Which type of liquids are used in the experimental determination of the critical solution temperature **2 marks**
c. How many phase(s) is/are present below the lower critical solution temperature? **1 mark**
d. Explain the procedure for determining the critical solution temperature. **5 marks**
e. What can significantly affect the critical solution temperature? **1 mark**

QUESTION THREE (9 MARKS)

a. In an adsorption experiment involving acetic acid and charcoal,

i. why is it that the first 4 -5 ml of the filtrate are discarded? 2 **marks**

ii. Which indicator is used for this experiment? **1 mark**

b. Answer the questions below on the determination of the rate constant of a reaction between acetone and iodine.
the presence of mineral acid

i. Write the equation of the reaction. **2 marks**

ii. Why would you transfer the reaction of acetone and iodine into an ice–cooled water with some ice pieces? **1 mark**

iii. Why was sodium thiosulphate used for titration? **2 marks**

iv. Which indicator is used for this experiment? **1 mark**