UNIT – 404G2-P

5. a) Define 'quantum yield' of a reaction. State the reasons behind the low value of quantum yield of some reactions. 3

   b) Calculate the energy per mole of photon of light having wavelength of 850 Å. In what spectral region does the wavelength fall? 2

6. a) What is E-type delayed fluorescence? 2

   b) What is 'one Einstein'? 1

7. Explain the role of mercury vapour as photosensitizer on photochemical reactions involving molecular hydrogen. 2

BACHELOR OF SCIENCE EXAMINATION, 2022

(2nd Year, 2nd Semester)

CHEMISTRY

PAPER – GE/CHEM/TH/04

Time : Two hours Full Marks : 40

Use a separate answer script for each Unit.

UNIT – 404G1-P

1. a) Express the rate of the following reaction in terms of concentrations of reactants: $3B + 2C \rightarrow$ Products. Give the unit of rate. What will be the effect of temperature on the rate of the reaction? 1+1+1

   b) How can you determine order of a reaction using its half life periods ($t_{1/2}$) of a reaction becomes half when initial concentration of the reactant is doubled. Find the order of the reaction. 2+2

   c) i) Plot the concentration of A, B, C of the following consecutive reaction *vs.* reaction time at constant temperature. $A \rightarrow B \rightarrow C$

   ii) What do you mean by molecularity of a reaction?

   iii) How does the activation energy of a reaction change in presence of a catalyst? 2+1+2

2. a) Define conductivity (κ) and molar conductivity (Λ_m) of ionic solution. What are the units of them? Establish a relationship between them. 4

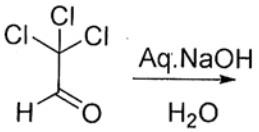
   b) What factors can influence the conductivity of an ionic solution and how? 4

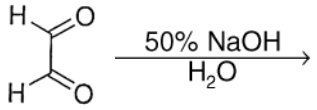
UNIT – 404G2-O

3. a) Predict the relative rate of hydrate formation of acetaldehyde, formaldehyde, and acetone – explain your answer. 2

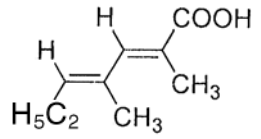
   b) Predict the product(s) with a mechanism when acetaldehyde is treated with excess formaldehyde in the presence of NaOH? 2

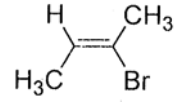
   c) Write the structure of the product for the following reactions. 1

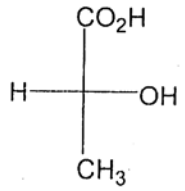
i) 

ii) 

4. a) Write the IUPAC nomenclature of the following compounds assigning proper stereochemical descriptor (R/S or E/Z) (Answer ***any two***). 1×2

i) 

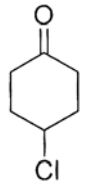
ii) 

iii) 

   b) A sample of the chiral molecule of limonene is 67% enantiopure. Calculate the percentage of each enantiomer present in the sample. 1

   c) Which one between acetic acid and 2-cyanoacetic acid is more acidic? Explain briefly. 1

   d) Determine which of the following compounds are chiral and which are achiral. Indicate each chiral centre with an asterisk (*), noting that more than one may be present in some examples. 1

i) 

ii)