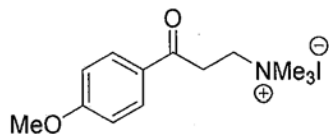
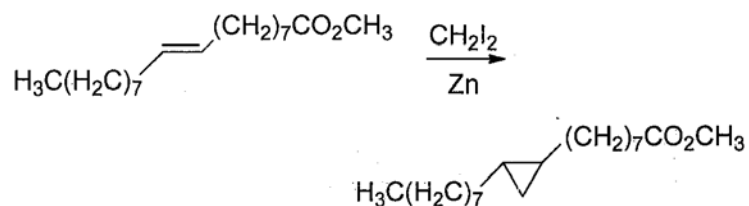


[4]

when the reaction mixture is irradiated with MW in the mixture of CHCl_3 and H_2O solvent an unsaturated carbonyl compounds is formed in good yields. Draw the structure of the product and how would you explain the above observations. $2\frac{1}{2}$



- b) How can you explain in the following reaction, ultrasound is more beneficial than conventional



Ultrasound: 91% yield, no exotherm, no iodine

Without Ultrasound: 51%, unpredictable exotherm, with iodine $2\frac{1}{2}$

- c) What is the greener alternative of perchloroethylene (PERC) solvent for dry cleaning of garments? Describe the working mechanism of it in dry cleaning industry? $2\frac{1}{2}$
- d) What are the drawbacks of PVC-back carpet? ECOWORKS carpeting is a cradle to cradle design – justify the statement. $2\frac{1}{2}$

Ex/SC/CHEM/UG/DSE/TH/02/2023

B. SC. CHEMISTRY EXAMINATION, 2023

(6th Semester)

CHEMISTRY (DSE)

PAPER: DSE/CHEM/TH/02

Time : Two Hours

Full Marks : 40

(20 marks for each unit)

(Use a separate answer script for each unit.)

UNIT : 6021-O

Answer *all* the questions.

1. a) Define the terms “pollution” and “sustainability”. $1+1$
- b) Illustrate with example what do you mean by “pictogram”. 2
- c) 4-Methoxyaniline and 4-hydroxybenzaldehyde reacts in refluxing benzene in the presence of a catalyst to produce the corresponding imine in 90% yield. Calculate the atom economy and comment on the greenness of this process. $2+2$
- d) Predict the product when ethylbenzene reacts with potassium permanganate adsorbed on moist neutral alumina. Highlight the green context of this protocol. Suggest a plausible mechanism to rationalize the experimental outcome. $\frac{1}{2} + 1\frac{1}{2} + 3$

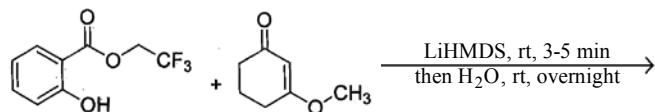
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[2]

- e) Aqueous solution of ferrous sulphate is oxidized to ferric sulfate in the absence of aerial oxygen when it is subjected to ultrasonic irradiation. Suggest a reason for the aforesaid observation. 3
- f) Benzaldehyde undergoes Baylis-Hillman reaction with methyl acrylate in [bmim]BF₄ when DABCO is used as a catalyst to give the product **A**. After scrupulous isolation of the unreacted reactants, catalyst and product **A**, the ionic liquid was subjected to the same reaction under identical condition to check the recyclability. The isolated yield of the product **A** was found to be increased. Moreover, the same recycled ionic liquid specimen was used for the Baylis-Hillman reaction between 4-methoxybenzaldehyde and methyl acrylate using DABCO as catalyst. The corresponding product **B** was obtained along with substantial amount of **A**. Logically account for the aforesaid observation. 4

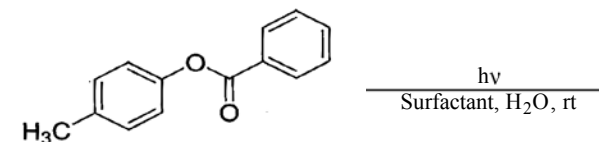
UNIT : 6022-O

2. a) Write down the product and provide plausible mechanistic pathway for the following reaction. Mention the basic name reaction(s) involved herein. 2

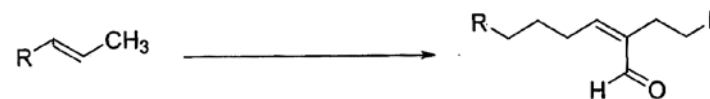


[3]

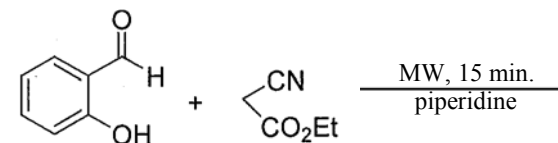
- b) Write down the product, underlying mechanism for the following reaction and mention the basic name reaction(s) involved. 2



- c) Mention a greener route to synthesize disodium iminodiacetate. 1
- d) Give outline of greener steps for the following transformation and mention the name reaction(s) involved. 2



- e) Illustrate a suitable metal-free approach for Friedel-Crafts acylation reaction with proper substrates. 1
- f) Write down the product, underlying mechanism for the following reaction and mention the basic name reaction(s) involved herein. 2



3. a) The following quaternary ammonium salt leads to polymerization when heated in H₂O at 125°C, but

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