

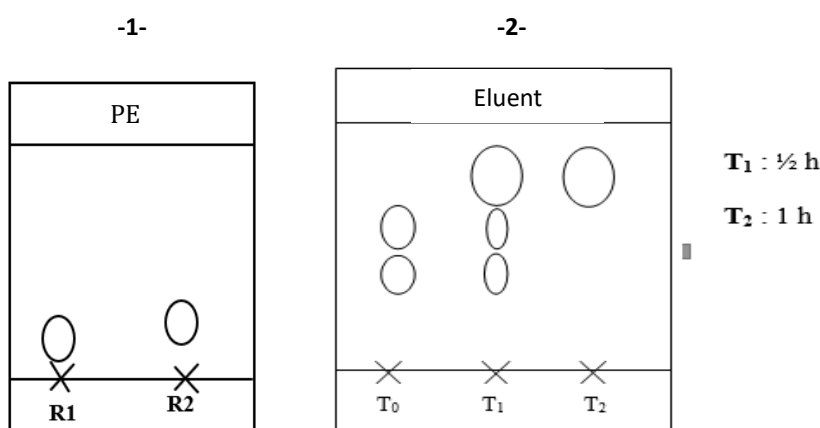


FINAL EXAM

Exercise 01 (08 pts)

Indole is a fused-ring heterocycle with molecular formula C_8H_7N in which a pyrrole ring and benzene ring fused together. Indole usually occurs in some flower oils like jasmine and orange blossom, thus indole is more likely to be used in perfumery. Fischer indole synthesis is an important general method of preparing substituted indoles. Under acidic conditions, Fischer indole synthesis produces the aromatic heterocycle indole from a phenylhydrazine and an aldehyde or ketone (with the exception of formaldehyde and acetaldehyde).

1. What chemical reaction is involved in the synthesis of the indole derivative that you have synthesized?
- 2.
3. This reaction was carried out without a solvent, such as EtOH. Why?
4. What are the therapeutic effects of its derivatives?
5. Give a detailed mechanism for this reaction.
6. Assuming that our ketone is substituted with the aldehyde 3-phenylpropanal, suggest a mechanism for this reaction.
7. Comment on the following chromatograms?



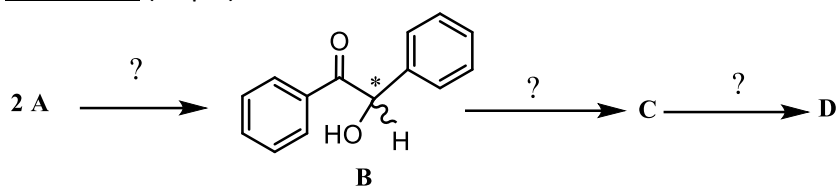
8. All chemical compounds (the reagents and product) are characterized by their absorption under UV light. Why?

Exercise 02 (04 pts)

Chalcone (1, 3-diphenylprop-2-en-1-one) is an important intermediate in many biologically active compounds such as flavonoid. Chalcone was prepared by the aldol condensation.

1. What kind of condensation is this reaction?
2. What is the chemical reaction involved in this synthesis?
3. Provide the structure of the flavonoid skeleton and discuss some biological activities associated with it.
4. Justify the choice of ethanol as recrystallization solvent.

Exercise 03 (08 pts)



1. Complete the reaction scheme by providing the names of compounds **A-D**.
2. Explain how it is possible to determine the configuration of compound **B** obtained.
3. The synthesis reaction of compound **C** is performed under the hood. Why?
4. What is the mechanism of this step (**B** into **C**)?
5. Give an alternative method of converting **B** into **C**.
6. The cyclization to yield compound **D** was carried out under basic and acidic conditions. What was the reason for this?
7. Interpret the IR spectra below, assigning each spectrum to the corresponding compound.

