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Tanta University, Faculty of Science, Chemistry Department.

Final Exam. for the 4th Year Students Course no. CH 4145

(Petrochemicals)

Total assesment Marks: 200

Jan. 2014

Time allowed: 2h

Answer the following questions:

1-Show how can you prepare the petrochemicals: (50 Marks)

a-Styrene.

b-D.D.T.

c-Phenols.

d- Nylon 66.

e- Ethyl. lamine.

f-Anthraquinone Dyes.

2-Describe with examples:

(50 Marks)

a-Lubricating oils.

b-Catalytic cracking.

c-Hydroreforming.

d-'

Detergents.

3-Give notes on the followings with equations:

(50 Marks)

a-Thermal cracking.

b-Isomerization.

c-Hydrotreating.

d-Dehydrocyclisation.

4-Discuss giving examples:

(50 Marks)

a- Hloginated phenols.

b-Biphenol A acetate.

c-Petrochemicals from ethy ne.

d- Cumene.

With best wishes,,

Prof.Ahmed El-Barbary





## TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY

## INCOMPLETE EXAMINATION FOR CRDIT HOUR STUDENTS

COURSE TITLE: LASER CHEMISTRY

COURSE CODE: CH4113

DATE:23 JANUARY, 2014

TERM: FIRST

TOTAL ASSESSMENT MARKS: 50

TIME:2 HOURS

Answer the following questions (5 marks per point):

- 1- Using suitable diagrams and illustrations, describe each of the following laser systems:
- i Carbon dioxide laser
- ii Excimer laser
- iii- Proton transfer dye laser
- iv-Bonding in molecular oxygen O<sub>2</sub> and its first two excited states according to molecular orbital theory.
- v- Construct the energy level diagram of species in a typical triplet sensitization experiment in which a mixture of naphthalene and benzophenone was irradiated through a 315 nm cut in filter given the following absorption data:

For naphthalene  $S_o \longrightarrow S_1$  at 385 nm and  $S_o \longrightarrow T_1$  at 465 nm.

For penzophenone  $S_o \longrightarrow S_1$  at 385 nm and  $S_o \longrightarrow T_1$  at 413 nm.

The cut-in filter that absorbs below 315 nm. [Hint: The energy in k cal mol<sup>-1</sup> is obtained as  $28500 / \lambda (nm)$ ]

- 2- The synthesis of vinyl chloride from 1,2-dichloroethane is an important multibillion industrial process demonstrating the advantages of laser applications. Write the reaction scheme and mention the advantages of laser application in comparison with thermal applications.
- 3- The technique of thermal lensing is an important application on laser collimation. Draw a time- resolved thermal lensing experimental setup and trace upon using the technique to study singlet oxygen sensitization kinetics.
- 4 Discuss each of the following:
  - (a) The technique of Raman spectroscopy showing energy level diagram, the spectral output and band assignment.
  - (b) The principal of MUCAP reagent operation
  - (c) Oxygen sensors based on fluorescence quenching
  - (d) Photodynamic therapy (PDT)
- 5 Explain the reason for each of the following:
  - (a) Carbonyl compounds are common triplet sensitizers
  - (b) R6G-I solutions are strongly fluorescent in ethanol but non-fluorescent in chloroform.

EXAMINER: PROF. DR. EL-ZEINY MOUSA EBEID