বিদ্যাসাগর বিশ্ববিদ্যালয়

VIDYASAGAR UNIVERSITY

B.Sc. Honours Examination 2021

(CBCS)

4th Semester

CHEMISTRY

PAPER—C10T & C10P

ORGANIC CHEMISTRY–IV

Full Marks : 60

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

THEORY : C10T

Answer any *one* question from **Q. 1 and 2** and any *two* questions from **Q. 3 to 6**.

1. (a) Homoannular diene absorbs at 39nm higher wavelength than heteroannular diene – Explain.

(b) Give an example where a secondary amide undergoes Hofmann degradation.

(c) What is the difference between Synthon and Synthetic equivalent? Explain with suitable examples.

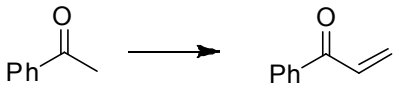
(d) Distinguish Vinyl acetate and Methyl Acrylate by IR Spectroscopy.

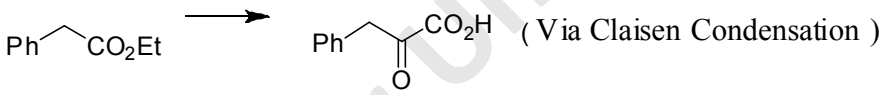
(e) In Arndt-Eistert Synthesis excess Diazomethane is required – Why?

2+2+2+2+2

2. (a) Synthesize $CH_3CH_2COCH_2CO_2Et$ from Ethyl acetoacetate.

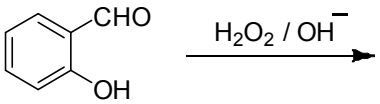
(b) Suggest suitable reagent and appropriate reaction condition to carry out the following transformations.

(i)  (Via Mannich Reaction)

(ii)  (Via Claisen Condensation)

(c) How do you distinguish *cis*-Stilbene and *trans*-Stilbene by UV Spectroscopy?

(d) Predict the product(s) of the following reaction with plausible mechanism.

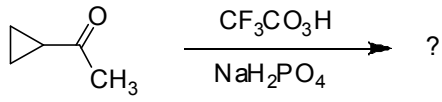


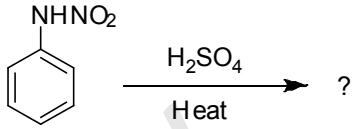
2+4+2+2

3. (a) The UV Spectrum of mesityl oxide shows absorption band at 230 nm (ε 12600) and 329 nm (ε 41). Assign them in terms of electronic transition. How does the absorption band change their position in aqueous medium?

(b) How the isomeric Phenyldiamines are prepared in laboratory? Write down their reaction with Nitrous acid.

(c) Predict the product(s) of the following reaction with plausible mechanism.

(i) 

(ii) 

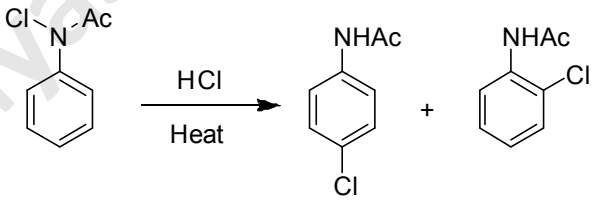
(d) Define the term Chemical shift. What difference in chemical shift values is expected for the proton of CH_3F, CH_3Cl and CH_3Br? Explain

4+4+4+3

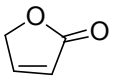
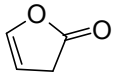
4. (a) What is illogical electrophile and nucleophile? Give examples for each.

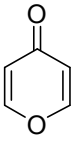
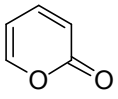
(b) How can you proceed to synthesize tert-butyl amine from Acetone?

(c) Give the mechanism of the following transformation. Give evidence in favour of the mechanism. What is the name of the reaction?

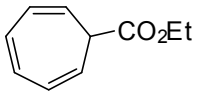


(d) How do you distinguish between the following pair of compounds by IR spectroscopy?

(i)  and 

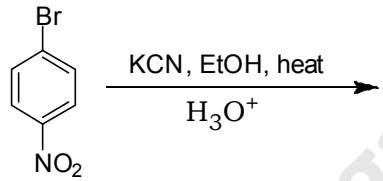
(ii)  and 

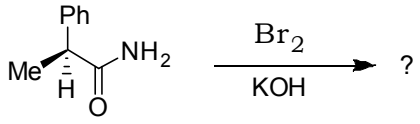
(e) How do you synthesize the following compound from benzenein one step ? Give the mechanism of the reaction.

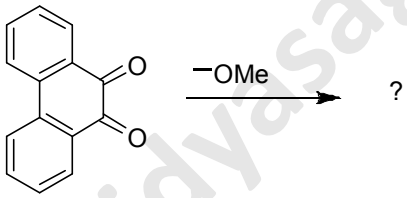


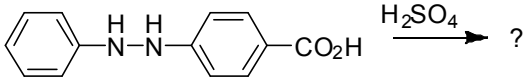
2+3+3+4+3

5. (a) Predict the product(s) of the following reaction with plausible mechanism.

(i) 

(ii) 

(iii) 

(iv) 

(b) Write the structure of the compound $C_5H_{11}Cl$ which shows two singlets in its ^{1}HNMR spectrum.

(c) What is high dilution principle ? State the synthetic utility of this technique.

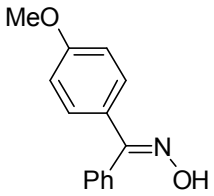
(d) What is Ritter reaction ? Illustrate with example. (4×2)+2+3+2

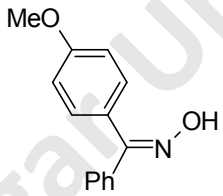
6. (a) Von-Pechmann prepared diazomethane from CH_3NH_2 and $ClCO_2Et$. Give the method with mechanism.

(b) What is Henry reaction ? Give example.

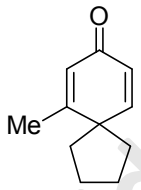
(c) What are stereospecific and stereoselective reaction ? Explain with suitable examples.

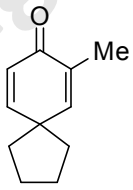
(d) Which member in each of the following pairs will undergoes the indicated rearrangement reaction more readily ? Justify your answer in each case.

(i) 

Or 

(Beckmann Rearrangement)

(ii) 

Or 

(Dienone- Phenone rearrangement)

(e) A compound C_4H_6O shows a very strong IR band at 1720 cm^{-1} and only one singlet signal in its ^{1}HNMR spectrum. Deduce the structure of the compound. 3+2+4+4+2

PRACTICAL : C10P

Answer any *one* question. 1×20

1. Write down the principle, reagents required and detailed procedure for the estimation of Glycine by Sorensen's Formol method.

2. Write down the principle, reagents required and detailed procedure for the estimation of Vitamin C (Ascorbic acid).

3. Write down the principle, reagents required and detailed procedure for the estimation of Aniline by Bromate-Bromide method.

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