

3 (Sem-5) CHM M 3

2017

CHEMISTRY

(Major)

Paper : 5.3

(Organic Chemistry)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following questions (any seven) : 1×7=7

~~(a)~~ Write 'aciform' structure of nitromethane.

~~(b)~~ How is Lindlar's catalyst prepared?

(c) Write IUPAC name of



oxole

8A/271

(Turn Over)

*1d- BaSO₄
quinoline sulphur*

(2)

(d) ^{reaction with thiol} What is a thiolation reaction? Give example.

(e) Define 'frontier orbital' with appropriate example.

(f) Define 'betaine' with example.

(g) ^{concern with geometry from R₂C=NR₂'} What is a Schiff's base? (R'≠H)

(h) When is a rearrangement reaction said 'anchimerically assisted'?

^{when neighbouring group participated in the reaction}

2. Answer the following questions (any four) : 2×4=8

^{R₁ + R₂ + H} (a) Give Fittig's synthesis to confirm the fused ring structure of naphthalene.

(b) Give one appropriate example to prove that no cross product is formed in Claisen rearrangement reaction.



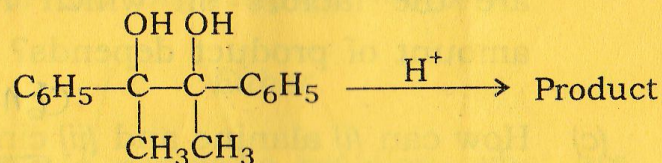
8A/271

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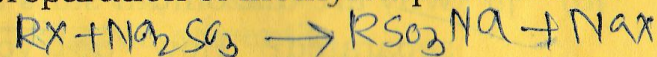
(3)

(c) Write migratory aptitude of alkyl or aryl group in the following reaction and give product with appropriate explanation :

55



(d) Write Strecker reaction for preparation of methylsulphonic acid.



(e) Why does pyridine undergo electrophilic substitution reaction slowly than benzene?

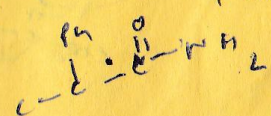
3. Answer the following questions [any one from (a) and (b) and two from (c), (d) and (e)] : 5+(5×2)=15

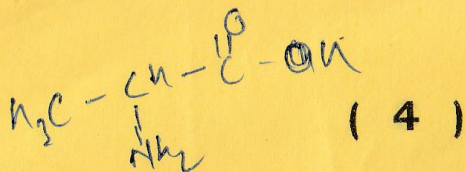
(a) How does optically active α-phenyl propionamide undergo Hofmann degradation reaction? Give mechanism of the reaction. Justify configuration of product produced.

1+3+1=5

8A/271

(Turn Over)



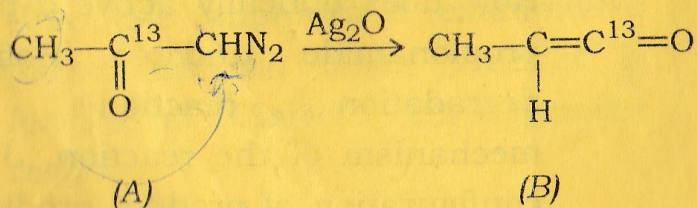


(b) How does phenylacetate undergo intramolecular rearrangement reaction in presence of AlCl_3 ? Give mechanism of this reaction. What are the factors on which relative amount of product depends? $1+3+1=5$

(c) How can (i) alanine and (ii) cinnamic acid be prepared from diethyl malonate? Give reactions. $2\frac{1}{2}+2\frac{1}{2}=5$

(d) (i) Why are diazonium salts seldom separated? How do you get benzene from benzene diazonium chloride (give reaction)?

(ii) Show with mechanism that carbonyl carbon (C^{13}) of (A) is same carbonyl carbon (C^{13}) of (B) in following reaction: $(1+1)+3=5$

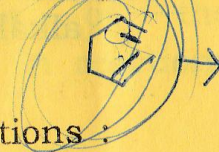


8A/271

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(5)

(e) Explain sigmatropic migration of carbon in cope rearrangement reaction.



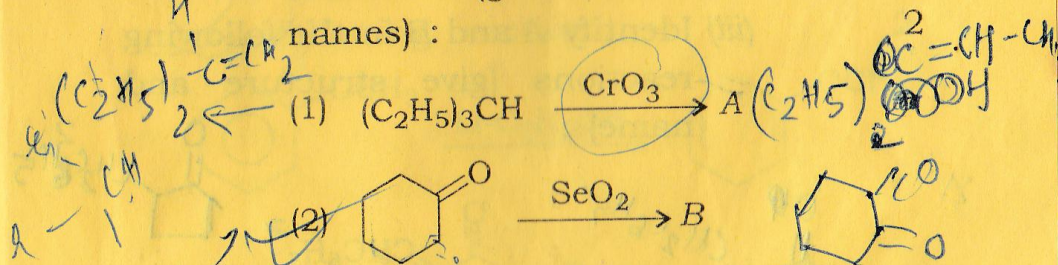
4. Answer the following questions:

Either

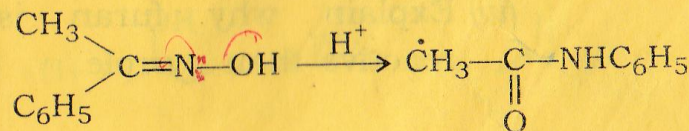
(a) (i) In pericyclic reaction, what are endo-addition and exo-addition? 3

(ii) Why is NaBH_4 generally used in protic solvent? 1

(iii) Identify A and B in the following reactions (give structures and names):



(iv) Prove that, the following reaction is stereoselective: 2

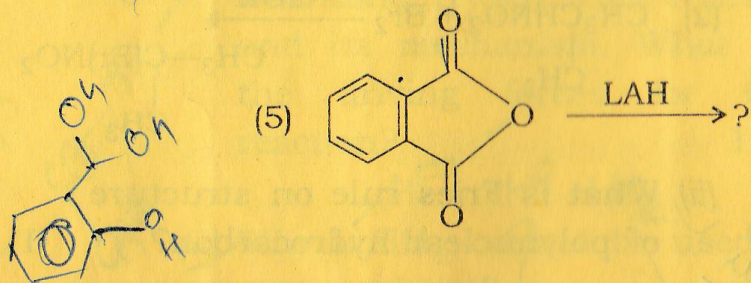
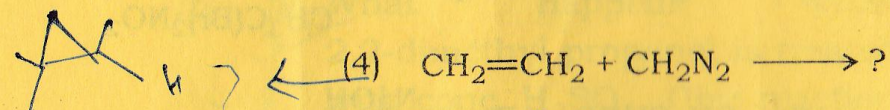
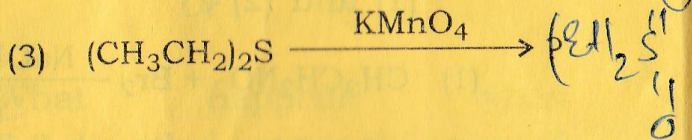
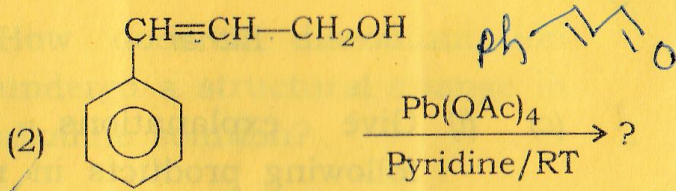


8A/271

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(8)

CH₃COO⁻ + H⁺

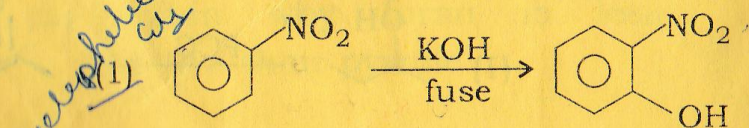


Or

(d) (i) How does ethanoic acid react with hydrazoic acid in presence of conc. H₂SO₄? Give the reaction with mechanism. 3

Schmidt reagent

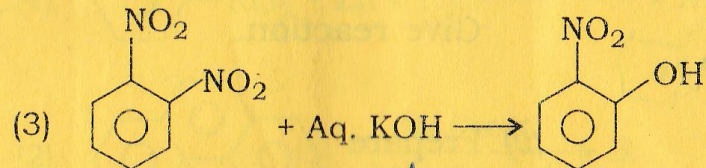
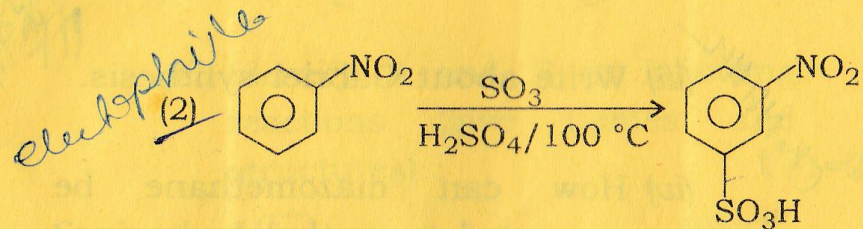
(ii) Give explanations of forming the following products in reactions 1, 2 and 3 : 3



8A/271

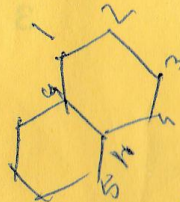
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(9)



nucleophile displacement

(iii) What is peri-hydrogen interaction in sulphonation of naphthalene? 2

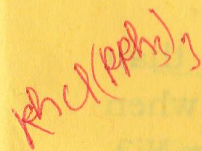


(iv) Write the structure of peridinium chlorochromate. 1

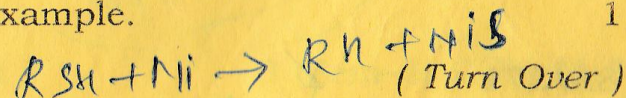
(v) What is Sarett's reagent? 1

Either

(e) (i) Why does pyridine react under vigorous condition with electrophilic reagents? Explain with appropriate example. 3



(ii) How does thiol undergo desulphurization reaction? Give example. 1



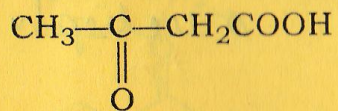
8A/271

(10)

(iii) Write about Gabriel synthesis. 2

(iv) How can diazomethane be converted to methyl hydrazine? Give reaction. 1

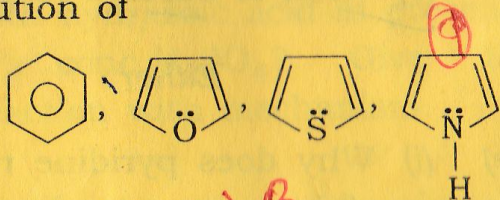
(v) Prepare



from acetoacetic ester. 3

Or

(f) (i) Write relative reactivity towards electrophilic aromatic substitution of 1



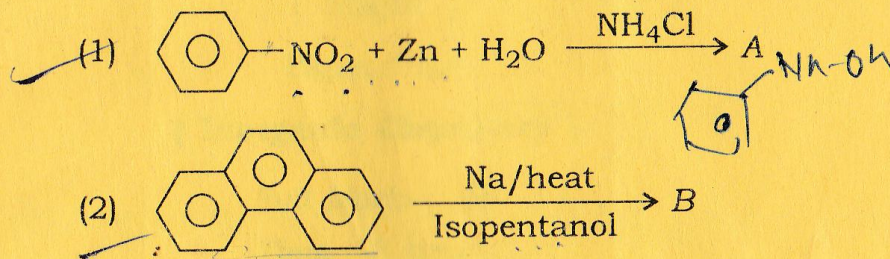
(ii) Why is indole less reactive than pyrrole? What happens when indole reacts with $\text{H}_2 + \text{Raney Ni}$? 1+1=2

8A/271

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11

(iii) Identify A and B in following reactions (give names and structures) : 1+1=2

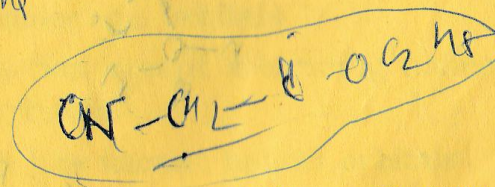
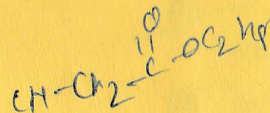


(iv) What is the driving force to form alkene in Wittig reaction? 11651M

(v) What happens when anthracene reacts with $\text{Na}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4$? Give product name and structure. 1

(vi) Prepare $\text{CH}_3\text{CH}_2\text{COOH}$ from cyanoacetic ester. 2

(vii) What is a suprafacial process? 1



8A-5000/271

3 (Sem-5) CHM M 3