

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

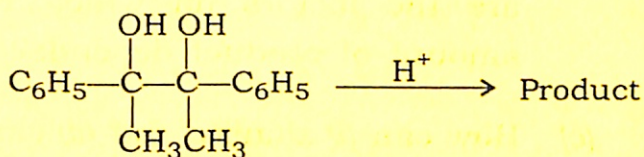


- (d) What is a thiolation reaction? Give example.
- (e) Define 'frontier orbital' with appropriate example.
- (f) Define 'betaine' with example.
- (g) What is a Schiff's base?
- (h) When is a rearrangement reaction said 'anchimerically assisted'?

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

- (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.

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



- (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  $\alpha$ -phenyl propionamide undergo Hofmann degradation reaction? Give mechanism of the reaction. Justify configuration of product produced.

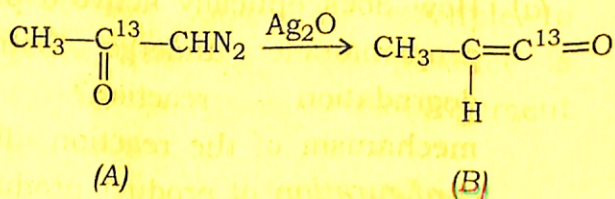
1+3+1=5

(b) How does phenylacetate undergo intramolecular rearrangement reaction in presence of  $\text{AlCl}_3$ ? 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 ( $\text{C}^{13}$ ) of (A) is same carbonyl carbon ( $\text{C}^{13}$ ) of (B) in following reaction :  $(1+1)+3=5$



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

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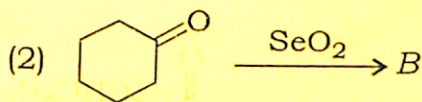
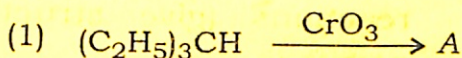
4. Answer the following questions :

*Either*

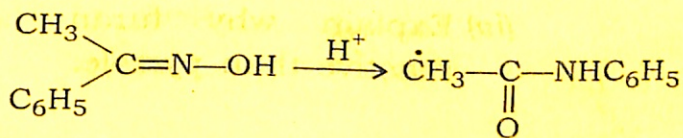
- (a) (i) In pericyclic reaction, what are endo-addition and exo-addition? 3

- (ii) Why is  $\text{NaBH}_4$  generally used in protic solvent? 1

- (iii) Identify A and B in the following reactions (give structures and names) : 2



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



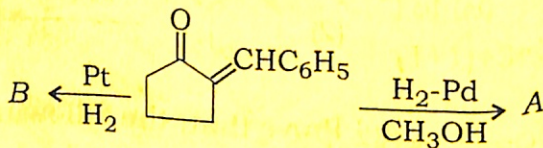
(v) How does a diazonium ion undergo a structural change in alkaline solution? 2

Or

(b) (i) What happens when 2,2-dimethyl propanol is treated with conc.  $H_2SO_4$ . Give reaction and its mechanism. What are the driving forces for this reaction? 1+2+2=5

(ii) Why  $LiAlH_4$  cannot be used in protic solvent? 1

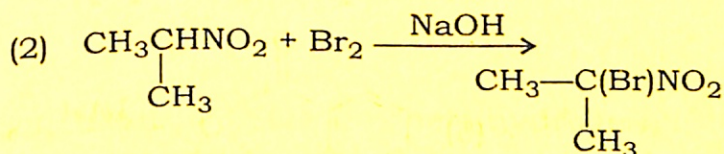
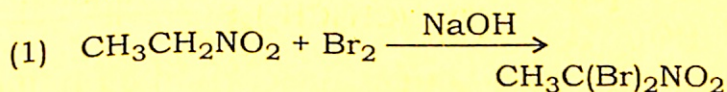
(iii) Identify A and B in the following reactions (give structure and name) : 2



(iv) Explain why furan is less reactive than pyrrole. 2

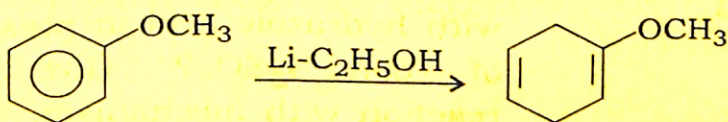
*Either*

- (c) (i) Give explanations of the following products in reactions (1) and (2) : 2

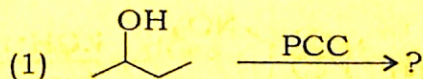


- (ii) What is Fries rule on structure of polynuclear hydrocarbon? 1

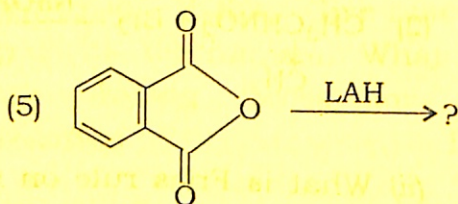
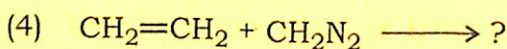
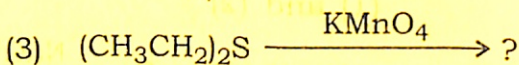
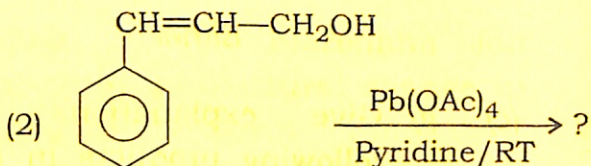
- (iii) Write mechanism of the following reaction : 2



- (iv) Write the products and the names for the reactions given below : 1×5=5



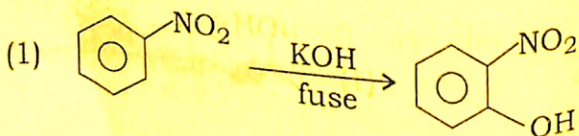
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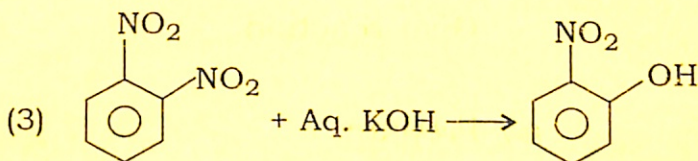
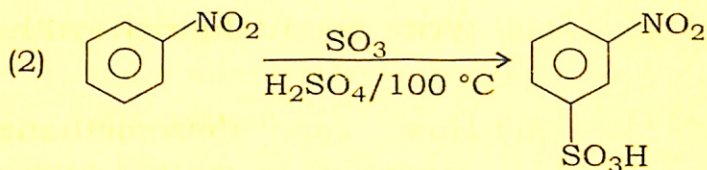


Or

(d) (i) How does ethanoic acid react with hydrazoic acid in presence of conc.  $\text{H}_2\text{SO}_4$ ? Give the reaction with mechanism. 3

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





(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*

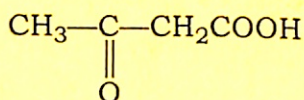
(e) (i) Why does pyridine react under vigorous condition with electrophilic reagents? Explain with appropriate example. 3

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

(iii) Write about Gabriel synthesis. 2

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

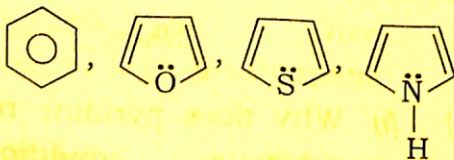
(v) Prepare



from acetoacetic ester. 3

Or

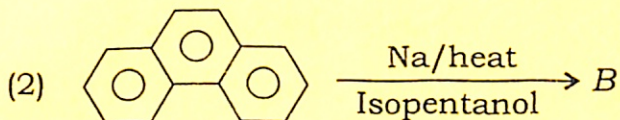
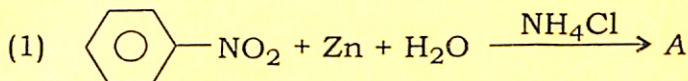
(f) (i) Write relative reactivity towards electrophilic aromatic substitution of 1



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

1+1=2

(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? 1

(v) What happens when anthracene reacts with Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> + H<sub>2</sub>SO<sub>4</sub>? Give product name and structure. 1

(vi) Prepare CH<sub>3</sub>CH<sub>2</sub>COOH from cyanoacetic ester. 2

(vii) What is a suprafacial process? 1

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