

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



(2)

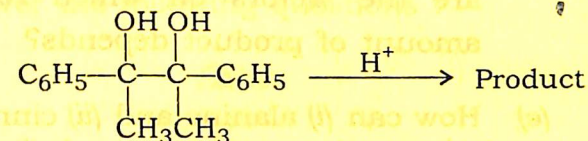
- (d) What is a thiolation reaction? Give example.
- (e) Define 'frontier orbital' with appropriate example.
- (f) Define 'betaine' with example.
- (g) What is a Schiff's base?
- (h) When is a rearrangement reaction said 'anchimerically assisted'?

2. Answer the following questions (any four) : $2 \times 4 = 8$

- (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.

(3)

- (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)] : $5 + (5 \times 2) = 15$

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

$1 + 3 + 1 = 5$

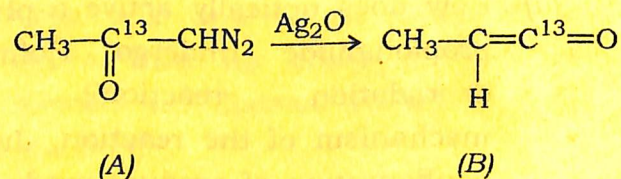
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(b) How does phenylacetate undergo intramolecular rearrangement reaction in presence of AlCl_3 ? Give mechanism of this reaction. What are the factors on which relative amount of product depends? $1+3+1=5$

(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 : $(1+1)+3=5$



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(5)

(e) Explain sigmatropic migration of carbon in cope rearrangement reaction. 5

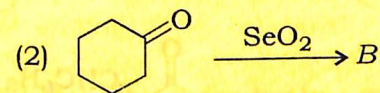
4. Answer the following questions :

Either

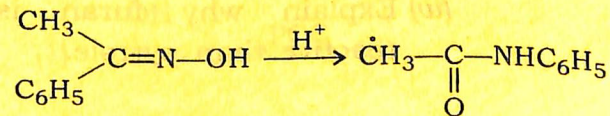
(a) (i) In pericyclic reaction, what are endo-addition and exo-addition? 3

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

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



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



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(Turn Over)

(6)

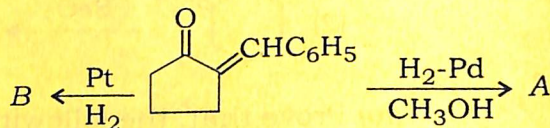
(v) How does a diazonium ion undergo a structural change in alkaline solution? 2

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

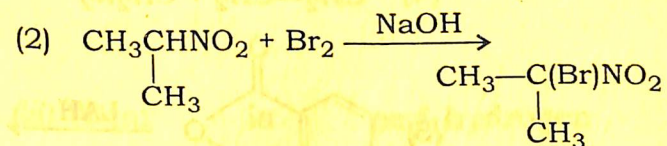
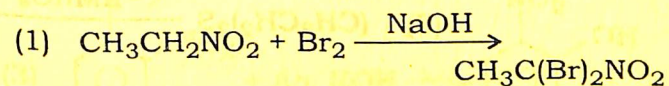


(iv) Explain why furan is less reactive than pyrrole. 2

(7)

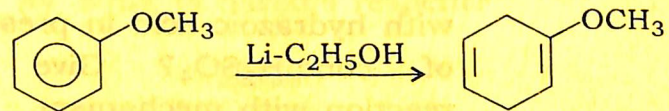
Either

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

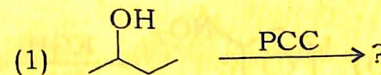


(ii) What is Fries rule on structure of polynuclear hydrocarbon? 1

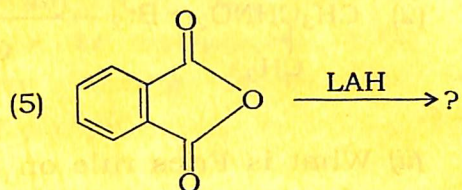
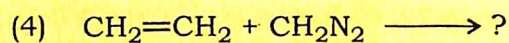
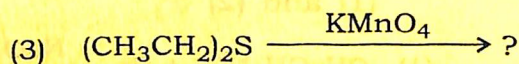
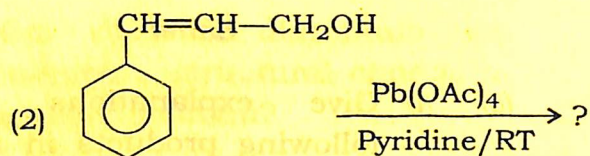
(iii) Write mechanism of the following reaction : 2



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



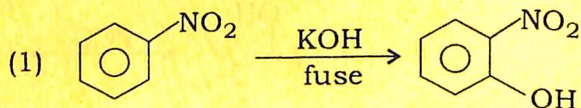
(8)



Or

(d) (i) How does ethanoic acid react with hydrazoic acid in presence of conc. H_2SO_4 ? Give the reaction with mechanism. 3

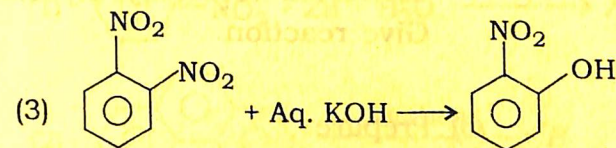
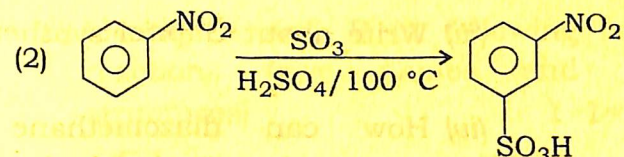
(ii) Give explanations of forming the following products in reactions 1, 2 and 3 : 3



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(9)



(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

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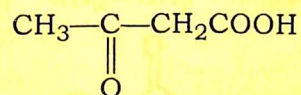
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(10)

(iii) Write about Gabriel synthesis. 2

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

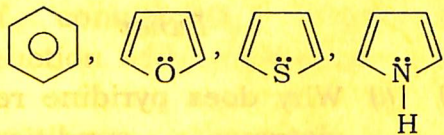
(v) Prepare



from acetoacetic ester. 3

Or

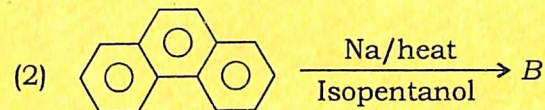
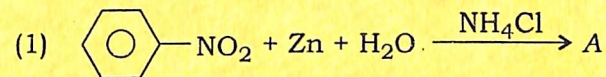
(f) (i) Write relative reactivity towards electrophilic aromatic substitution of 1



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

(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? 1

(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
