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B.Sc. RNLKWC(A)-/C10T/22

2022

CHEMISTRY

[Honours]

B.Sc. Fourth Semester End Examination - 2022

PAPER - C10T

Full Marks : 40

Time : 2 hours

*The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own
words as far as practicable.
Illustrate the answers wherever necessary.*

Group - A

Answer any one question :-

10×1=10

1. (a) Account for the following observations : **2½×2=5**

(i) The rate of the reaction of 1-bromobutane with azide ion is increased 5×10^3 fold on changing the solvent from methanol to acetonitrile.

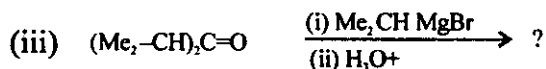
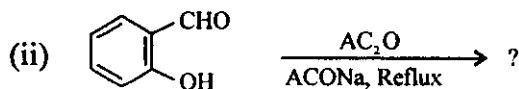
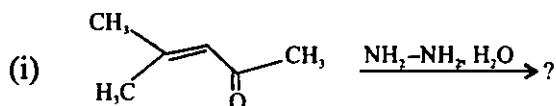
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(2)

(ii) Both o-bromo anisole and m-bromo anisole give same product on treatment with NaNH_2 in liq. NH_3 .

(b) Write the product(s) of the following reactions and give plausible mechanism in each case.(any two)

2×2=4



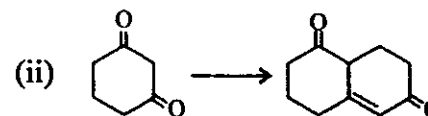
(c) 18-Crown-6 ether greatly increases the rates of reaction where KCN is used as the source of cyanide ion. Account for the empirical observation. 1

2. (a) Carry out the following conversions (any two) 2×2=4

(i) $\text{PhCHO} \longrightarrow \text{PhCH}_2\text{CHO}$ (applying witting

(3)

reaction as the key step)



(Using alcohol condensation as the key step)

(iii) phenol \longrightarrow p-aminophenol.

(b) Deuterium labeling experiment may be used to establish the mechanism of cannizaro reaction—Justitfy.

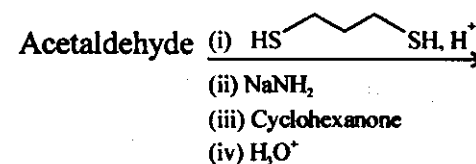
3

(c) Compare the green and classical route (Friedel crafts acylation) for the preparation of p-methoxyacetophenone. 3

Group - B

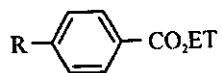
Answer any four questions.

3. (a) Write the product(s) of the following reaction. 2



(4)

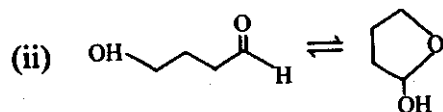
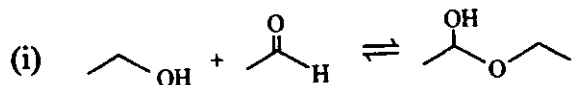
- (b) Write the BAC² mechanism of hydrolysis of ethyl benzoate. Hence arrange the following ethyl para-substitute benzoates. 3



(where R is -OMe, -NO₂, -Cl and -Me)

In order of decreasing rates of BAC² hydrolysis and explain your answer.

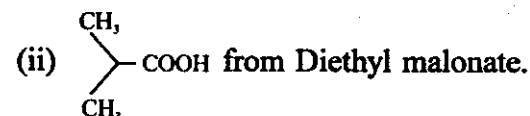
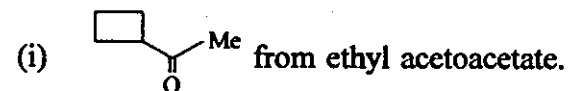
4. (a) What is green chemistry? 1
(b) Give example (Green synthesis) 1+1=2
(i) Michael reaction (under solvent free)
(ii) Knoevenagel reaction (Under aqueous solvent)
(c) In which case would the equilibrium be more favourable to R.H.S. and why? 2



(5)

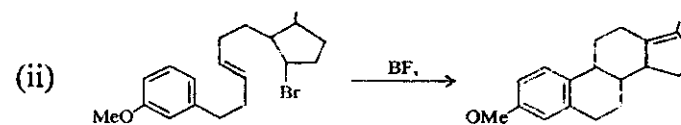
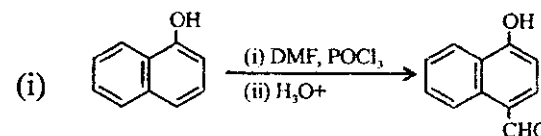
2+2

5. (a) Outline the synthesis of

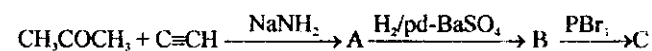


- (b) Trichloro acetaldehyde is exclusively hydrated in water—explain. 1

6. (a) Explain the product formation and give plausible mechanism. 2½×2=5



7. (a) Write structure of A, B and C in the following sequence of reactions. 3

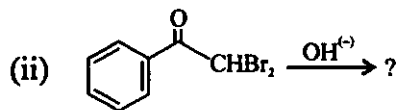
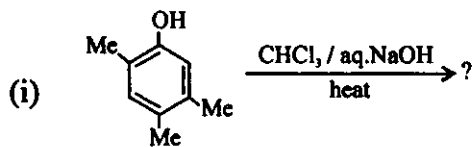


(6)

(b) The substitution reaction of $\text{EtSCH}_2\text{CH}_2\text{Cl}$ with ethanol proceeds at a rate many folds faster than the similar reaction of $\text{Et OCH}_2\text{CH}_2\text{Cl}$ – explain. 2

8. (a) Use Reformatsky reaction for the synthesis of $\text{PhCH}=\text{C}(\text{Et})\text{COOH}$. Explain why Magnesium metal can not be used in place of Zinc in the synthesis. 3

(b) Write down the product(s) with plausible mechanism. (Any one) 2

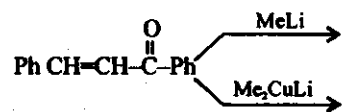


Group - C

Answer any five questions :

5×2=10

(a) Give the products of the following reactions and explain.



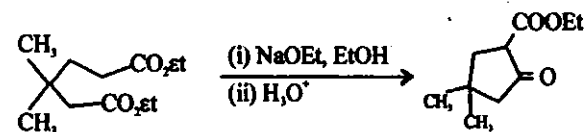
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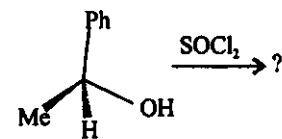
(7)

(b) What is Hammond's postulate?

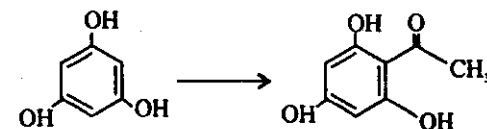
(c) Explain the following observation.



(d) Write down the structure of the product of the following reaction with plausible mechanism.



(e) Carry out the following conversions and explain with mechanism.

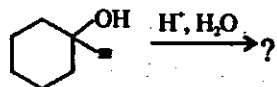


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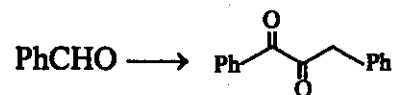
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(8)

- (f) Show the mechanism of the following rearrangement reaction with product structure.



- (g) Transform the following



- (h) Explain the lack of reactivity of α -halocarbonyl compounds in S_N1 reactions.