'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 3rd Semester Examination, 2023

CC6-CHEMISTRY

NEW AND OLD SYLLABUS

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.

GROUP-A

1. Answer any ***five*** questions from the following: 1×5 = 5

(a) Acetals are easily cleaved by acids but two-acetals show considerable stability. Why?

(b) Why acid catalyzed haloform reactions are not feasible?

(c) Why excess of isopropanol is employed in MPV reaction?

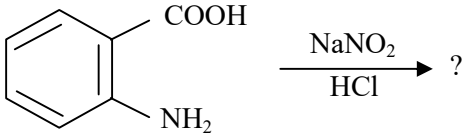
(d) How will you synthesize acetophenone from acetic acid?

(e) 'β-keto acids undergo decarboxylation easily. Justify.

(f) How will you prepare Tollen's reagent?

(g) Why C–N bond in amide is shorter than C–N bond in amines?

(h) Predict the intermediate from the following:



GROUP-B

2. Answer any ***three*** questions from the following: 5×3 = 15

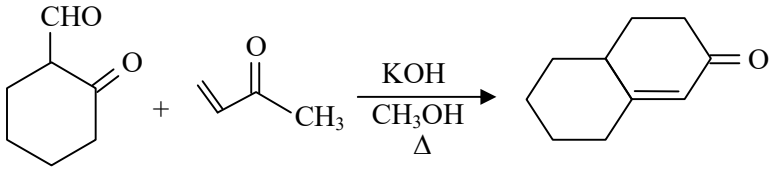
(a) (i) $CH_3 - I + X^{\ominus} \xrightarrow{EtOH} CH_3 - Nu$ 3

$Nu = X^{\ominus}$	pKa of HX	Relative rate
$PhS^{\ominus}$	6.4	5×10^7
$PhO^{\ominus}$	10.0	2×10^3

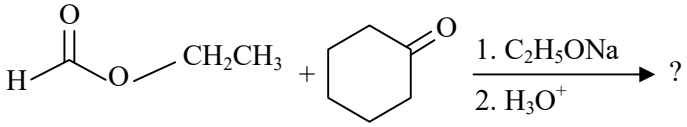
Give a rational explanation for the above observation though $RO^{\ominus}$ is more basic than $RS^{\ominus}$.

(ii) Both *o*-bromoanisole and *m*-bromoanisole give same product on treatment with $NaNH_2$/liq.NH_3. Account for the observation and give mechanism. 2

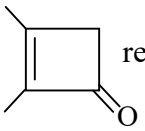
(b) (i) Outline mechanistic pathway of the following conversion. 3



(ii) Predict the product of the following reaction: 2

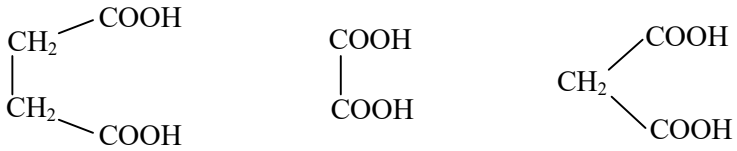


(c) (i) 2,2-Dimethylpropanal gives Cannizzaro reaction but 2-methylpropanal does not. Explain. 2

(ii)  remains exclusively in keto form. Justify. 2

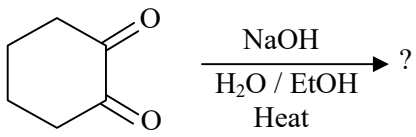
(iii) Write one reaction where lead tetraacetate is used. 1

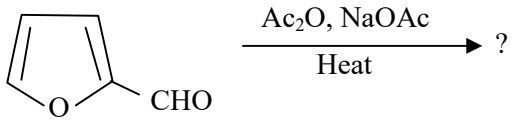
(d) (i) Arrange the following acids in order of increasing acidity. Explain the appropriate reason. 2



(ii) Write short note on Wurtz reaction. 3

(e) Predict the product(s) with plausible mechanism: $2\frac{1}{2}\times 2=5$

(i) 

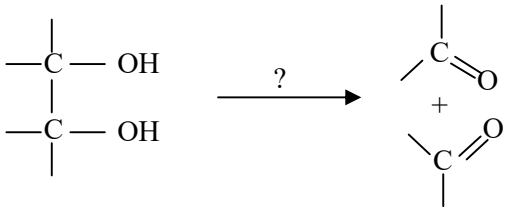
(ii) 

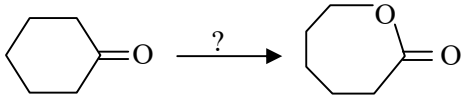
GROUP-C

3. Answer any ***two*** questions from the following: 10×2 = 20

(a) (i) Identify the reagents of the following reactions: 1×3 = 3

1. $PhCOCH_3 + Me_2CHOH \xrightarrow{?} PhCH(OH)CH_3 + Me_2CO$

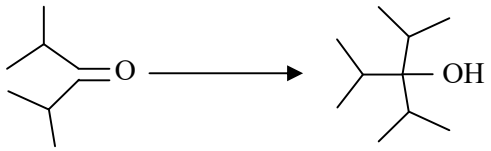
2. 

3. 

(ii) Synthesize dimedone from a suitable starting material with the mechanism of the steps involved. 5

(iii) Discuss the role of CN^- ion in benzoin condensation reaction. 2

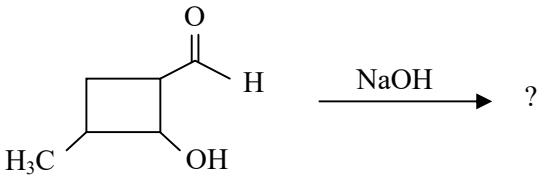
(b) (i) Can Grignard reagent be used to convert the following: 3



If not, why? Which organometallic reagent should be used for this conversion?

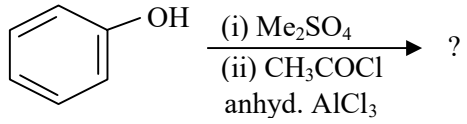
(ii) Give an evidence in favour of reversibility of Benzilic acid rearrangement. 2

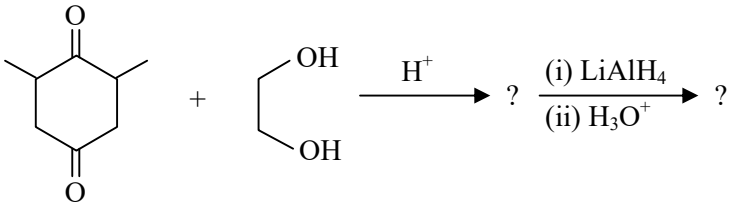
(iii) Predict the product and write the name of the reaction. 2

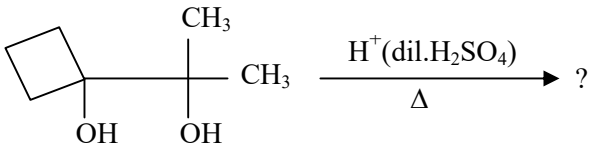


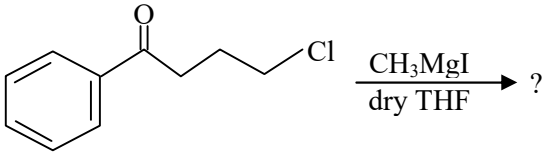
(iv) In the Kolbe-Schmidt reaction, sodium phenolate gives salicylic acid as predominant product, while p-hydroxy benzoic acid is the major product if potassium phenolate is used. Justify. 3

(c) Predict the product(s) and suggest plausible mechanism: $2\frac{1}{2} \times 4 = 10$

(i) 

(ii) 

(iii) 

(iv) 

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