UG/3rd Sem/CHEM(H)/T/19

2019

B.Sc.

3rd Semester Examination

CHEMISTRY (Honours)

Paper - C 7-T

Full Marks : 40 Time : 2 Hours

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

Group – A

1. Answer any ***five*** questions : 2×5

(a) Account for the following structural change :

$$CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{C}}}=\overset{*}{C}H_2 \xrightarrow{Cl_2} CH_3-\underset{\displaystyle CH_2}{\overset{\displaystyle CH_2}{\overset{\|}{C}}}-\overset{*}{C}H_2-Cl$$

(b) The orientation in the addition of HBr to allyl bromide depends on whether or not the

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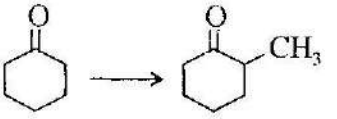
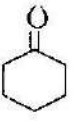
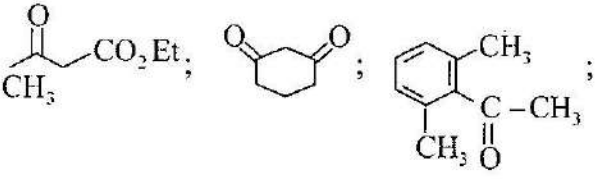
reactants are contaminated with peroxide impurities – Explain.

(c) Convert : 

(d) Hydration of an alkyne is not a reasonable propartive method for each of the following compounds. Explain why?

(i) $Me_3C-\overset{\overset{O}{\|}}{C}-CMe_3$ (ii) 

(e) State which of the following compounds will undergo haloform reaction and why?



$CH_3-CH(OH)-CH_3$

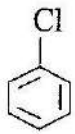
(f) When phenol is prepared from chloro benene and NaOH at 400°C the major side product is diphenyl ether. Explain.

(g) Convert : $RCHO \longrightarrow RCOOCH_2R$

(h) When vinyl magnesium bromide is prepared from vinyl bromide and Mg, tetrahydrofuran (THF) is used as solvent instead of diethyl ether. Why?

Group – B

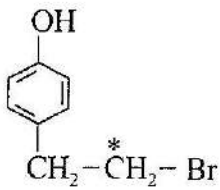
2. Answer any ***four*** questions : 4×5

(a) 

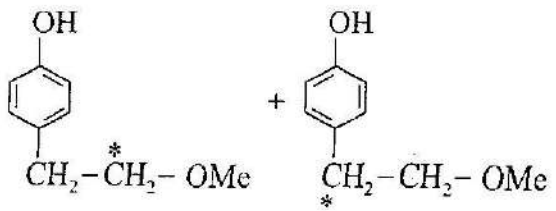
$\rightarrow$ A (C_6H_7N) + B($C_{12}H_8$)

Identify 'A' and 'B'. Shows mechanism. 2

(b) Explain mechanistically :



(ii) H_3O^+

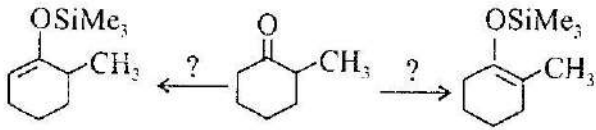


3

[Turn Over]

3. (a) cis-2-butene $\xrightarrow[\text{(ii) } NaHSO_3]{\text{(i) } OsO_4}$? (mention stereochemistry) 2

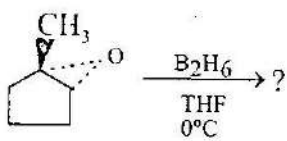
(b) Put suitable reagents/conditions :



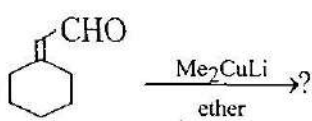
2

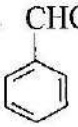
(c) How will you convert 1-pentyne to 2-pentyne? 1

4. (a) Predict the major product of the following reactions :

(i) 

(ii) $CH_3 - \underset{\diagdown\ \diagup}{CH} - CH - CH_2 - Br \xrightarrow[70°C]{NaBH_3CN} ?$
O

(iii) 

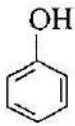
(iv)  $+ (CH_3CO)_2O \xrightarrow[180°C]{CH_3COONa} ?$

(v)  $+ I_2 + AgOAC \xrightarrow[H_2O]{AcOH} ?$

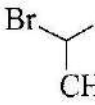
5. (a) Which of the following would be most and least readily hydrolysed with NaOH and why?

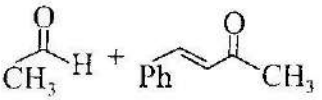
$MeCO_2Me$; Me_3CHCO_2Me; $MeCO_2But$ 2

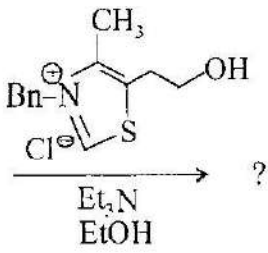
(b) Write down the $B_{AC}2$ mechanism of ester hydrolysis. 2

(c) Predict the product(s) :  $\xrightarrow{CHCl_3/KOH} ?$ 1

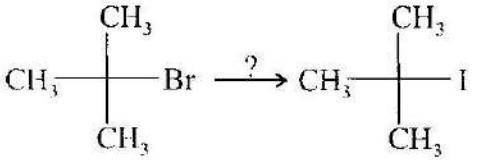
6. (a) Predict the product(s) of the following reaction showing mechanism in each case. 2×2

(i)  $\xrightarrow[(ii)\ CH_3CN\ (iii)\ H_2O]{(i)\ Zn} ?$

(ii) 



(b) Give suitable regent and conditions :

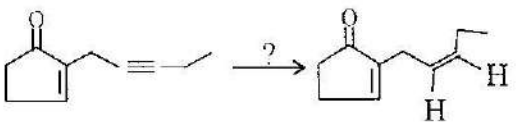


1

7. (a) Write down thechanism of Vilsmeir-Haack reaction. 2

(b) What will happen when phenyl magnesium bromide is reacted with excess oxygen followed by acidification with dilute aqs. acid? 2

(c) Give suitable reagent(s) in the following conversion.

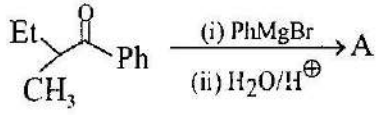


1

Group – C

8. Answer any ***one*** question : 1×10

(a) Identify the compounds A, B, C, D, E in the following reactions :

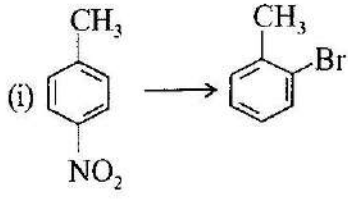


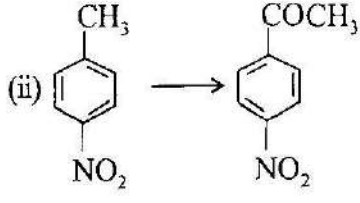
$$\xrightarrow{H^{\oplus}} B \xrightarrow[(ii)\ Zn/H_2O]{(i)\ O_3} C + D$$

$$C \xrightarrow[NaOH]{I_2} E$$

5

(b) How would you carry out the following transformations?





1½+1½

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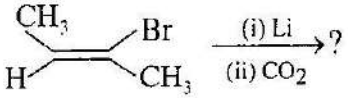
(c) What is Reformatsky reaction? 2

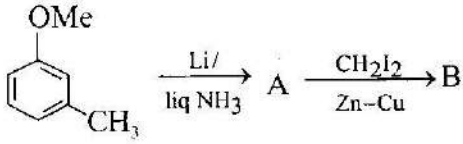
9. (a) Indicate the product(s) and explain the mechanism involved :



2

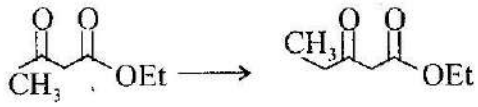
(b) What happens when PhCOCHO is treated with concentrated NaOH ? 2

(c) Identify A and B in the following reactions.



2

(d) Convert :



2

(e) When an optically active (R) -2-Phenyl propanoic acid is brominated under H-V-Z condition, is the product optically active or racemic? Explain. 2