Roll No. .....

(12/19-II)

5210

B. Sc. EXAMINATION

(For Batch 2011 & Onwards)

(Third Semester)

CHEMISTRY (ORGANIC)

Paper X

CH-203

Time : Three Hours *Maximum Marks : 27*

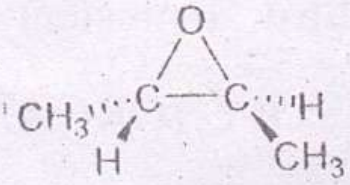
Note : Attempt *Five* questions in all, selecting *two* question from each Unit. Q. No. 1 is compulsory.

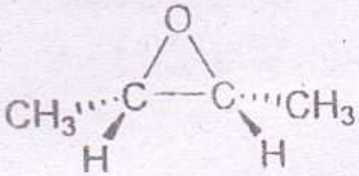
Compulsory Question

1. (a) Why are alcohols weaker acids than water ? 1

(b) Name the reagent which can be used to distinguish between .butane-1, 2-diol and butane-1, 3-diol. 1

(c) Show what reagents you would use to prepare the following epoxides :

(i) 

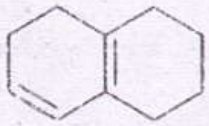
(ii)  1

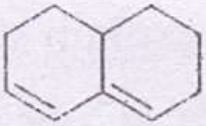
(d) Which electrophile is used in Reimer-Tiemann reaction and how it acts as electrophile ? 1

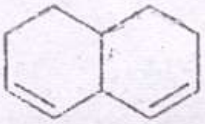
(e) Why aldehydes and ketones do not undergo nucleophilic substitution reactions ? 1

(f) α-Hydrogen atom of carbonyl compound is acidic while β is not. Explain it. 1

(g) Arrange the following compounds in the increasing order of wavelength of λ_{max} in the UV spectrum : 1

(i) 

(ii) 

(iii) 

Section A

2. (a) Discuss briefly the mechanism of reduction of esters with $LiAlH_4$. 2

(b) Discuss the mechanism of pinacol-pinacolone rearrangement. 2

(c) Why is anhydrous $ZnCl_2$ added in the reaction of ethanol and HCl ? 1

(b) Define and explain the following :

(i) Absorbance

(ii) Transmittance

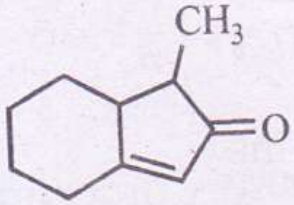
(iii) Absorption Maxima

(iv) Molar Extinction Coefficient. 2

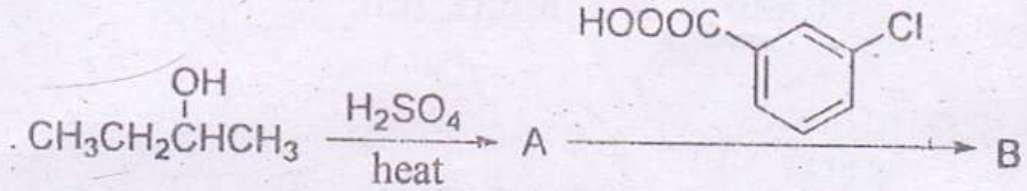
(c) State and explain Beer-Lambert's Law. 1

7. (a) Explain, why a polar solvent usually shifts the $\pi \rightarrow \pi^*$ transitions to longer wavelength and $n \rightarrow \pi^*$ transitions to shorter wavelength. 2

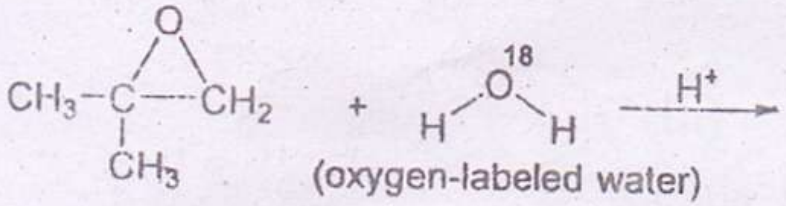
(b) Use Woodward-Fieser rules to estimate the expected λ_{max} for the following compounds : 2

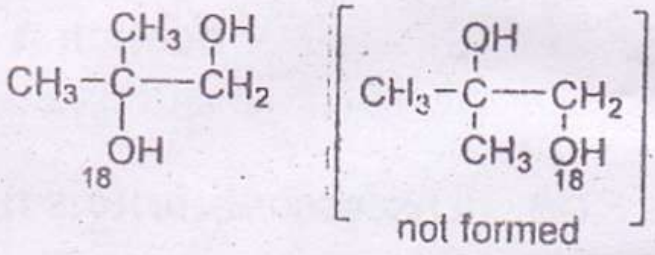
(i) 

3. (a) Identify A and B in the following reaction sequence and give the mechanism for the conversion of A to B. 2

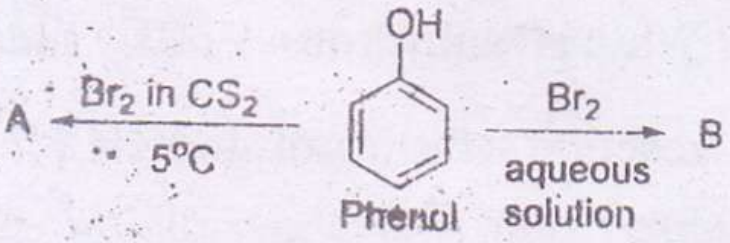


(b) Give the mechanism of the following reaction and also explain why the product shown in brackets is not formed ? 2

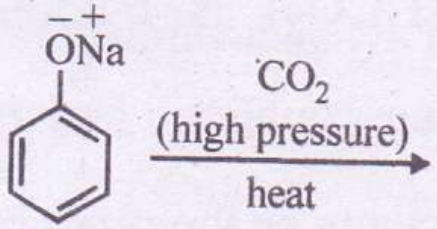


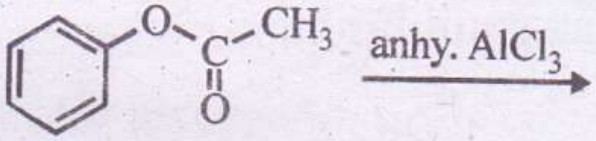


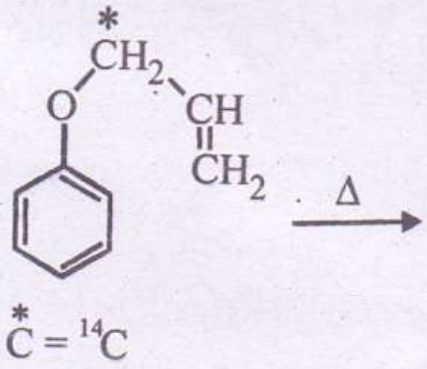
(c) Predict the major products A and B of the following reactions, and explain the difference in reactivity of phenol in the two solvents. 1

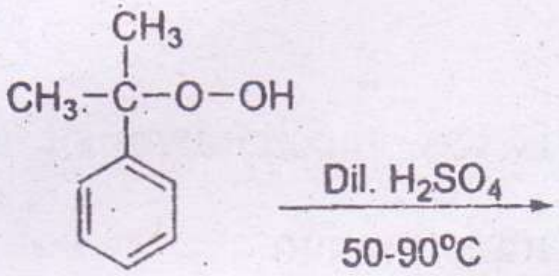


4. (a) Give the product(s) of the following reactions : 2

(i) 

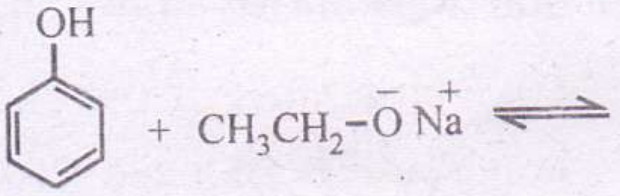
(ii) 

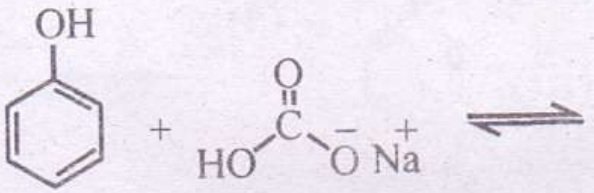
(iii) 

(iv) 

(b) Give the mechanism of the Reimer-Tiemann reaction. 2

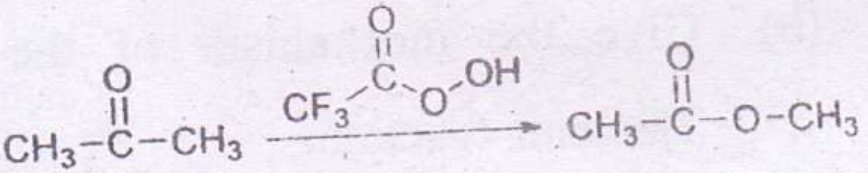
(c) The pKa for phenol is 10, the pKa for ethanol is 16 and the pKa for carbonic acid (H_2CO_3) is 6.35. Complete the following equations and predict whether the reactants or the products are favoured at equilibrium : 1

(i) 

(ii) 

Section B

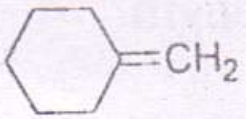
5. (a) Discuss mechanism of the following transformation : 2



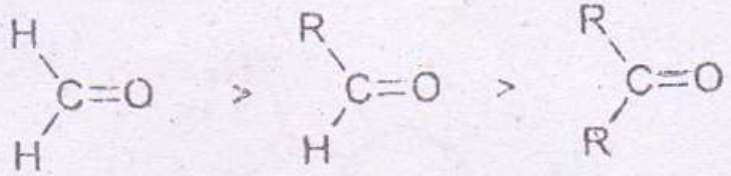
(b) An organic compound having molecular formula, $C_6H_{12}O$ does not reduce Tollen's reagent, but gives a crystalline derivative with 2,4-dinitrophenyl hydrazine. It also gives iodoform test and produces 2-methyl pentane on Clemmensen's reduction. Assign a structural formula to the organic compound and write the reactions involved. 2

(c) Give structures of the ylide and carbonyl compounds needed to prepare the following alkenes :

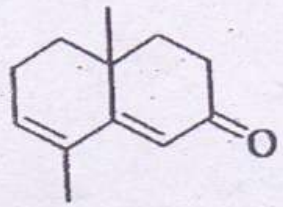
(i) $C_6H_5CH=CHCH_3$

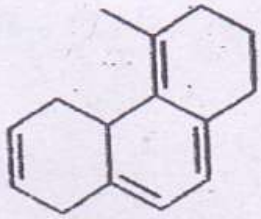
(ii)  1

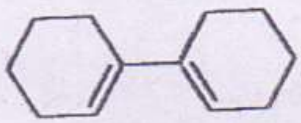
6. (a) The order of reactivity in nucleophilic addition is :



Account for this order in terms of steric and electronic factors. 2

(ii) 

(iii) 

(iv) 

(c) How can UV spectroscopy be used to distinguish between the *cis* and *trans* isomers of stilbene ? 1