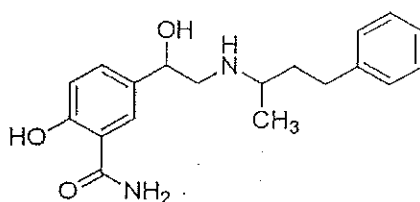BACHELOR OF PHARMACY HONOURS - LEVEL 03 - 2018/19
BSU3341- PHARMACEUTICAL CHEMISTRY II
FINAL EXAMINATION

INDEX NO: ....

Part B –Answer all questions

(80 marks)

1. Given below is the structure of Labetalol (A), which is used to treat high blood pressure and in long term management of angina.
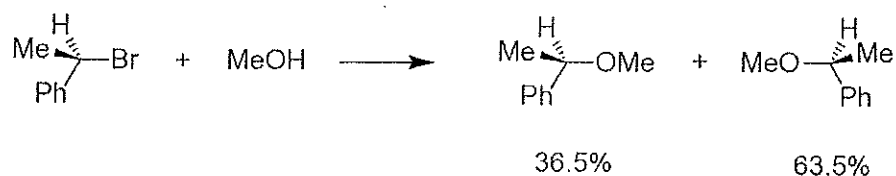

(A)

a) How many stereocenters are there in this molecule? **(02 marks)**
b) How many stereoisomers are possible for Labetalol? Draw their structures and assign configuration (as R or S) to each chiral center. **(10 marks)**
c) Identify the structures of a pair of enantimores of A from the structures you have drawn in part (b). **(04 marks)**
d) Identify the structures of a pair of diastereoisomers of A from the structures you have drawn in part (b). **(04 marks)**

2. a) Draw Newman projection diagrams to show staggered and eclipsed conformations of 2-chlorobutane when the C2-C3 bond is rotated through 360^0. Indicate the most stable conformation(s). **(06 marks)**
b) Draw chair conformations of trans-1-ethyl-4-methylcyclohexane and indicate which conformation is most stable. **(04 marks)**

3. The rate of hydrolysis of ethyl chloride is increased with the increase of NaOH concentration. Comment on this statement providing the mechanism of the reaction. **(10 marks)**

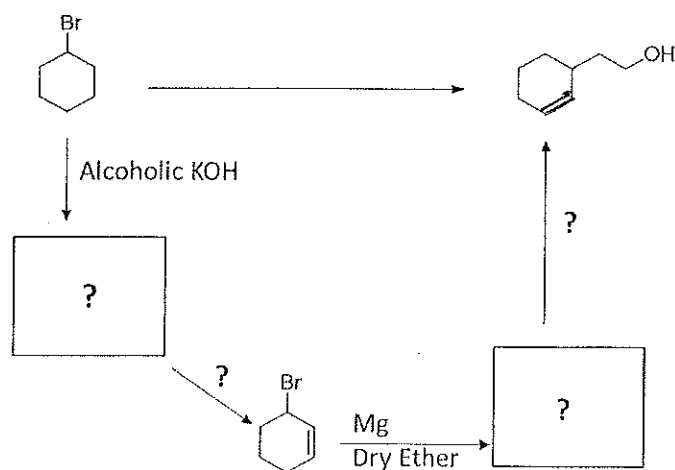4. a) Giving the mechanism, propose the structure of the major product of the following reaction. **(06 marks)**

$$H_3C-\underset{\underset{H_3C}{\overset{H_3C}{|}}}{C}-\underset{\underset{H}{\overset{|}{}}}{C}=CH_2 \quad \xrightarrow{HCl}$$
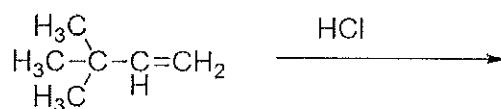
a) Explain why the methanolysis of optically active 1-bromo-1-phenylethane yields the following product distribution. **(09 marks)**

$$\underset{Ph}{\overset{H}{Me}}-Br \;+\; MeOH \;\longrightarrow\; \underset{Ph}{\overset{H}{Me}}-OMe \;+\; MeO-\underset{Ph}{\overset{H}{Me}}$$

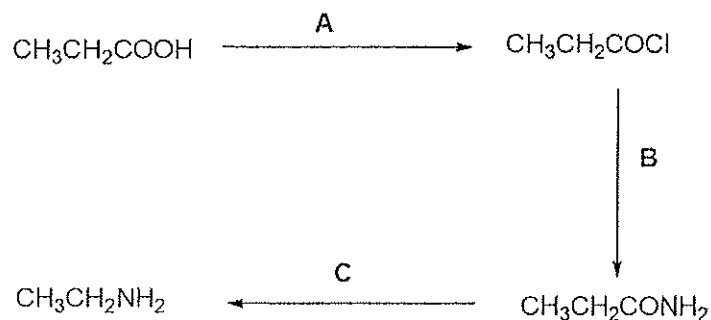$$\qquad\qquad\qquad\qquad\qquad 36.5\% \qquad\qquad 63.5\%$$

5. Complete the following reaction sequences giving structures of missing products, reagents and conditions. **(10 marks)**

a)

b)

$$CH_3CH_2COOH \xrightarrow{\quad A \quad} CH_3CH_2COCl$$

$$\downarrow B$$

$$CH_3CH_2NH_2 \xleftarrow{\quad C \quad} CH_3CH_2CONH_2$$
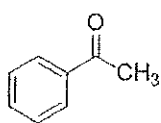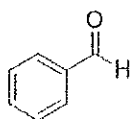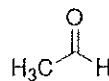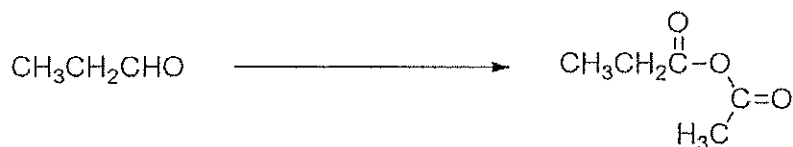
6. a) Consider the following compounds labelled as **Q**, **S** and **T**.

Q   S   T

 i. Select one compound which can undergo base-catalysed self-aldol condensation. **(02 marks)**

 ii. Select one compound which cannot undergo base-catalysed self-aldol condensation. **(02 marks)**

 iii. Write a mechanism for the formation of base-catalyzed crossed aldol condensation product between the two compounds you have chosen in I) and II). **(05 marks)**

b) How would you carry out the following transformation? **(06 marks)**

$$CH_3CH_2CHO \longrightarrow CH_3CH_2\overset{\overset{\displaystyle O}{\|}}{C}-O\overset{\displaystyle \diagdown}{\underset{H_3C\diagup}{C}}=O$$

———————— **END** ————————