



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF MEDICAL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY MEDICAL ENGINEERING:

BTMD 2016/S

ACH 4151: CHEMISTRY II

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of five questions. Answer question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

- (a) Define the following terms: (6 marks)
- i) Cracking
 - ii) Isomerism
 - iii) Octane number
- (b) Provide the correct structures for the following names (4 marks)
- (i) 1-bromo-2-methylhexan-2-ol
 - (ii) 2-methylbutanal
 - (iii) 3-methylhexanoic acid
 - (iv) Propyl pentanoate

(b) Give FIVE physical properties of alkyl halides.

(5 marks)

Question THREE

(a) Draw the structure of the aldehyde or ketone formed from the oxidation of each of the following alcohols.

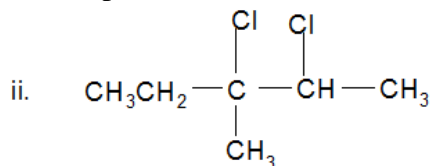
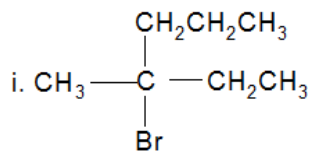
(Assume that reaction conditions are sufficiently mild that any aldehyde produced are not oxidized further to carboxylic acids.)

(6 marks)

- i) 2-methylpropan-1-ol ii. 2-butanol iii. 2-methylcyclohexanol

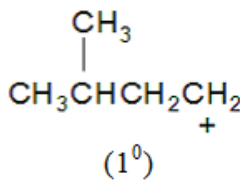
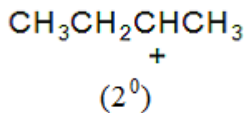
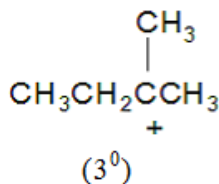
(b) i) Indicate the chiral carbon atoms in these compounds:

(3 marks)



ii) List the following carbocations in order of decreasing stability:

(2 marks)



i) State any ONE use in each of the following fractions of petroleum:

(5 marks)

- Natural gas
- Light petrol
- Gasoline
- Greases, Vaseline, Petroleum
- Paraffin wax

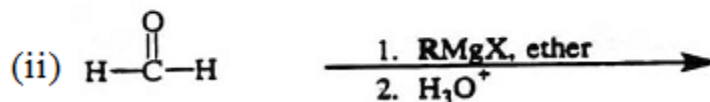
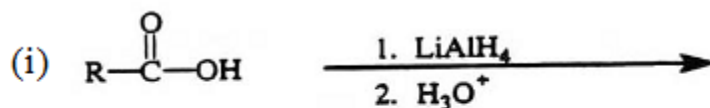
ii) State THREE ways of increasing octane number and ONE way to decrease octane number.

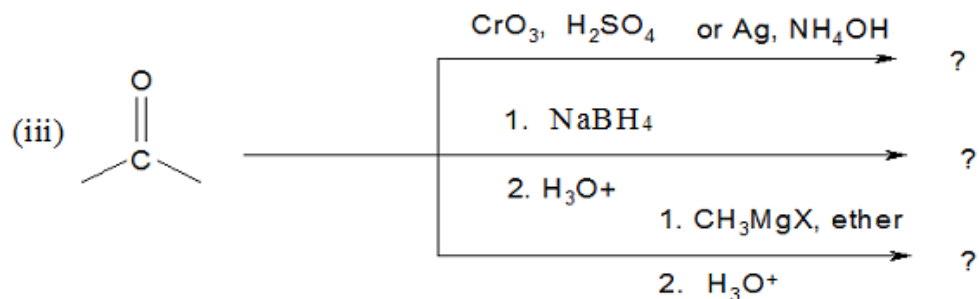
(4 marks)

Question FOUR

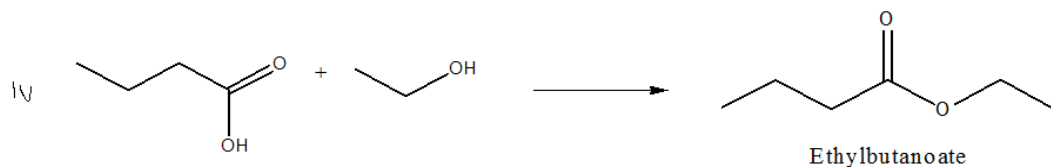
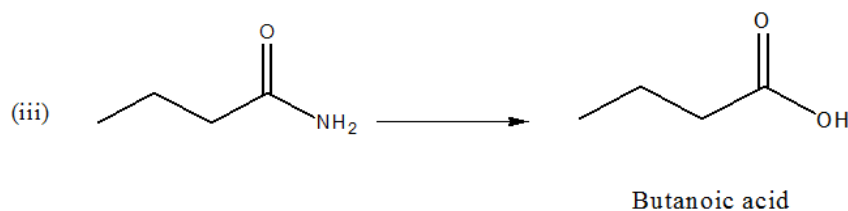
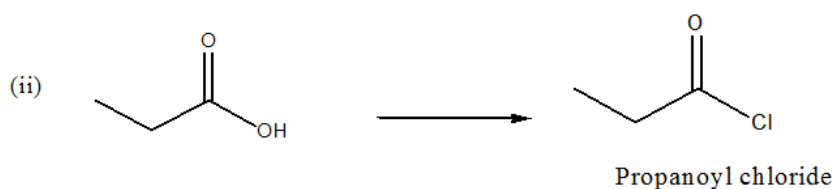
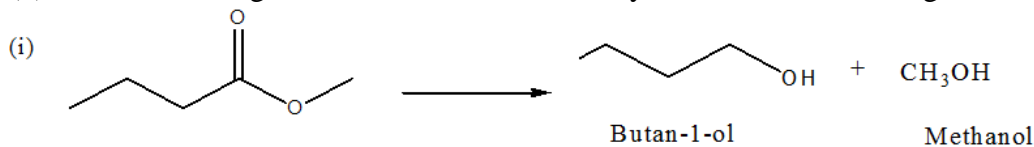
(a) Draw the structure of the product for the following transformations (R = Alkyl, Aryl or H)

(10 marks)





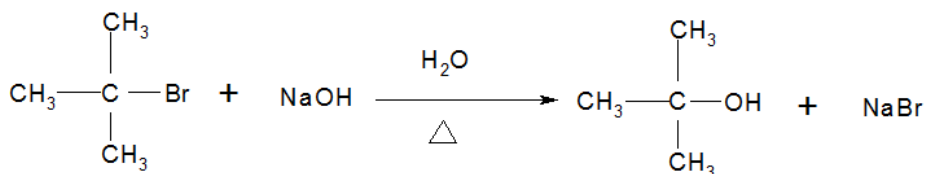
(b) Provide the reagents and conditions necessary to effect the following conversions: (10 marks)



Question FIVE

(a) Describe briefly the **Fischer-Tropsch Process** used to manufacture synthetic petroleum. (10 marks)

(b) Write down the $\text{S}_{\text{N}}1$ mechanism for the following reaction: (6 marks)



(c) With a reason, arrange the following compounds in order of increasing boiling points. (4 marks)

