Reg. No. | | | | | | | | | |

THE OPEN UNIVERSITY OF SRI LANKA

B.Sc Degree Programme and Stand Alone Courses in Science - 2011/2012

CMU2221/CME 4221 - Organic Chemistry 1

CONTINUOUS ASSESSMENT TEST III

Ques No.	Max.	Marks
1	50	
2	50	
Total	100	

Date: Saturday, 28th April 2012 Time: 1.30 p.m. – 3.00 p. m.

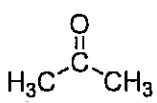
1. a) Arrange the following alcohols in the increasing order of reactivity towards Lucas reagent (HCl, anhydrous $ZnCl_2$, heat).

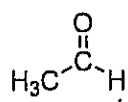
$(CH_3)_3COH$ (A) CH_3CH_2OH (B) $(CH_3)_2CHOH$ (C)

.....<.....<.....

(04 Marks)

b) Explain why (**D**) is less reactive than (**E**) towards addition of HCN.


(D)


(E)

.....

.....

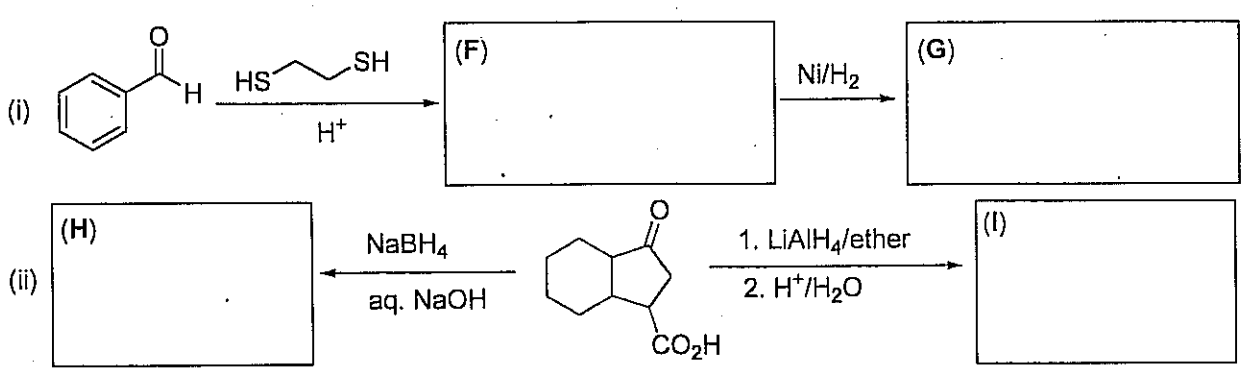
.....

.....

.....

(10 Marks)

c) Complete the reactions by giving correct substrates, intermediates, reagents and conditions or products from (**F**) to (**N**) in the cages.



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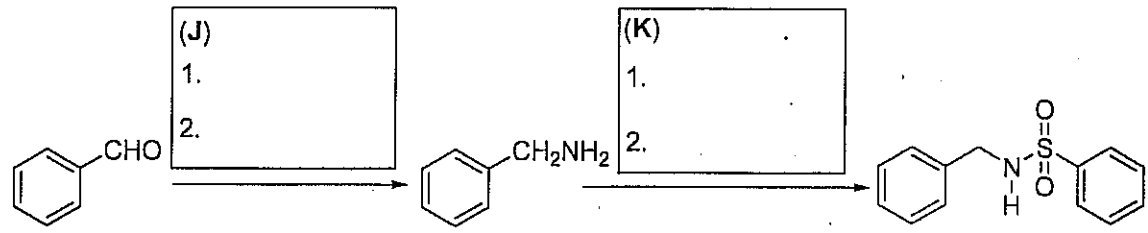
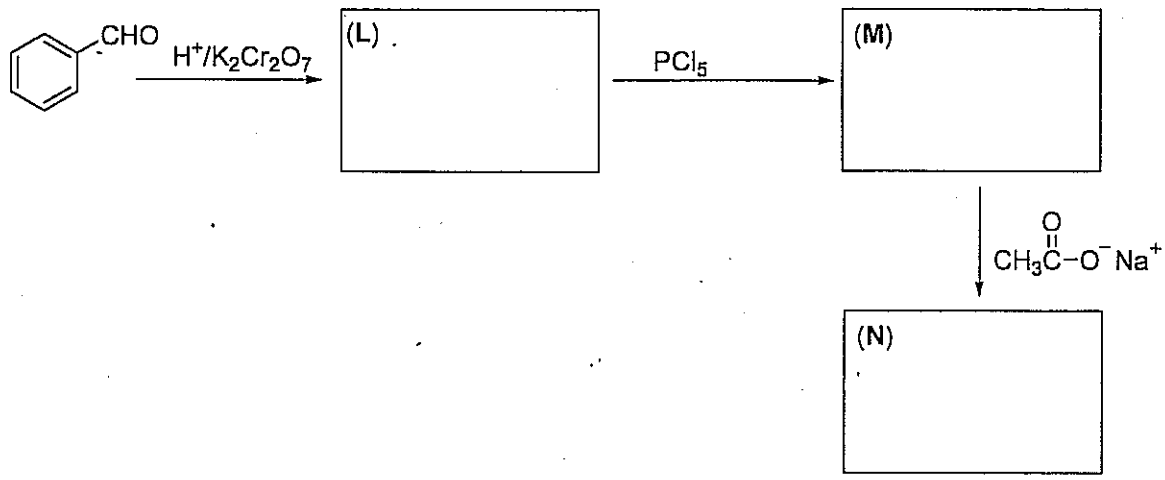
(iii)

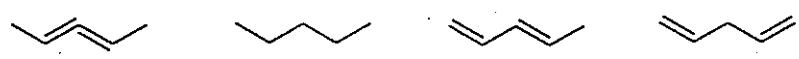


(iv)



(36 marks)

2. a) Arrange the given set of compounds in the order of increasing stability.



(P) (Q) (R) (S)

.....<.....<.....<.....

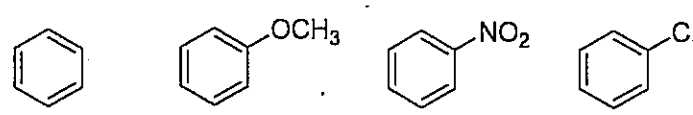
(03 marks)

b) Draw the two planar conformations of 1,3-butadiene.

s-*trans* s-*cis*

(03 marks)

c) Arrange the compounds given below in the increasing order of reactivity to bromination.



(T) (U) (V) (W)

.....<.....<.....<.....

(03 marks)

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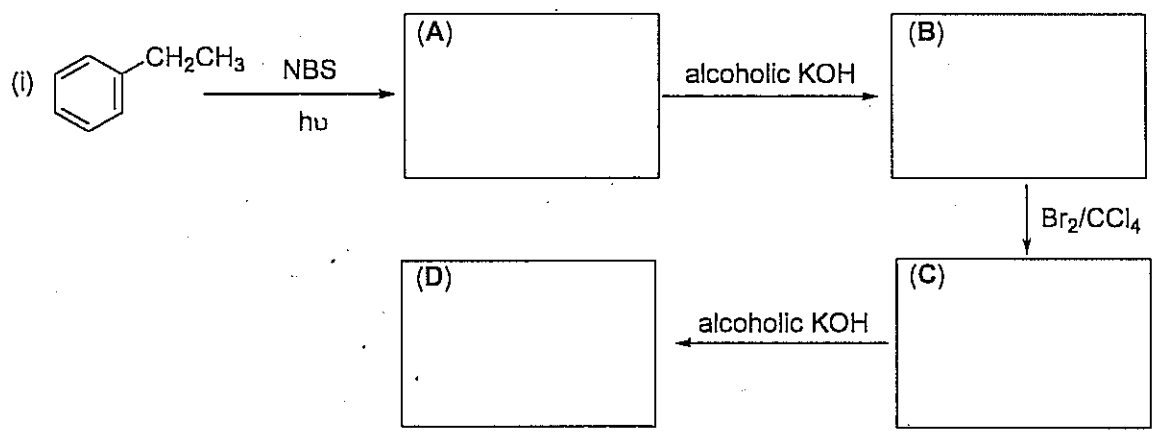
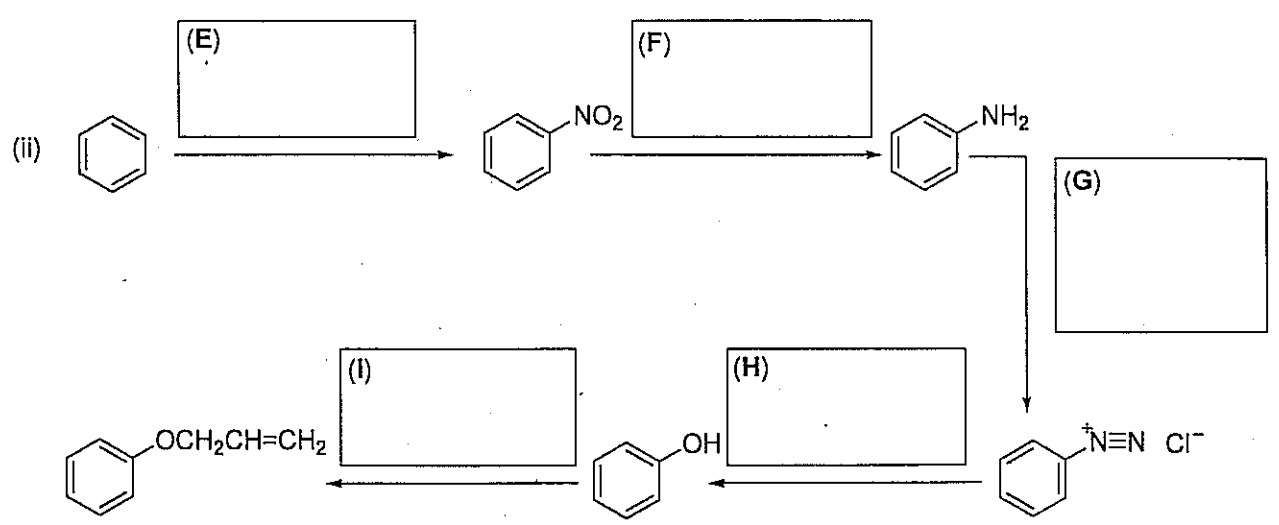
d) Draw the Frost Musulin diagram and the molecular orbital picture of cyclopentadienyl cation, anion and radical. Indicate whether each of the species is aromatic or non aromatic.

	cation	anion	Radical
Aromaticity →	.....	.....	.....

(10 marks)

e) Complete the following reactions giving missing compounds, reagents and conditions (**A**) to (**I**)





(31 marks)

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CAT III Answer guide

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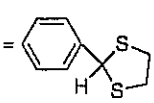
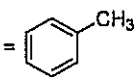
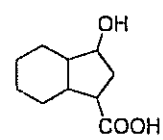
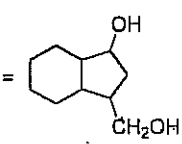
1. Unit IV

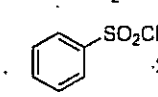
a) B < C < A [pg. 18]

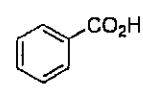
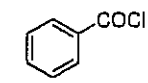
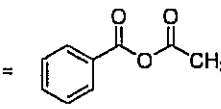
b)  CN^- addition is a nucleophilic addition reaction. If the positive charge on carbonyl group is larger CN^- addition will be faster. Alkyl groups releases electrons and the positive charge of the carbonyl carbon is reduced in acetone (D). Therefore (E) is more reative. [pg. 49]

c)

(i) (F) =  (G) =  [p. 54]

(ii) (H) =  (I) =  [p. 96]

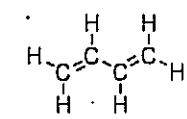
(iii) (J) = 1. NH_3, 2. H_2/Ni (K) = 1.  2. NaOH [pp. 132, 127]

(iv) (L) =  (M) =  (N) =  [pp. 147, 100]

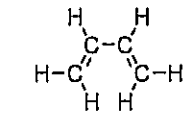
2. Unit V

a) (P) < (S) < (R) < (Q) [p. 7]

b) [p. 9]



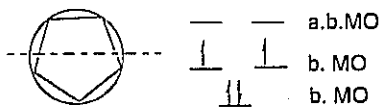
s-*trans*



s-*cis*

c) (V) < (W) < (T) < (U) [p. 79]

d)



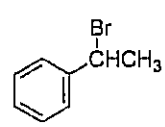
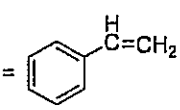
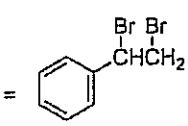
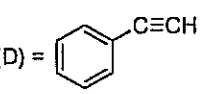
[p. 47]

cyclopentadienyl cation
anti aromatic (markes given for non aromatic as there was an error in the question)

cyclopentadienyl anion
aromatic

cyclopentadienyl radical
non aromatic

e)

(i) (A) =  (B) =  (C) =  (D) =  [p. 121]

(ii) (E) = conc. HNO_3, conc. H_2SO_4 (F) = 1. Sn/conc. HCl 2. OH^- (G) = $NaNO_2$/conc. HCl, 0-5°C

(H) = aq. H_2SO_4 , heat (I) = 1. NaOH 2. $BrCH_2CH{=}CH_2$ [pp.136, 148, 170]