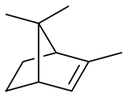
國立嘉義大學九十四學年度
應用化學系碩士班招生考試試題

科目：綜合化學 I

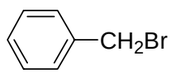
1. Provide the likely product(s) with proper stereochemistry and indicate the major one if more than one product formed. (3 % for each question)

a)



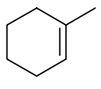
1) BH_3/THF
2) NaOH/ H_2O_2

b)



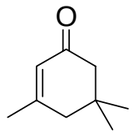
1) NaCN
2) $LiAlH_4$
3) $(CH_3CO)_2O$

c)



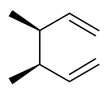
1) $Hg(OAc)_2$
2) $NaBH_4$

d)



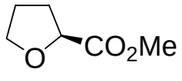
LDA/
work-up

e)



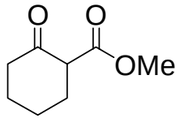
heat
225°C

f)



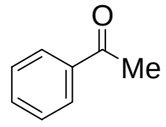
1) 2.5 eq EtMgBr
2) H_3O^+

g)



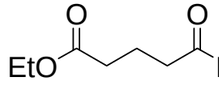
$NaBH_4$

h)



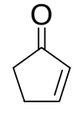
1) I_2/ NaOH
2) H^+

i)



EtONa/ EtOH

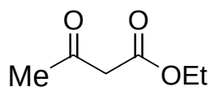
j)

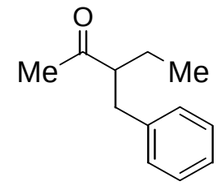


1)Me_2CuLi
2) EtI

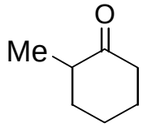
2. Please complete the following synthesis, starting from the given material. (10 % for each question)

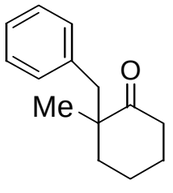
a)





b)





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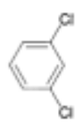
3. Arrange the order **by putting ">" or "<"** between the following molecules. (10%)

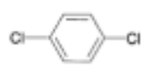
(a) OSF_2 $OSCl_2$ $OSBr_2$ (halogen-S-halogen angle)
(b) NH_3 PH_3 AsH_3 (H-N-H angle)
(c) H_2O H_2S H_2Se (H-O-H angle)
(d) PF_3 PCl_3 PBr_3 (X-P-X angle)
(e) ClO_3^- BrO_3^- IO_3^- (O-X-O angle)

4. Give the point group of the following: (10 %)

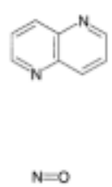
(a)



(b)



(c)



(d)

5. Predict the order of acidity between BF_3 , BCl_3, BBr_3 and **explain why**. (10%)

6. What's the coordination number of the following structures. (10 %)

(a) a primitive cubic structure _____
(b) a body-centered-cubic lattice _____
(c) a face-centered-cubic lattice _____
(d) a cesium chloride lattice _____
(e) a rock-salt lattice _____

7. Give the synthesis for *cis* and *trans*-$[Pt(NH_3)_2Cl_2]$, starting with $[Pt(NH_3)_4]^{+2}$ or $[PtCl_4]^{-2}$. (10 %)