

國立暨南國際大學九十二學年度博士班研究生入學考試試題

431 有機化學 (應化所適用)

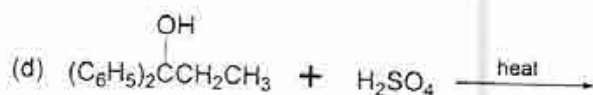
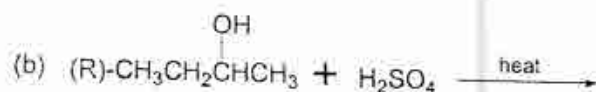
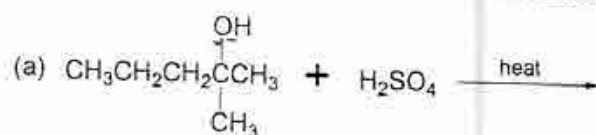
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考生注意: 1. 依次序作答, 只要標明題號, 不必抄題。
2. 答案必須寫在答案卷上, 否則不予計分。
3. 試題隨卷繳回。

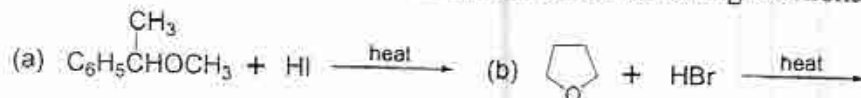
1. Write equations to show how the following conversions could be made: (10)



2. Write formulas for the expected elimination product(s) for each of the following reactions. If more than one alkene can be formed, indicate which alkene would predominate in the reaction mixture. (10)



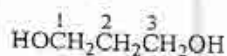
3. Write equations to show the mechanisms of the following reactions: (10)



4. Predict the major monohalogenation products of *N*-bromosuccinimide (NBS) halogenation of the following compounds: (10)

(a) butylbenzene (b) 1-phenylpropene

5. Identify the carbon(s) that are *not* prochiral in 1,3-propanediol. Label the enantiotopic hydrogens on the prochiral carbon(s) as H_R and H_S . (10)



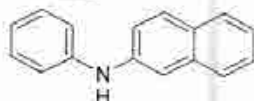
國立暨南國際大學九十二學年度博士班研究生入學考試試題

431 有機化學 (應化所適用)

(本試題共 2 頁, 第 2 頁)

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6. *N*-phenyl-2-naphthylamine is added to rubber articles to prevent radical degradation of the rubber. Write an equation that shows how this amine can function as an antioxidant. (10)



N-phenyl-2-naphthylamine

7. Predict the major organic products of the following reactions: (10)

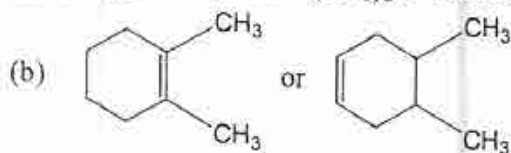
(a) 2-methylpropene with H_2SO_4 in ethanol

(b) 1-butene with 0.1M aqueous HI

(c) $(\text{CH}_3)_3\text{CCH}=\text{CH}_2 \xrightarrow[(2) \text{NaBH}_4]{(1) \text{Hg}(\text{O}_2\text{CCH}_3)_2, \text{H}_2\text{O}}$

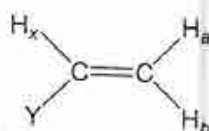
8. Which member of each of the following pairs would release the greater amount of energy per mole upon hydrogenation of the alkene double bonds? Explain. (10)

(a) $(\text{CH}_3)_2\text{C}=\text{CH}_2$ or $(\text{CH}_3)_2\text{C}=\text{CHCH}_3$



9. Write equations to show how you could prepare $\text{C}_6\text{H}_5\text{CH}=\text{CHCH}_2\text{CH}_3$ by Wittig reaction. (Begin with organic halide and carbonyl compound.) (10)

10. Construct a tree diagram for each proton in the NMR spectrum of the following partial structure: (10)



$$J_{ab} = 2.0 \text{ Hz}$$

$$J_{ax} = 8.0 \text{ Hz}$$

$$J_{bx} = 13.0 \text{ Hz}$$