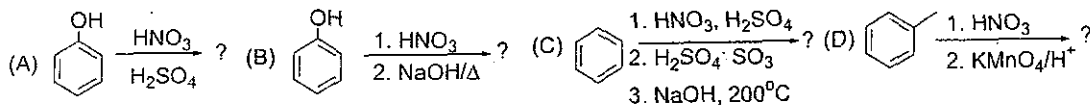
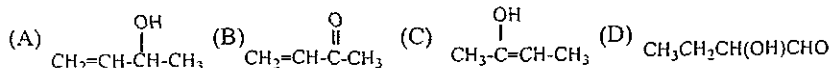


單選題 (60%) (不需抄題但請標明題號並依序作答)

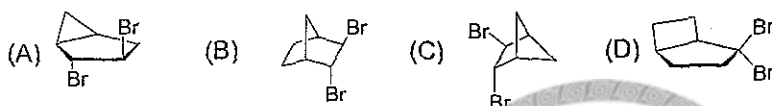
1. What is the best sequence of reactions to synthesize *m*-nitrophenol?

2. Which of the following is the enol tautomer of 2-butanone?

3. How many peaks would you expect to observe in the ^1H NMR spectrum for 1,3-diiodo-2,2-dimethylpropane?

(A) 2 (B) 3 (C) 4 (D) 10

4. Which of the following compounds is the strongest base?

(A) CH_3NH_2 (B) Pyridine (C) $(\text{CH}_3)_4\text{N}^+\text{Br}^-$ (D) $(\text{CH}_3\text{CH}_2)_2\text{NH}$ 5. Which compound is the product when bicyclo[2.2.1]-2-heptene reacts with Br_2/CCl_4 ?

6. Which of the following is the correct structure of allyl chloride?

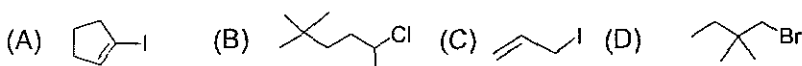
(A) $\text{CH}_3\text{CH}=\text{CHCl}$ (B) $\text{ClCH}_2\text{CH}=\text{CH}_2$ (C) $\text{CHCl}=\text{CHCH}_3$ (D) $\text{CH}_2=\text{CHCHCl}_2$ 7. What would be the reduction products of $\text{C}_6\text{H}_5\text{CH}=\text{CHCO}_2\text{CH}_2\text{CH}_3$ with LiAlH_4 after workup?

(A) $\text{C}_6\text{H}_5\text{CH}=\text{CHCH}_2\text{OH} + \text{CH}_3\text{CH}_2\text{OH}$ (B) $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{OH} + \text{CH}_3\text{CH}_2\text{OH}$
 (C) $\text{C}_6\text{H}_5\text{CHCHO} + \text{OHCCH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ (D) $\text{C}_6\text{H}_5\text{CH}=\text{CHCH}_2\text{OCH}_2\text{CH}_3 + \text{CH}_3\text{OH}$

8. Which of the following compounds has the highest boiling point?

(A) *o*-xylene (B) benzyl alcohol (C) benzene (D) diethyl ether9. Which of the following reaction will yield $\text{CH}_3\text{CHDCH}_3$ as the product?

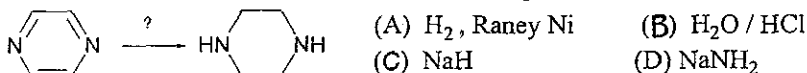
(A) $\text{CH}_3\text{CH}_2\text{CH}_2\text{MgBr} + \text{D}_2\text{O} \rightarrow ?$ (B) $\text{CH}_3\text{CHDCH}_2\text{MgBr} + \text{D}_2\text{O} \rightarrow ?$
 (C) $(\text{CH}_3)_2\text{CHLi} + \text{D}_2\text{O} \rightarrow ?$ (D) $\text{CH}_3\text{CHDCH}_2\text{OH} + \text{D}_2\text{SO}_4 \rightarrow ?$

10. Which of the following alkyl halides has the fastest substitution rate with KCN in acetone at room temperature?

11. Which of the following is a polar aprotic solvent?

(A) H_2O (B) $(\text{CH}_3)_2\text{S}=\text{O}$ (C) $\text{CH}_3\text{CH}_2\text{OH}$ (D) CH_3COOH

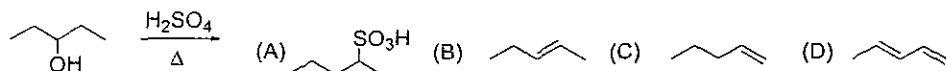
12. What set of reagents is required for the following reaction?



13. A pentapeptide contains the amino acids: Gly, Leu, Ala, Phe(2). Partial hydrolysis of the peptide gives fragments: Leu-Gly-Phe, Phe-Ala and Gly-Phe-Phe. What is the structure of peptide?

(A) Leu-Gly-Phe-Phe-Ala (B) Phe-Phe-Ala-Leu-Gly (C) Gly-Leu-Ala-Phe-Phe (D) Leu-Gly-Phe-Ala-Phe

14. What would be the Major product of the following reaction?



15. What would be produced from the reaction of D-glucose with Fehling's solution?

(A) D-glucital + Cu_2O (B) D-mannaric acid + Cu_2O
 (C) L-gluconic acid + Cu_2O (D) D-gluconic acid + Cu_2O

16. Which of the following amino acid contains an imidazole ring?

(A) histidine (B) glycine (C) aspartic acid (D) serine

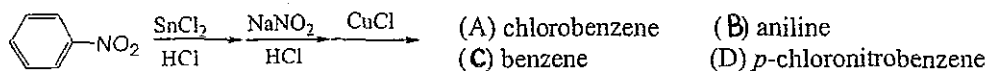
17. What product(s) would be obtained from the reaction of cyclopentene with O_3 followed by the treatment of zinc metal in CH_3COOH ?

(A) $OHCCH_2CH_2CHO$ (B) $OHCCH_2CH_2CH_2CHO$ (C) $CH_3CH_2CHO + CH_3CHO$ (D) $2 CH_3CHO$

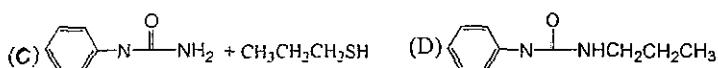
18. Which of the following compounds will give a Positive "Tollens' test"?

(A) $C_6H_5CH_2COOH$ (B) $C_6H_5COCH_2CH_3$ (C) $C_6H_5CH(OCH_2CH_3)_2$ (D) $p-CH_3OC_6H_4CHO$

19. What is the final product for the following transformation?



20. What would be the product of the reaction of C_6H_5NCS with $CH_3CH_2CH_2NH_2$?



問答題

- 一. *t*-Butyl methyl ether is an additive for unleaded gasoline. How to prepare this compound from isobutylene? (5%)
- 二. Maltose is a disaccharide composed of one D-glucose unit joined to a second D-glucose unit through a α -1,4' linkage. Please draw the structure of : (A) α -D-glucopyranose in a chair conformation. (B) Maltose. (8 %)
- 三. Please explain each of the following terms. (12%)
 (a) Aldol reaction (b) meso compound (c) isoelectric point (d) *t*-butyl radical
- 四. Please give the structure of 2'-deoxyadenosine 5'-phosphate. (5%)
- 五. Provide the organic product(s) for the following reactions: (10%)

