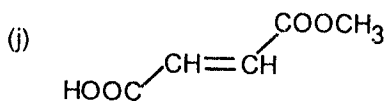
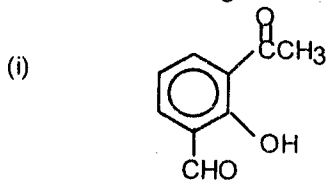
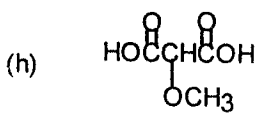
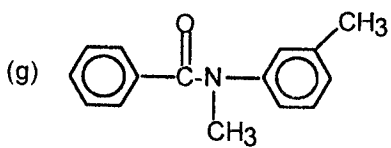
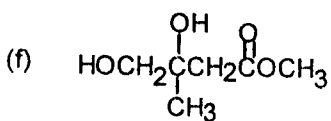
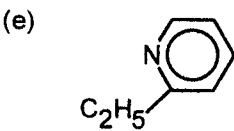
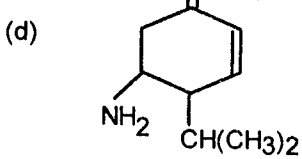
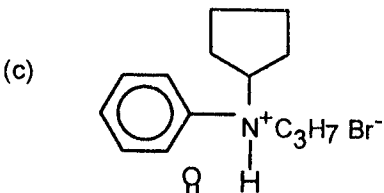
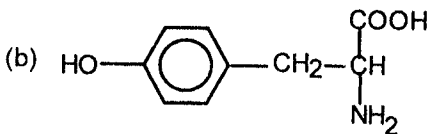
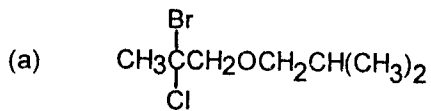
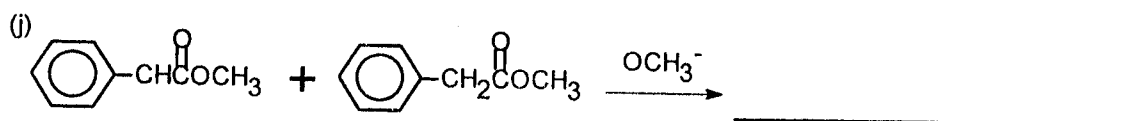
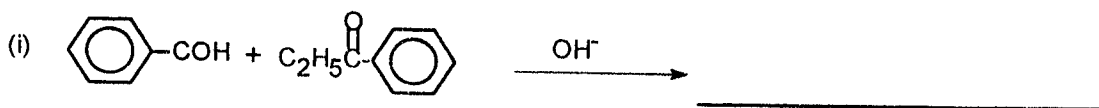
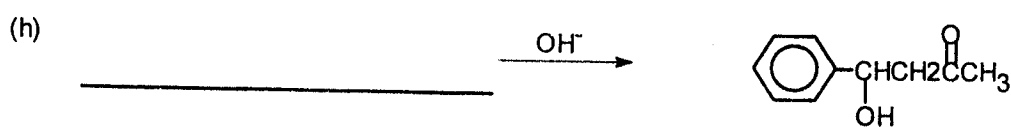
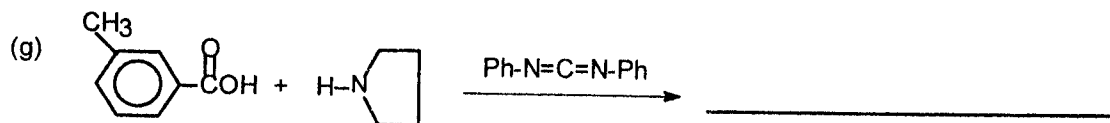
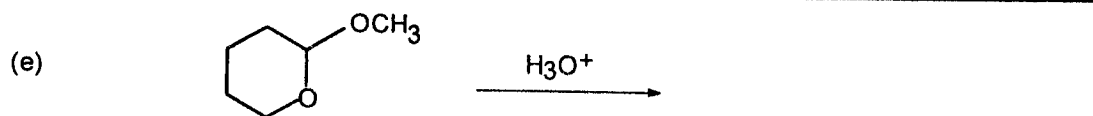
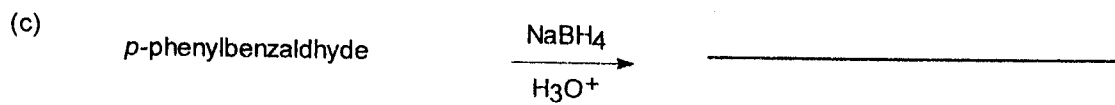
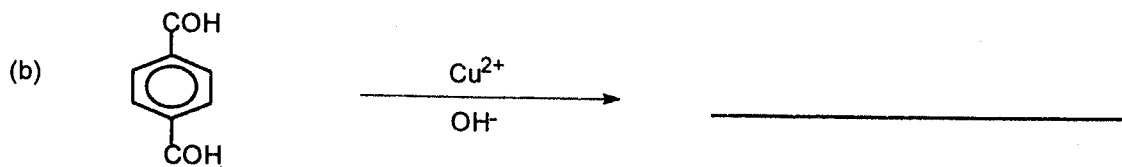


1. Write the IUPAC names of the following compounds (2% for each).



(背面仍有題目,請繼續作答)

2. Write the reactants or products of the following reactions (2% for each).

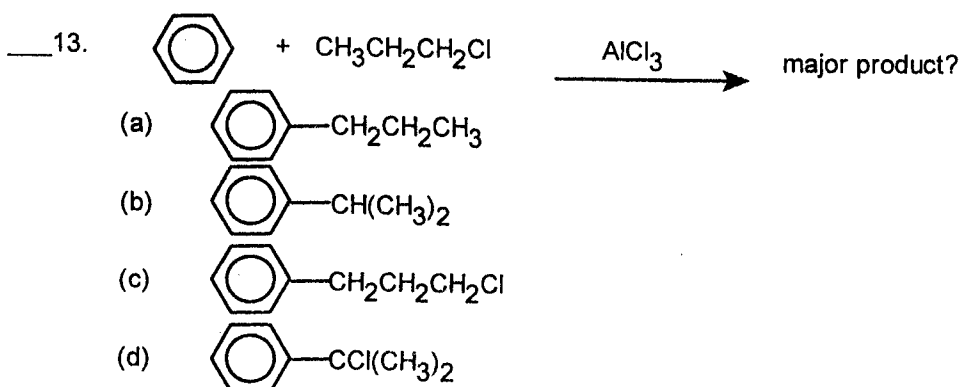


Answer the following questions (2% for each; minus 0.5% for wrong answer).

- ___ 3. Which of the following compounds has the highest reactivity.
- (a) CH_3COCH_3
 - (b) $\text{CH}_3\text{CONHCH}_3$
 - (c) $\text{CH}_3\text{OCOOCH}_3$
 - (d) $\text{CH}_3\text{COOCH}_3$
- ___ 4. Which of the following compounds has the highest boiling point?
- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
 - (b) $\text{CH}_3\text{CH}_2\text{CH}_3$
 - (c) $\text{CH}_3\text{CH}_2\text{CHO}$
 - (d) CH_3COOH
- ___ 5. Which of the following compounds has the highest activity in monosulfonation reaction?
- (a) Bromobenzene
 - (b) Toluene
 - (c) Nitrobenzene
 - (d) Anisole
- ___ 6. Which of the following compounds gives a positive Benedict's test?
- (a) $\text{CH}_3\text{CH}=\text{CH}(\text{OH})$
 - (b) CH_3COCH_3
 - (c) $\text{CH}_3\text{CH}_2\text{OH}$
 - (d) $\text{CH}_3\text{CH}_2\text{COH}$
- ___ 7. In the body, reduction of a carbonyl groups is carried out by:
- (a) Folate
 - (b) ADP
 - (c) NADPH
 - (d) ATP
- ___ 8. An unknown compound gave a positive Tollen's test, and treatment with iodine and sodium hydroxide gave iodoform. Which of the following compounds is the unknown compound?
- (a) $\text{CH}_3\text{CH}_2\text{OH}$
 - (b) $\text{CH}_3\text{CH}_2\text{COH}$
 - (c) CH_3COCH_3
 - (d) $\text{CH}_3\text{CH}_2\text{COOH}$

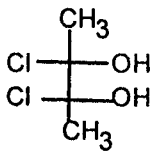
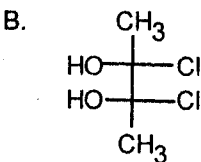
(背面仍有題目,請繼續作答)

- ___ 9. Acetyl CoA is a
 (a) thiol ester.
 (b) carboxylic ester
 (c) ketone
 (d) carboxylic acid
- ___ 10. Which of the following compounds would expect to be able not to react with an amine.
 (a) alanine
 (b) benzoic acid
 (c) pyruvate
 (d) glucose
- ___ 11. Hydrolysis of an acetal will yield
 (a) one aldehyde + one ether
 (b) one aldehyde + two ether
 (c) one aldehyde + one alcohol
 (d) one aldehyde + two alcohol
- ___ 12. Which of the following CANNOT take part in aldol reaction?
 (a) formaldehyde
 (b) acetaldehydef
 (c) 2-butanone
 (d) 3-pentanone



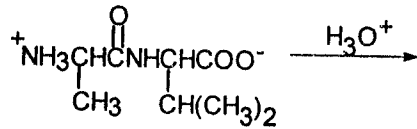
- ___ 14. What product is obtained from the reduction of CH₃CH₂-S-S-CH₂-CH₃
 (a) CH₃COSH
 (b) CH₃CH₂-S-CH₂-CH₃
 (c) CH₃CH₂SH
 (d) CH₃CH₂-S-S-H
- ___ 15. In NMR spectrum, which proton or protons of the following compounds gave the largest downfield shift ?
 (a) R-CH₃
 (b) R-CH₂OH
 (c) R-CH₂-Cl
 (d) R-COOH
 (e) Ar-H

- __16. What is the intermediate involving aldol condensaton?
 (a) carbocation
 (b) carboanion
 (c) free radical
 (d) enol
- __17. Which of the following, on oxidation, yields a compound of formula C_4H_8O that gives a negative result with Fehling's or Tollens' reagent?
 (a) $C_2H_5OC_2H_5$
 (b) $C_2H_5CH(OH)CH_3$
 (c) C_4H_9OH
 (d) $(CH_3)_2CHCH_2OH$
 (e) none of the above
- __18. A Claisen condensation performed on methyl acetate will form?:
 (a) methyl 3-ketobutanoate
 (b) methyl 3-ketoacetate
 (c) methyl 2-ethyl-3ketohehexanoate
 (d) methyl 3-ethyl-2ketohehexanoate
- __19. LD_{50} is the concentration that kills 50% of the living cells in a cultured medium. Which of the following organic compounds has the highest toxicity?

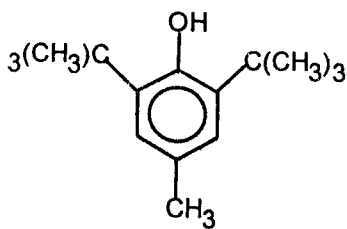
	LD_{50}
(a) Formaldehyde	800 mg/kg
(b) Acetaldehyde	1.9 g/kg
(c) Acetone	8.4 g/kg
(d) Benzopyrene	10 μ g/Kg
- __20. Which of the following compounds can be used as NMR solvent?
 (a) benzene
 (b) hexane
 (c) chlorform
 (d) carbon tetrachloride
- __21. Which of the following compounds has lowest pK_a value?
 (a) phenol
 (b) *p*-nitrophenol
 (c) *p*-methylphenol
 (d) *p*-aminophenol
- __22. A:  B: 
- A and B is:
 (a) stereoisomer (b) diastereomer (c) enantiomer (d) meso compounds

(背面仍有題目,請繼續作答)

23. Please write down the mechanism of the following reaction (5%).



24. Outline all steps in a possible laboratory synthesis of Butylated hydroxytoluene (BHT), a food preservative. The starting material will be toluene and other aliphatic or inorganic compound (5%).



25. Propose a structure for the compound based on the UV, IR, Mass, and NMR spectra, and explain what kinds of structural informations from these spectra (10%) ?

