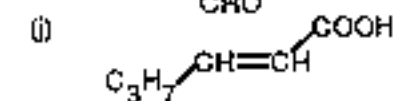
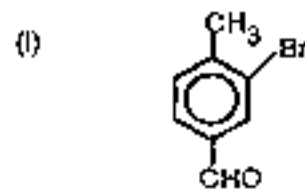
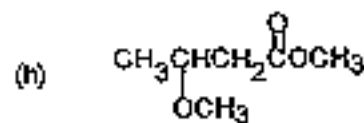
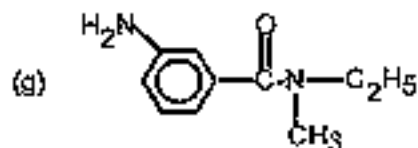
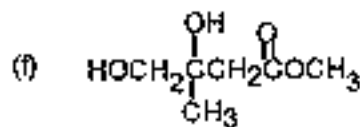
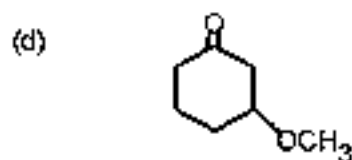
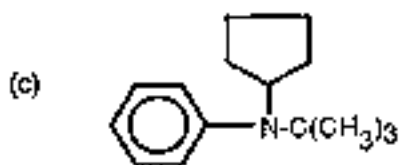
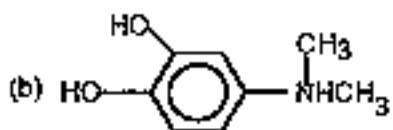
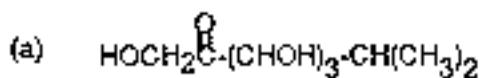
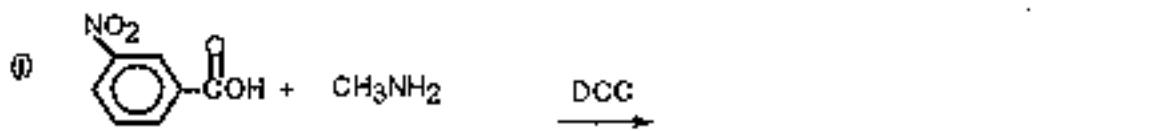
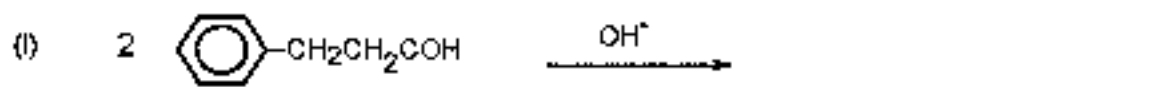
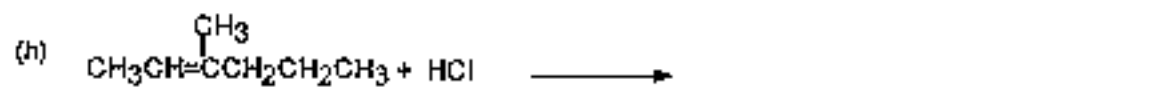
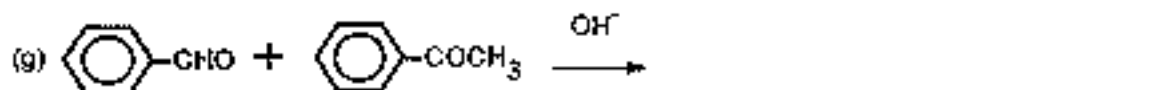
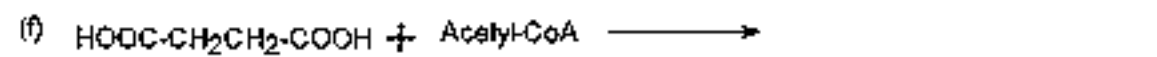
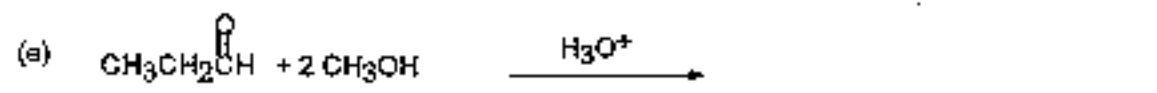
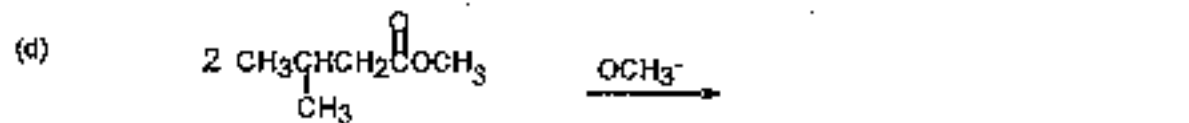
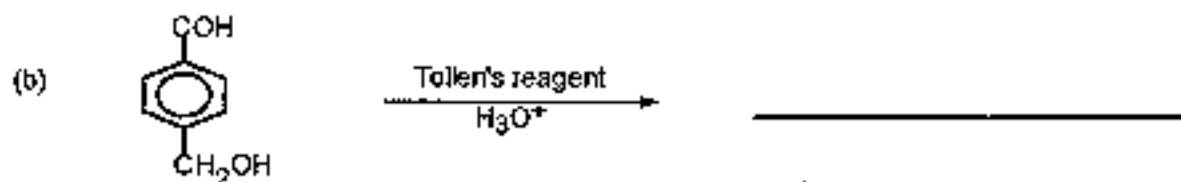
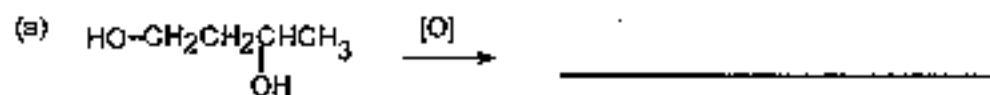


1. What are the IUPAC names of the following compounds (2% for each)?

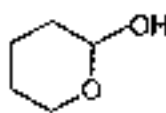


(背面仍有題目,請繼續作答)

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



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

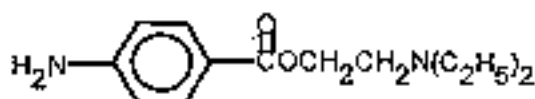
- ___3. Which of the following compounds has the highest basicity??
 (a) $C_6H_5NH_2$
 (b) $C_6H_5SO_2NH_2$
 (c) $C_6H_5CONH_2$
 (d) $CH_3(CH_2)_5NH_2$
- ___4. Which of the following compounds has the second highest boiling point?
 (a) CH_3CH_2OH
 (b) CH_3OCH_3
 (c) $CH_3CH_2NH_2$
 (d) CH_3COOH
- ___5.  Is a or an (a) acetal
 (b) semiacetal
 (c) ester
 (d) amide
- ___6. Reactions double bond compounds are known as
 (a) substitution.
 (b) addition.
 (c) oxidation.
 (d) elimination.
- ___7. Which of the following compounds give a positive Benedict's test and treatment with iodine and sodium hydroxide gives iodoform?
 (a) CH_3CH_2OH
 (b) CH_3OCH_3
 (c) CH_3COH
 (d) CH_3CH_2COH
- ___8. What ester would you need to produce $C_3H_7\overset{O}{\parallel}CH(C_2H_5)\overset{O}{\parallel}COC_2H_5$?
 (a) $C_3H_7COOCH_3$
 (b) $C_3H_7COOC_2H_5$
 (c) $C_2H_5COOC_2H_5$
 (d) $C_3H_7COOC_3H_7$
- ___9. An unknown compound is soluble in cold concentrated sulfuric acid, but is soluble in sodium hydroxide. It does not decolorize bromine and does not react with metallic sodium. Which of the following compounds is the unknown compound?
 (a) Alcohol
 (b) Phenol
 (c) Ketone
 (d) Ether

(背面仍有題目,請繼續作答)

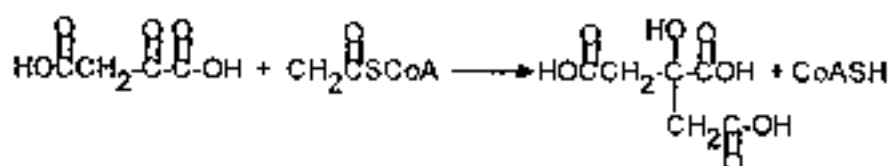
- ___ 10. Which of the following compounds would you expect to be able to react with an amine.
- ammonia
 - methane
 - phenol
 - diethyl ether
- ___ 11. In the body, reduction of carbonyl groups is a(n):
- H^+
 - $NaBH_4$
 - Pyruvate
 - NADH
- ___ 12. Which of the following describes the visible evidence for a positive Tollen's Test?
- A red-brown solution becomes clear.
 - A red precipitate forms from a blue solution.
 - A purple solution yields a brown precipitate.
 - A mirrorlike deposit forms from a colorless solution.
- ___ 13. Which of the following compounds would you expect not to be able to react with carboxylic acid?
- tertiary amine
 - thiol
 - carboxylic acid
 - alcohol
- ___ 14. A Claisen condensation performed on methyl acetate will form:
- methyl 3-ketobutanoate
 - methyl 3-ketoacetate
 - methyl 2-ethyl-3-ketohexanoate
 - methyl 3-ethyl-2-ketohexanoate
- ___ 15. LD₅₀ is the concentration that kills 50% of the living cells in a cultured medium. Which of the following compounds has the lowest toxicity?
- | | LD ₅₀ |
|-------------------|------------------|
| (a) Formaldehyde | 800 mg/kg |
| (b) Acetaldehyde | 1.9 g/kg |
| (c) Acetone | 8.4 g/kg |
| (d) Batrachotoxin | 1.0 μ g/kg |
- ___ 16. cyclic glucose is a
- thiol ester
 - semiacetal
 - acetal
 - acetic acid
- ___ 17. In NMR spectra, the most up-field shift will be exhibited by the proton or protons in which compound?
- $R-CH_3$
 - $R-OCH_3$
 - $R-CH_2-Cl$
 - $RCOOH$

18. Mention at least two simple chemical tests by which you could distinguish between benzaldehyde and benzoic acid (5%).

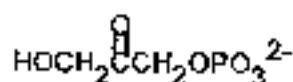
19. Procaine, a local anesthetic whose hydrochloride is Novocain, has the following structure. Identify the functional groups present and show the structures of the alcohol and carboxylic acids you would use to prepare it (5%)?



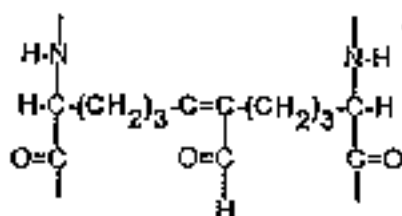
20. In a metabolism pathway in the body, oxaloacetic acid reacts with acetyl coenzyme A (acetyl SCoA) in the presence of an enzyme and water to form citric acid and free coenzyme A. Please write the reaction mechanism in detail (Biological aldol reaction) (5%).



21. The following phosphate ester is an important intermediate in carbohydrate metabolism. What products would result from hydrolysis of this ester? Please write down the reaction mechanism in the presence of acid (5%).



22. Collagens have extensive posttranslational modification. Collagen triple helices crosslink each other involving oxidation, aldol condensation, and dehydration of two lysines. Please write the reactions based on the resulting product (5%).



(背面仍有題目,請繼續作答)

23. 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 (5%) ?

