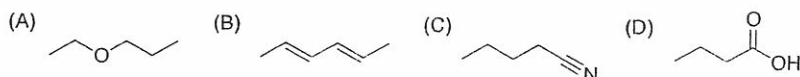


※注意：請於試卷上”選擇題作答區”依序作答

單選題 (75%)

1. Which of the following compounds would you expect to have the highest boiling point?



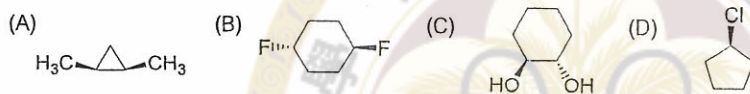
2. Which of the following solvents is protic?

(A) diethyl ether (B) ethanol (C) chloroform (D) benzene

3. The most stable conformation of *trans*-1-*tert*-butyl-4-chlorocyclohexane is the one in which:

- (A) the *tert*-butyl group is axial and the chloro group is equatorial.
(B) the chloro group is axial and the *tert*-butyl group is equatorial.
(C) both groups equatorial.
(D) both groups axial.

4. Which of the following compound is chiral?



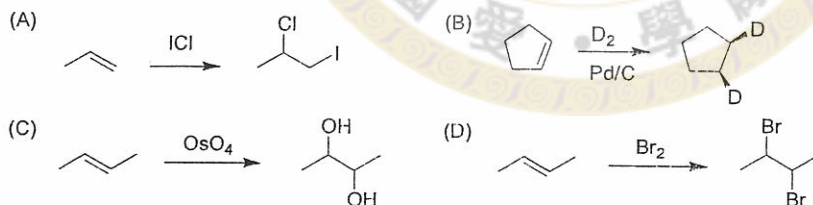
5. Which of the following is NOT true of enantiomers? They have the same:

(A) melting point (B) density (C) chemical reactivity toward achiral reagents (D) specific rotation

6. A compound with the formula $C_{10}H_{13}OBr$ react with excess hydrogen and a catalyst yielded a compound with the formula $C_{10}H_{17}OBr$. The compound could have:

- (A) one ring and two double bonds (B) two rings and one triple bond
(C) no ring and two double bonds (D) two rings and two triple bonds

7. Which of the following reaction is regioselective?



8. Select the structure of a compound C_6H_{14} with a base peak at $m/z = 43$?

- (A) $CH_3CH_2CH_2CH_2CH_2CH_3$ (B) $(CH_3)_2CHCH(CH_3)_2$
(C) $(CH_3CH_2)_2CHCH_3$ (D) $(CH_3)_3CCH_2CH_3$

9. Which of the following compound will NOT be represented by a singlet ONLY in the 1H NMR spectrum?

(A) Neopentane (B) Hexamethylbenzene (C) (Z)-1,2-Dibromoethene (D) Isobutane

10. Which free radical is most stable relative to the hydrocarbon from which it is formed?

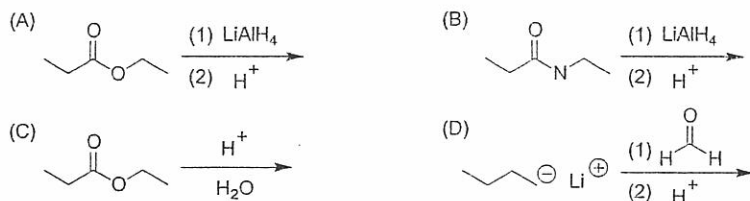


11. Heating $CH_3CH_2OCH_2CH_2CH_3$ with excess concentrated HBr would produce:

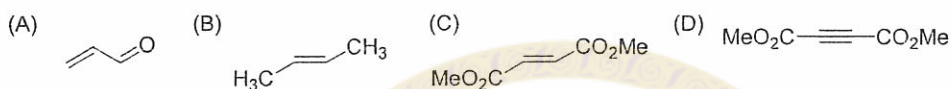
- (A) $CH_3CH_2OCH_2CH_2CH_2Br$ (B) CH_3CH_2OH and $CH_3CH_2CH_2Br$
(C) $BrCH_2CH_2OCH_2CH_2CH_3$ (D) CH_3CH_2Br and $CH_3CH_2CH_2Br$

見背面

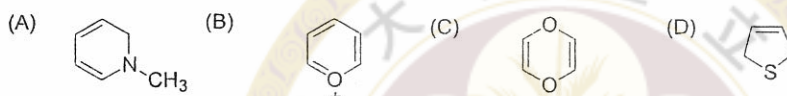
12. Which of the following reaction will NOT produce 1° alcohol?



13. From the standpoint of reactivity, which of the following compound will be the poorest choice of dienophile to react with 2,3-dimethyl-1,3-butadiene in a Diels-Alder reaction?



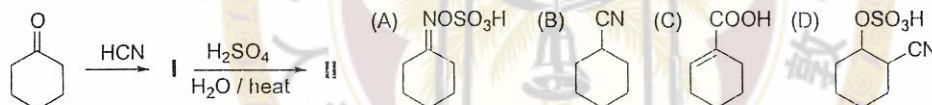
14. Which of the following compound is aromatic?



15. Which of the following electrophilic aromatic substitution reactions is reversible?

(A) nitration (B) Friedel-Crafts alkylation (C) sulfonation (D) both (B) and (C)

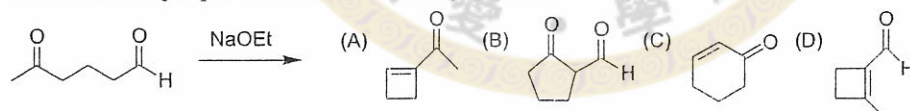
16. What is the major product II of the following reaction sequence?



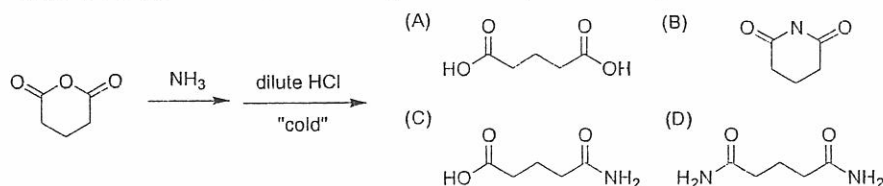
17. Acetals are unstable in the presence of an aqueous solution of which of the following reagents?

(A) HCl (B) NaOH (C) NaCl (D) KHCO₃

18. What is the major product of the following reaction?



19. What is the product of the following reaction sequence?



20. What type of amine is triethylamine?

(A) primary (B) secondary (C) tertiary (D) quaternary

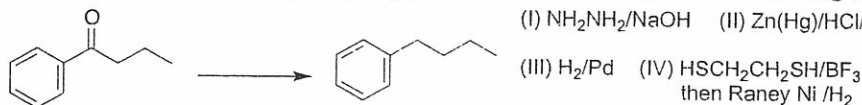
21. In aqueous solution, which of the following compound (as the conjugated acid) possesses the smallest value of pK_a?

(A) NH₃ (B) C₆H₅NH₂ (C) (CH₃CH₂)₂NH (D) CH₃CH₂NH₂

22. The pH at which the concentration of the dipolar ion (zwitterions) form of an amino acid is at a maximum and the cationic and anionic forms are at equal concentration is termed the:

(A) end point (B) equivalent point (C) isoelectric point (D) neutral point

23. How many of the following reagent(s) could be used to carry out the following transformation?



(A) 1 (B) 2 (C) 3 (D) 4

24. Styrene is the name commonly assigned to:

(A) $\text{C}_6\text{H}_5\text{NH}_2$ (B) $\text{C}_6\text{H}_5\text{CHCH}_2$ (C) $\text{C}_6\text{H}_5\text{OCH}_3$ (D) $\text{CH}_3\text{CHCHCH}_3$

25. Which of the following ions is weakest nucleophile in polar aprotic solvents?

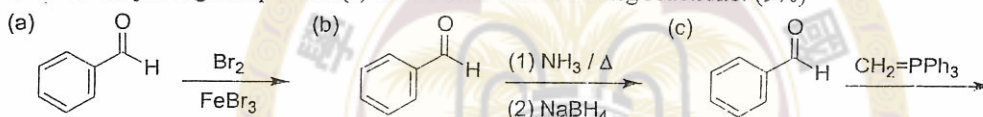
(A) CN^- (B) Cl^- (C) Br^- (D) I^-

※注意：請於試卷上”非選擇題作答區”依序作答並應註明作答之題號

問答題

一. Draw structures of the following compounds: (a) bicyclo[4.2.0]octane (b) pyrrole (c) acetonitrile (9%)

二. Give the major organic product(s) for each of the following reactions. (9%)



三. A compound with the molecular formula C_8H_{10} gave a ^1H NMR spectrum consisting of a triplet at δ 1.24, a quartet at δ 2.59 and a multiplet at δ 7.06–7.23. Draw the structure of this compound. (7%)

試題隨卷繳回