

說明：答案一律寫在答案紙並請標明題號依序作答

單複選選擇題（共 40 題，每題 2.5 分，答錯到扣 1 分）

1. The chlorination of 2-methylpentane would produce how many isomeric monochloro compounds?
(a) 6 (b) 5 (c) 4 (d) 3
2. Because carbon and hydrogen have very similar electronegativities, hydrocarbons are generally
(a) electropositive
(b) nonpolar
(c) polar
(d) hydrogen-bonded
3. The compound $\text{CH}_3-\text{C}\equiv\text{C}-\text{H}$ is
(a) soluble in water
(b) a hydrocarbon
(c) soluble in gasoline
(d) unsaturated
4. A family of organic compounds whose molecules will add water (under an acid catalysis) and change into alcohols are the
(a) alkenes
(b) alkanes
(c) aromatic hydrocarbons
(d) cycloalkenes
5. A chemist, handed a sample of an organic compound, was told that it was either $\text{CH}_2=\text{CHCH}_2\text{CH}_3$ or $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
Which one it was could be decided by determining if the sample would react with
(a) sodium hydroxide
(b) hydrogen (with nickel present and heated)
(c) sodium chloride
(d) water (in the presence of an acid catalyst)


(背面仍有題目,請繼續作答)

6. An aromatic hydrocarbon can be expected to undergo

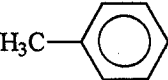
- (a) substitution reactions
- (b) reaction with water
- (c) addition reactions
- (d) no reactions

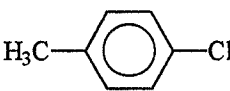
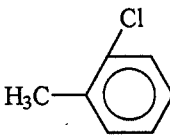
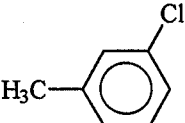
7. The substance $\begin{array}{c} \text{CH}_3 \\ | \\ \text{H}_3\text{C}-\text{C}-\text{OH} \\ | \\ \text{CH}_3 \end{array}$ could be made by addition of water to

- (a) $\text{CH}_3\text{CH}=\text{CHCH}_3$
- (b) $\begin{array}{c} \text{CH}_3 \\ \diagup \\ \text{H}_2\text{C}=\text{C} \\ \diagdown \\ \text{CH}_3 \end{array}$
- (c) $\text{CH}_2=\text{CHCH}_2\text{CH}_3$
- (d) none of these

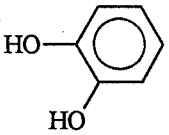
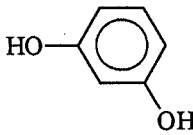
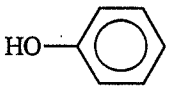
8. The substance  is

- (a) benzene
- (b) aromatic
- (c) a diene
- (d) none of these

9. Action of aqueous hydrochloric acid on  could be expected to produce

- (a) 
- (b) 
- (c) 
- (d) no reaction

10. Action of aqueous potassium permanganate on benzene could be expected to produce

- (a) 
- (b) 
- (c) 
- (d) no reaction

11. The substance whose structure is $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ is

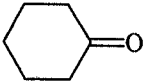
- (a) a common fuel
- (b) a common antifreeze
- (c) an anesthetic
- (d) an eye irritant in smog

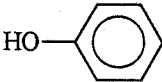
12. The dehydration of 3-hexanol would produce

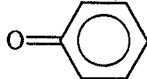
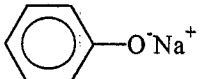
- (a) 2-hexene only
- (b) 3-hexene only
- (c) a mixture of 2-hexene and 3-hexene
- (d) cyclohexene

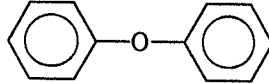
13. The oxidation of  would

- (a) destroy the ring
- (b) produce hydroquinone

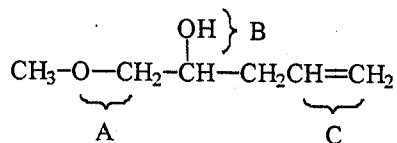
(c) produce  (d) cyclohexene

14. The reaction of  with $\text{NaOH}_{(aq)}$ gives

(a)  (b)  + H_2O

(c)  (d) none of these

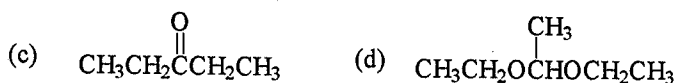
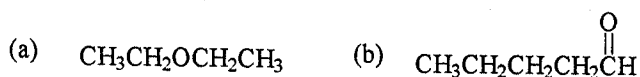
Questions 15 through 17 refer to this structure:



15. The group labeled A is

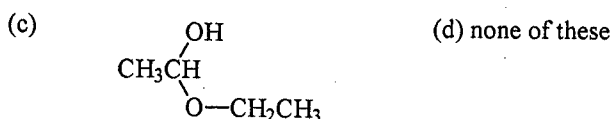
- (a) an easily hydrolyzed group
- (b) an easily oxidized group
- (c) an easily reduced group
- (d) a generally unreactive group

16. The group labeled B is
- oxidized to a ketone
 - oxidized to an aldehyde
 - involved in an acid-catalyzed dehydration
 - reduced to a ketone
17. The group labeled C could be
- made to react with dilute sodium hydroxide
 - made to add a water molecule (if an acid catalyst were available)
 - reduced to a carbon-carbon single bond by hydrogen (with a catalyst and heat)
 - involved in hydrogen bonding
18. Which of these compounds could be the most easily oxidized under mild conditions:

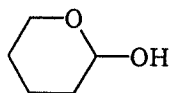


19. The substance that precipitates in a positive Benedict's Test is
- CuO
 - Ag
 - Cu_2O
 - Ag^+

20. The acetal that could be hydrolyzed to $\text{CH}_3\text{CH}_2\text{OH}$ and CH_3CHO is



21. Which choice contains the best description of the functional group(s) present in this structure?



- (a) a hemiacetal

- (b) an acetal
(c) a hemiketal
(d) a ketal

22. If a hydride donor were used, which of the following systems would be able to accept it?

- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
(b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
(c) $\text{CH}_3\text{OCH}_2\text{CH}_3$
(d) $\text{CH}_3\text{CH}_2\text{CH}_2\overset{\text{O}}{\parallel}\text{CH}$

23. The name of $\text{CH}_3\overset{\text{CH}_3}{\text{CH}}\text{CO}_2\text{CH}_2\overset{\text{CH}_3}{\text{CH}}\text{CH}_3$ is

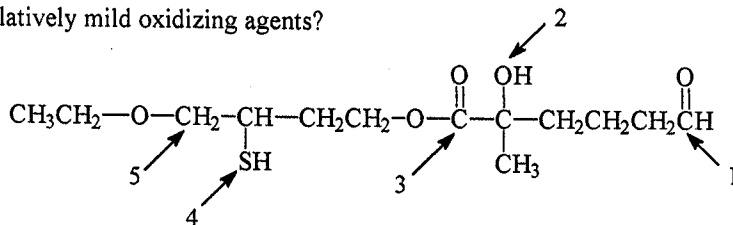
- (a) isopropyl isobutyrate
(b) isobutyl 2-methylpropanoate
(c) isobutyl butyrate
(d) isopropyl 3-methylbutanoate

24. The acid derivative that is most reactive toward water is

- (a) the ester
(b) the acid salt
(c) the acid chloride
(d) both (b) and (c)

25. In the following structure, the numbered arrows point toward functional groups.

What are the numbers of the arrows pointing toward groups readily attacked by relatively mild oxidizing agents?



- (a) 1 (b) 2 (c) 3 (d) 4 (e) 5

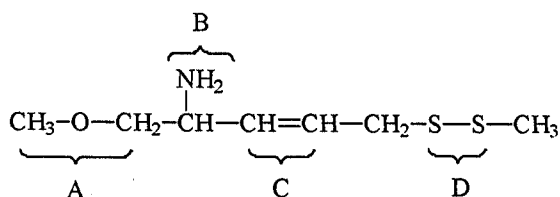
26. In the structure of question 25, which groups, if any, are subject to acid-catalyzed hydrolysis?

- (a) 1 (b) 2 (c) 3 (d) 4 (e) 5 (f) none

27. In the structure of question 25, which groups, if any, will neutralize aqueous sodium hydroxide at room temperature?

- (a) 1 (b) 2 (c) 3 (d) 5 (e) none of these

Questions 28 through 31 refer to this compound:



28. The group at A would

- (a) react with $\text{NaOH}_{(aq)}$
 (b) react with $\text{HCl}_{(aq)}$
 (c) be reduced by catalytic hydrogenation
 (d) be oxidizable by mild reagents
 (e) none of these

29. The group at B would

- (a) neutralize aqueous HCl
 (b) accept H-bonds from water
 (c) react with H_2
 (d) none of these

30. The group at C would

- (a) add hydrogen chloride
 (b) donate hydrogen bonds
 (c) be attacked by OH^-
 (d) none of these

31. The group at D would

- (a) be easily reduced
 (b) react with $\text{HCl}_{(aq)}$
 (c) neutralize $\text{NaOH}_{(aq)}$
 (d) react with water

32. If a substance has a specific rotation described as $[\alpha]^{20} = -15.6^\circ$, the substance is

- (a) levorotatory

- (b) dextrorotatory
- (c) optically active
- (d) superimposable

33. A bottle labeled "(+)-glucose" contains a substance that is

- (a) achiral
- (b) optically active
- (c) dextrorotatory
- (d) positively charged

34. If a solution of 0.06 g/ml of compound X in a polarimeter tube 20 centimeters long has an optical rotation of 1.2° , then its specific rotation is

- (a) 23°
- (b) 10°
- (c) 100°
- (d) 1°

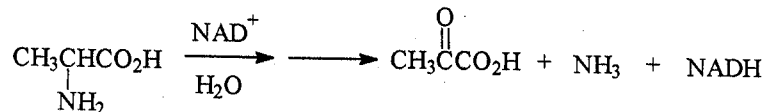
35. An example of reducing carbohydrate is

- (a) sucrose
- (b) maltose
- (c) cellulose
- (d) galactose

36. An aldohexose would have

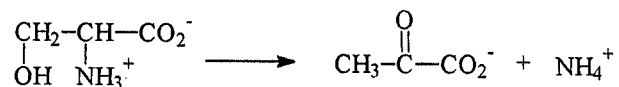
- (a) a potential aldehyde group
- (b) five hydroxyl groups in its open form
- (c) six carbons
- (d) one CH_2OH group

37. The following reaction is an example of



- (a) oxidation deamination
- (b) direct deamination
- (c) decarboxylation
- (d) transamination

38. The following reaction illustrates

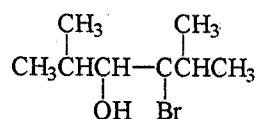


- (a) oxidation deamination (b) direct deamination
(c) decarboxylation (d) transamination

39. Intermediates in the catabolism of amino acids may be used to make

- (a) glucose (b) fatty acids
(c) ketone bodies (d) other amino acids

40. How many tetrahedral stereocenters are present in the following structure?



- (a) 1 (b) 2 (c) 3 (d) 4