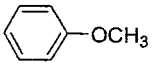
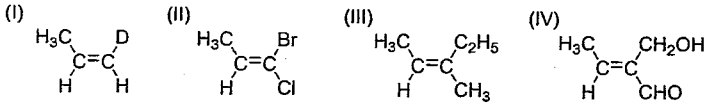
單選題 (75 %) (請依序於選擇題作答區作答)

1. What is the correct name of the following compound?



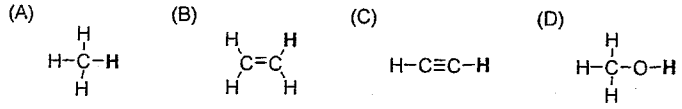
(A) Methyl benzyl ether
(B) 2-Methoxybenzene
(C) Anisole
(D) None of the above answers

2. How many of the following alkenes have the Z geometry?



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

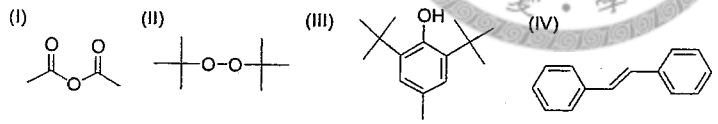
3. Which of the following indicated hydrogen has the lowest pK_a?



4. Which of the following statements is less appropriate?
(A) Among the conformers of cyclohexane, the chair form is more stable than the boat form.
(B) Among the conformers of cyclohexane, the boat form is more stable than the half-chair form.
(C) The 1,3-diaxial interaction is one type of hydrogen bonding interaction.
(D) The boat conformation of cyclohexane has a flagpole interaction, which is a steric interaction.

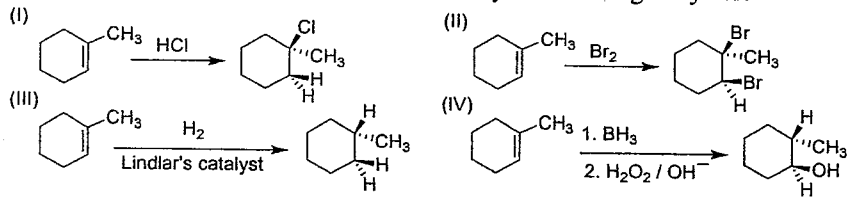
5. Which of the following description is less appropriate?
(A) For 1,2-dimethylcyclohexane, the *trans* isomer is more stable than the *cis* isomer.
(B) For 1,3-dimethylcyclohexane, the *cis* isomer is more stable than the *trans* isomer.
(C) For 1,4-dimethylcyclohexane, the *cis* isomer is more stable than the *trans* isomer.
(D) Cyclohexane displays only one signal in the ^1H NMR spectrum ($CDCl_3$) at room temperature.

6. How many of the following compounds can be used to initiate a radical reaction?



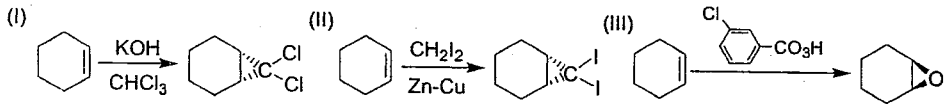
(A) 1 (B) 2 (C) 3 (D) 4

7. How many of the following reactions are likely to occur in good yield?



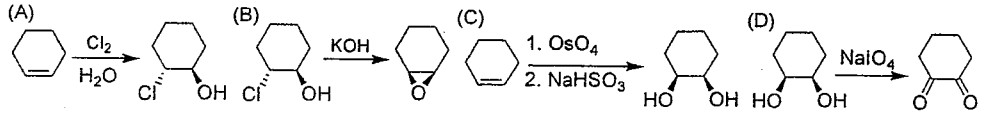
(A) 1 (B) 2 (C) 3 (D) 4

8. How many of the following reactions are likely to occur in good yield?



(A) 0 (B) 1 (C) 2 (D) 3

9. Which of the following reaction is less likely to happen?



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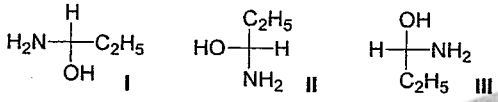
10. Which one of the following absorption frequency is more likely to appear in the IR spectrum of acetylene?
(A) 2100 cm^{-1} (B) 1780 cm^{-1} (C) 1650 cm^{-1} (D) 1050 cm^{-1}

11. How many sets of signals are there in the ^{13}C NMR spectrum for 1-methylcycloheptene?
(A) 5 (B) 6 (C) 7 (D) 8

12. About S_N2 reaction, which of the following description is <u>less appropriate</u>?
(A) the reaction pursues faster in aprotic solvents than the protic ones (B) the reaction pursues faster in nonpolar solvents than the polar ones (C) the reaction pursues faster in acetonitrile than in methanol (D) the reaction involves a bimolecular rate-determining step.

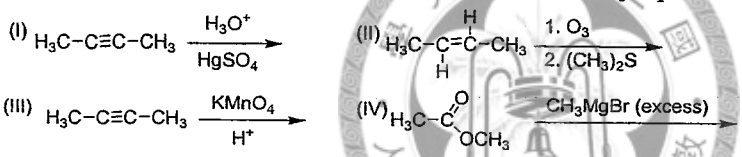
13. Which of the following statements is <u>less appropriate</u>?
(A) The stability ranking for carbocation is 3°>2°>1° (B) The stability ranking for radical is 3°>2°>1° (C) The hydrogenation reaction of *trans*-2-butene release more heat than the one of 1-butene (D) Normally, 1° radical is less stable than allylic radical.

14. About compound **I**, **II** and **III**, which of the following description is <u>incorrect</u>?



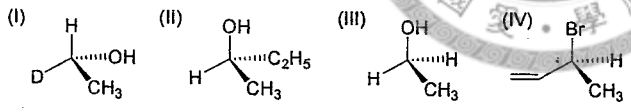
(A) **I** = **II** (B) **II** and **III** are enantiomers (C) **III** has the R configuration (D) none of the above answers.

15. How many of the following reactions give ketone as the major product after normal work up procedure?



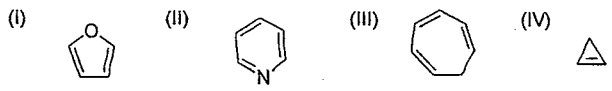
(A) 1 (B) 2 (C) 3 (D) 4

16. How many of the following compounds have the R-configuration?



(A) 0 (B) 1 (C) 2 (D) 3

17. How many of the following compounds are aromatic?

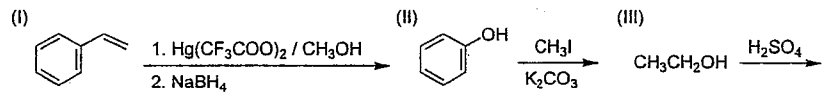


(A) 1 (B) 2 (C) 3 (D) 4

18. About benzyl alcohol, which of the following description is <u>less appropriate</u>?
(A) can be oxidized to benzaldehyde by pyridinium chlorochromate (PCC) (B) can be obtained from the reduction of methyl benzoate by $LiAlH_4$ (C) using K_2CO_3 as the base, benzyl alcohol can react with ethyl bromide to produce benzylethyl ether (D) can be obtained from the reduction of benzaldehyde by $NaBH_4$.

19. About crown ethers, which of the following description is <u>less appropriate</u>?
(A) was first discovered by Pedersen (B) can complex to alkali metal ions (C) generally are acyclic compounds (D) is quite useful in organic synthesis.

20. How many of the following reactions give ether as the product in good yield?



(A) 0 (B) 1 (C) 2 (D) 3

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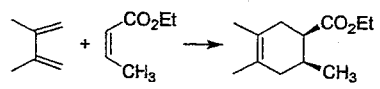
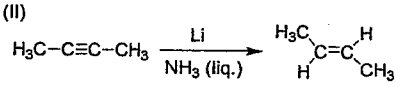
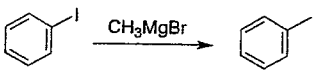
21. Which of the following compound is less likely to be classified as an antioxidant?
(A) Vitamin E (B) Vitamin C (C) butylated hydroxytoluene (BHT) (D) D-glucose

22. How many of the following reactions are unlikely to happen?

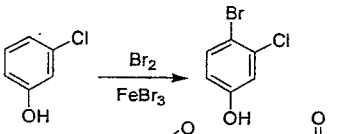
(I) 

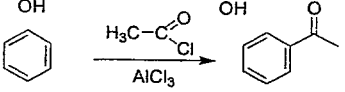
(II) 

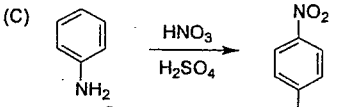
(III) 

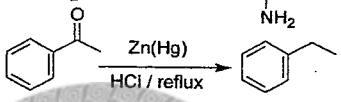
(A) 0 (B) 1 (C) 2 (D) 3

23. Which of the following reactions is unlikely to happen?

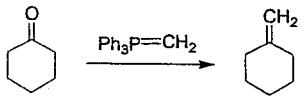
(A) 

(B) 

(C) 

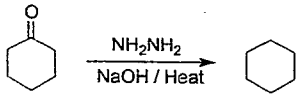
(D) 

24. What is the name of the following reaction?



(A) Aldol condensation (B) Wittig reaction (C) Gabriel reaction (D) Wolff-Kishner reaction.

25. What is the name of the following reaction?

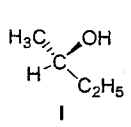


(A) Aldol condensation (B) Wittig reaction (C) Gabriel reaction (D) Wolff-Kishner reaction.

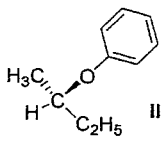
問答題 (不需抄題但請標明題號並依序作答)

一. Explain why the radical polymerization of ethylene can produce polymers with branches. (5%)

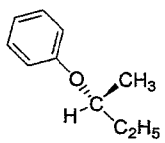
二. Start from chiral compound **I**, Propose possible synthetic approaches to synthesize compound **II** and **III** with good optical purity (may require more than one step) (10%)



I

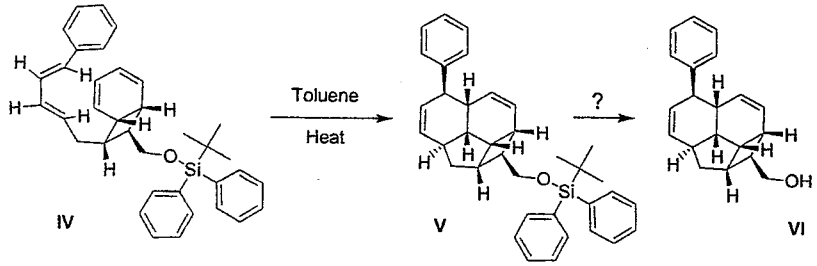


II



III

三. Compound **V** can be synthesized by heating compound **IV** in refluxing toluene, what is the name of the reaction? Give proper reagent(s) to convert compound **V** to compound **VI**. (10%)



IV　V　VI

試題隨卷繳回