

義守大學 100 學年度 學士後中醫學系 入學招生考試試題

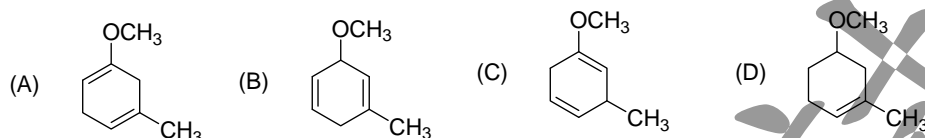
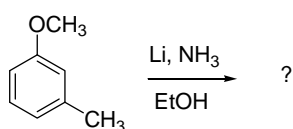
考試科目	化學 (含普通化學、有機化學)	考試日期	100/6/19	頁碼/總頁數	1/11
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選擇題 (單選題，共 50 題，每題 2 分，共 100 分。答錯 1 題倒扣 0.5 分，倒扣至零分為止。未作答時，不給分亦不扣分)

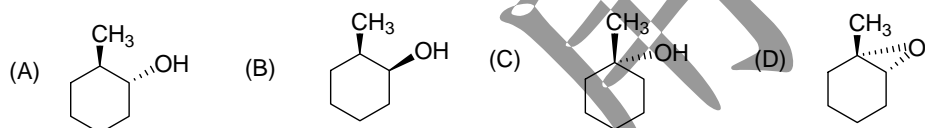
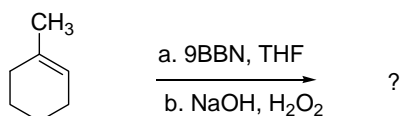
Useful information:

Value, X	2	3	5	7	10	100
ln X	0.6931	1.0986	1.6094	1.9459	2.3026	4.6052

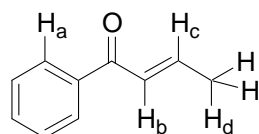
1. What product would be obtained from the following reaction?



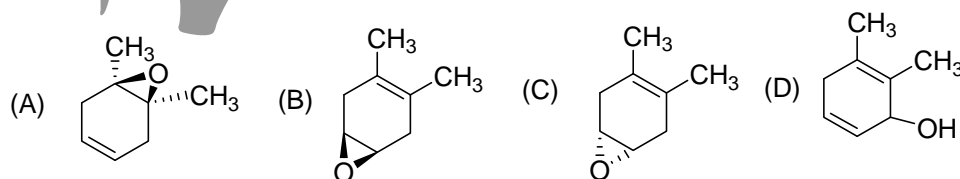
2. What product would be obtained from the following reaction?



3. There are 4 different hydrogens in the compound described below. Which one is the most acidic hydrogen?



4. What product would be obtained from the following reaction?



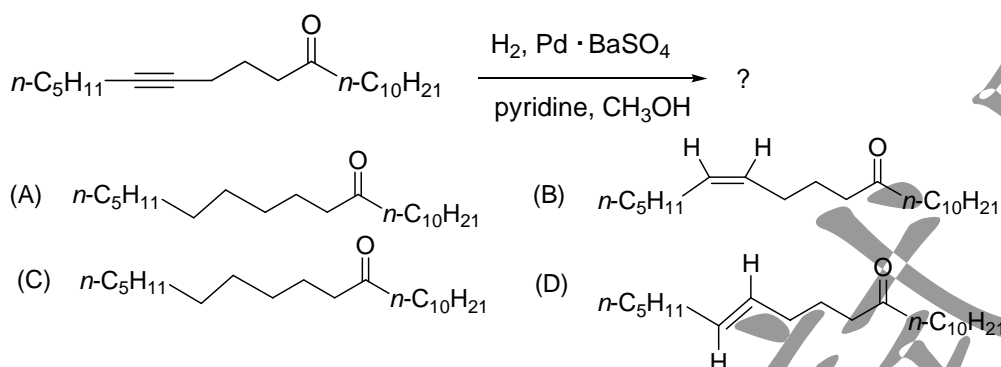
背面還有試題

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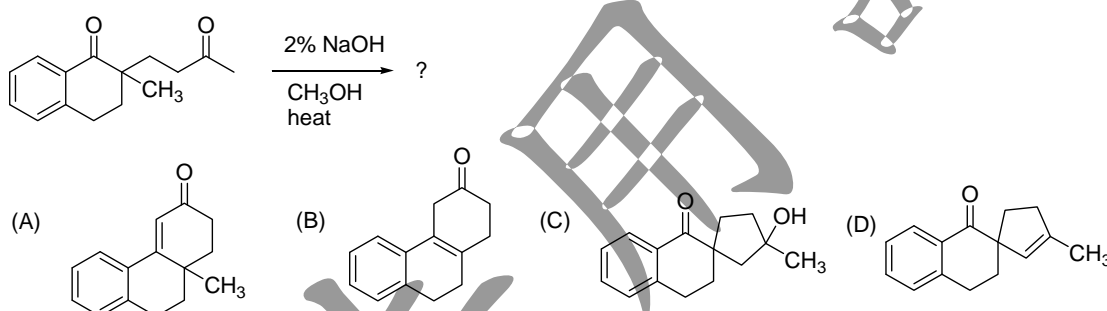
考試科目	化學 (含普通化學、有機化學)	考試日期	100/6/19	頁碼/總頁數	2/11
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5. In the following reaction, $2\text{H}_2\text{O}_2(\text{l}) \longrightarrow 2\text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$, hydrogen peroxide functions as
1. an oxidizing agent.
 2. a reducing agent.
 3. an acid.
- (A) 1 only (B) 2 only (C) 3 only (D) 1 and 2 only

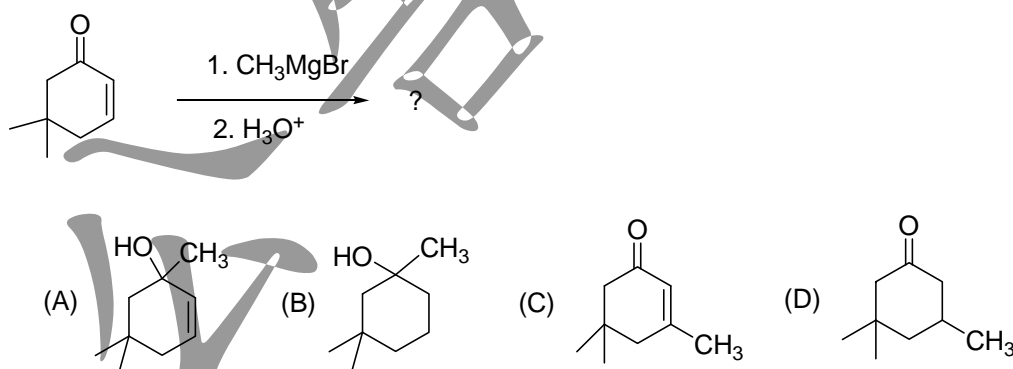
6. What major product would be obtained from the following reaction?



7. What final product would be obtained from following reaction?



8. What final product would be obtained from following reaction?



9. Which one of the following contains both ionic and covalent bonds?

(A) NaCl (B) NaOH (C) HOH (D) SiO₂

10. Based on molecular structure, which of the following substances should have the lowest boiling point?

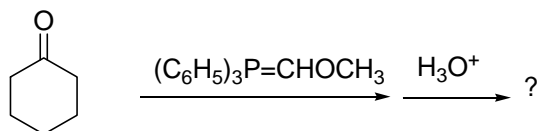
(A) H₂Te (B) H₂Se (C) H₂S (D) H₂O

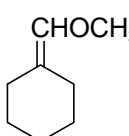
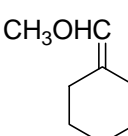
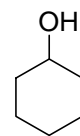
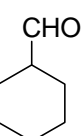
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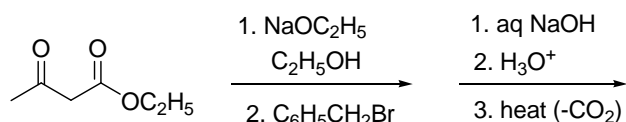
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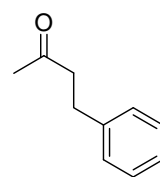
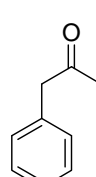
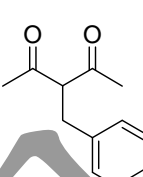
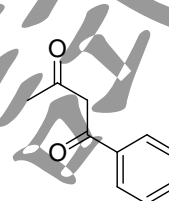
11. What final product would be obtained from following reaction?



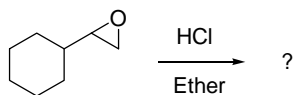
- (A) 
 (B) 
 (C) 
 (D) 

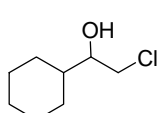
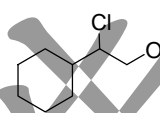
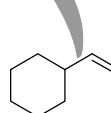
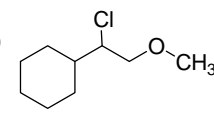
12. What major product would be obtained from following reaction?



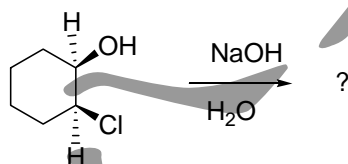
- (A) 
 (B) 
 (C) 
 (D) 

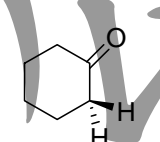
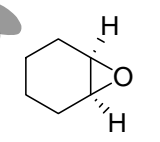
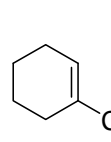
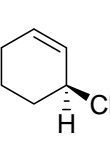
13. What major product would be obtained from following reaction?



- (A) 
 (B) 
 (C) 
 (D) 

14. What major product would be obtained from following reaction?



- (A) 
 (B) 
 (C) 
 (D) 

15. How many orbitals have the following quantum numbers: $n = 3, l = 2, m_l = -2$?

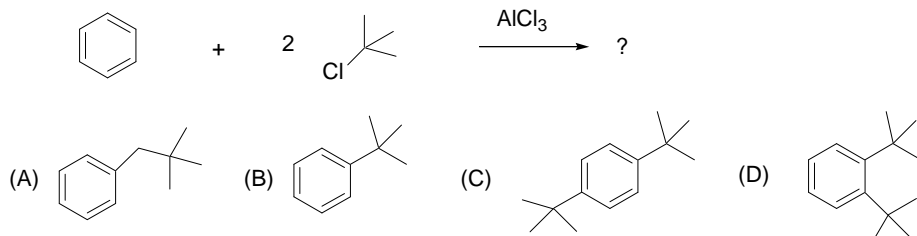
- (A) 1 (B) 3 (C) 5 (D) 7

背面還有試題

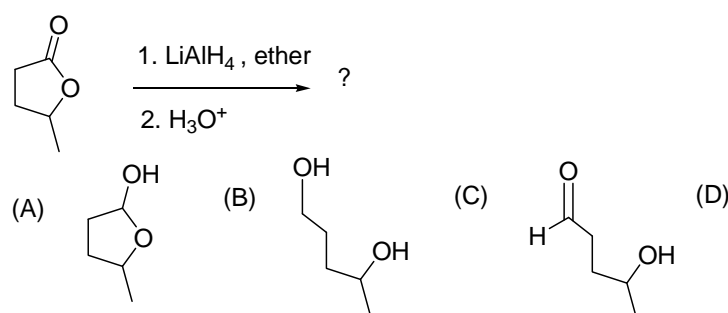
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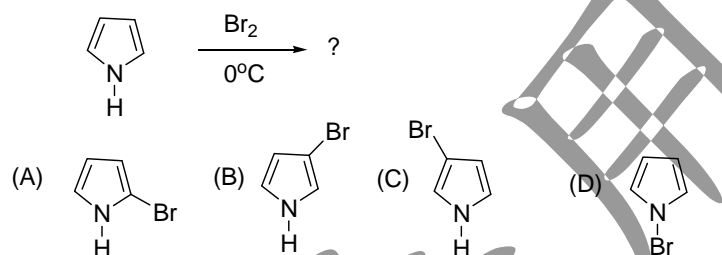
16. What major product would be obtained from following reaction?



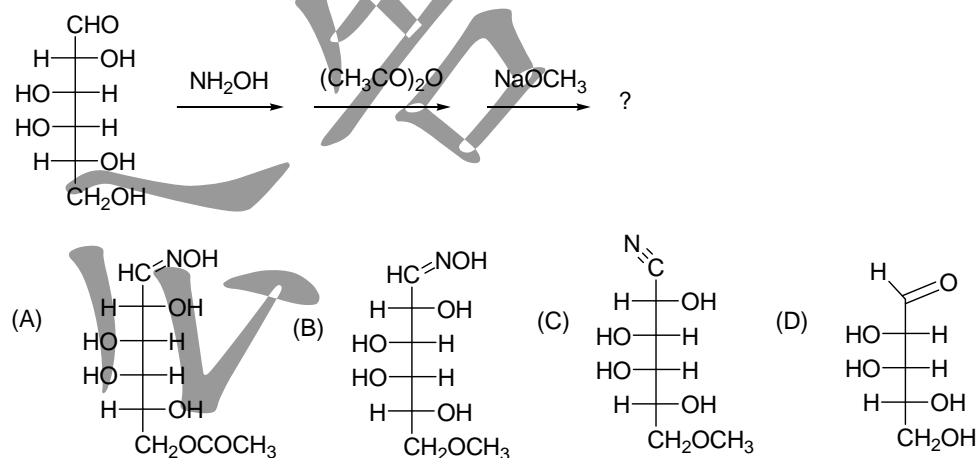
17. What major product would be obtained from following reaction?



18. What major product would be obtained from following reaction?



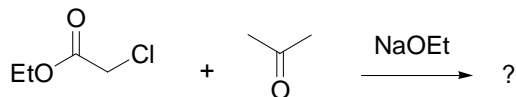
19. What final product would be obtained from following sequential reactions?

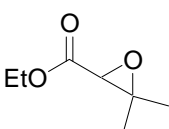
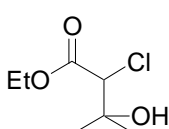
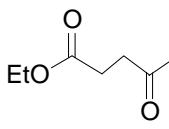
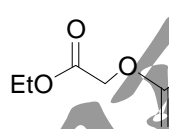


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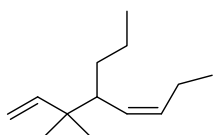
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20. What final product would be obtained from following reaction?



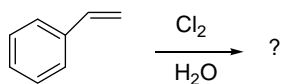
- (A)  (B)  (C)  (D) 

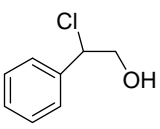
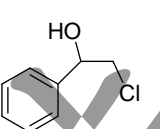
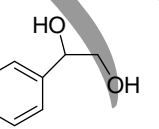
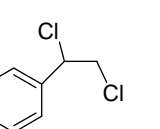
21. Which one is the correct IUPAC name for the following compound?



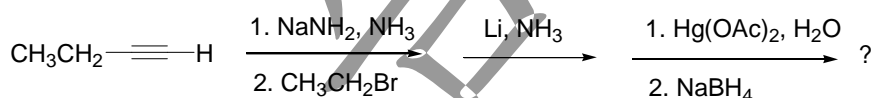
- (A) (E)-3,3-Dimethyl-4-propylocta-1,5-diene
 (B) (E)-6,6-Dimethyl-5-propylocta-3,7-diene
 (C) (Z)-3,3-Dimethyl-4-propylocta-1,5-diene
 (D) (Z)-3,3-Dimethyl-4-propylhepta-1,5-diene

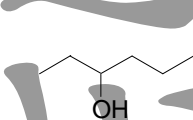
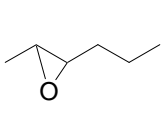
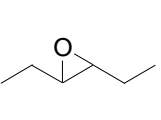
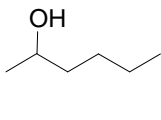
22. What major product would be obtained from following reaction?



- (A)  (B)  (C)  (D) 

23. What final product would be obtained from following reaction?



- (A)  (B)  (C)  (D) 

24. Which statements describe the bonding in the water molecule?

1. polar covalent
2. π bond
3. sp^3 hybridization

- (A) 1 only (B) 1 and 2 only (C) 1 and 3 only (D) 2 and 3 only

背面還有試題

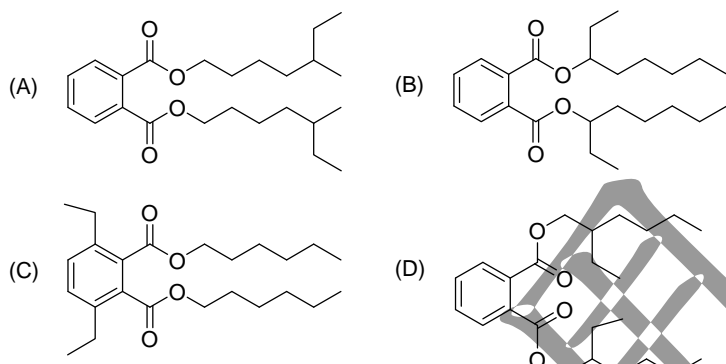
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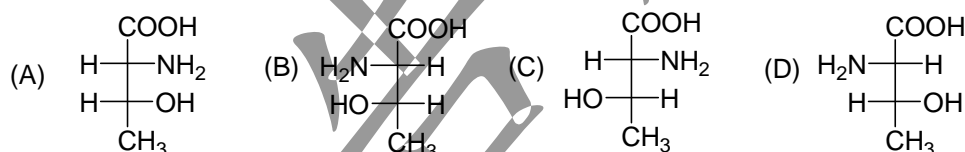
25. In the following S_N2 reaction which one would be predicted to be the fastest?

- (A) $\text{H}_2\text{O} + \text{CH}_3\text{Br} \longrightarrow \text{HOCH}_3 + \text{HBr}$
- (B) $\text{OH}^- + \text{CH}_3\text{Br} \longrightarrow \text{HOCH}_3 + \text{Br}^-$
- (C) $\text{H}_2\text{S} + \text{CH}_3\text{Br} \longrightarrow \text{HSCH}_3 + \text{HBr}$
- (D) $\text{SH}^- + \text{CH}_3\text{Br} \longrightarrow \text{HSCH}_3 + \text{Br}^-$

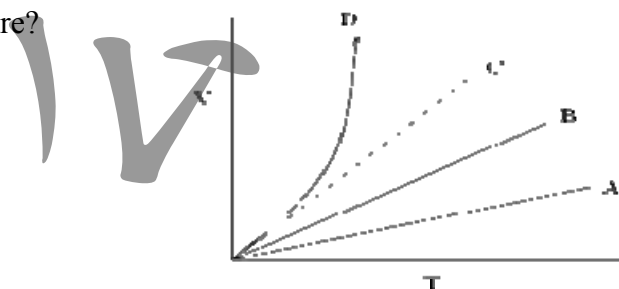
26. Bis(2-ethylhexyl)phthalate, commonly abbreviated DEHP, is an organic compound with the formula C₆H₄(C₈H₁₇COO)₂. It is sometimes called dioctyl phthalate and abbreviated DOP. Being produced on a massive scale by many companies, it has acquired many names and acronyms, including BEHP and di-2-ethylhexyl phthalate. Recently, the illegal use of the plasticizer DEHP in clouding agents for use in food has been reported in Taiwan, what is the structure of DEHP?



27. In the following four stereoisomers of 2-amino-3-hydroxybutanoic acid which chiral carbons have 2R,3S configuration?



28. The volume-temperature plots below were made at different values of constant pressure while the number of moles of gas in each experiment remained the same. Which curve represents measurements at highest pressure?

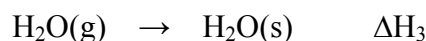
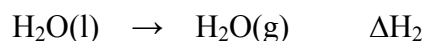
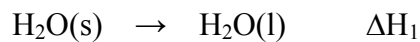


- (A) A (B) B (C) C (D) D

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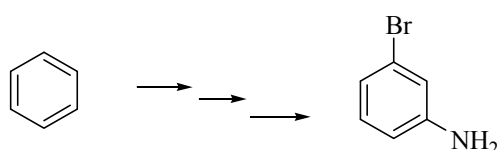
29. Consider the following changes:



Using Hess' Law, the sum all of $\Delta H_1 + \Delta H_2 + \Delta H_3$ is

- (A) > 0 (B) $= 0$
 (C) < 0 (D) sometimes > 0 and sometimes < 0 .

30. Choose the best series of reactions (A-D) for the synthesis of 3-bromoaniline from benzene shown below.



- (A) $\text{Benzene} \xrightarrow[\text{FeBr}_3]{\text{Br}_2} \text{Bromobenzene} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HNO}_3} \text{Nitrobenzene} \xrightarrow[\text{Ni}]{\text{H}_2} \text{Aniline} \xrightarrow{\text{Br}_2} \text{3-bromoaniline}$
- (B) $\text{Benzene} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HNO}_3} \text{Nitrobenzene} \xrightarrow[\text{HCl}]{\text{Fe}} \text{Aniline} \xrightarrow[\text{FeBr}_3]{\text{Br}_2} \text{3-bromoaniline}$
- (C) $\text{Benzene} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HNO}_3} \text{Nitrobenzene} \xrightarrow[\text{FeBr}_3]{\text{Br}_2} \text{3-bromonitrobenzene} \xrightarrow[\text{HCl}]{\text{Fe}} \text{3-bromoaniline}$
- (D) $\text{Benzene} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HNO}_3} \text{Nitrobenzene} \xrightarrow[\text{HCl}]{\text{Fe}} \text{Aniline} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HNO}_3} \text{3-nitroaniline} \xrightarrow[\text{2. CuBr, HBr}]{\text{1. HNO}_2, \text{H}_2\text{SO}_4} \text{3-bromoaniline}$

31. Which of the following orbital diagrams represents a paramagnetic atom?

- 1s 2s 2p
1. $\uparrow\downarrow$ $\uparrow\downarrow$ \circ \circ \circ
2. $\uparrow\downarrow$ $\uparrow\downarrow$ \uparrow \circ \circ
3. $\uparrow\downarrow$ $\uparrow\downarrow$ \uparrow \uparrow \circ

- (A) 1 and 2 only (B) 1 and 3 only (C) 2 and 3 only (D) 3 only

32. In a certain mountain range, the atmospheric pressure is 608 mmHg. What is the temperature of water boil under these conditions? Some information that may be useful is the following:

$$\ln \frac{P_2}{P_1} = \frac{\Delta H_{\text{vap}}}{R} \left[\frac{T_2 - T_1}{T_2 T_1} \right], \quad R = 8.314 \text{ kJ}/(\text{K} \cdot \text{mol}); \quad \Delta H_{\text{vap}} = 44.0 \text{ kJ/mol}$$

- (A) 94.2 °C (B) 96.3 °C (C) 98.4 °C (D) 99.6 °C

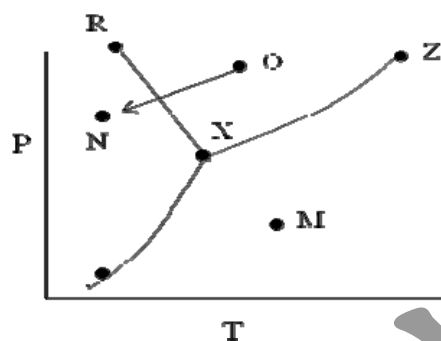
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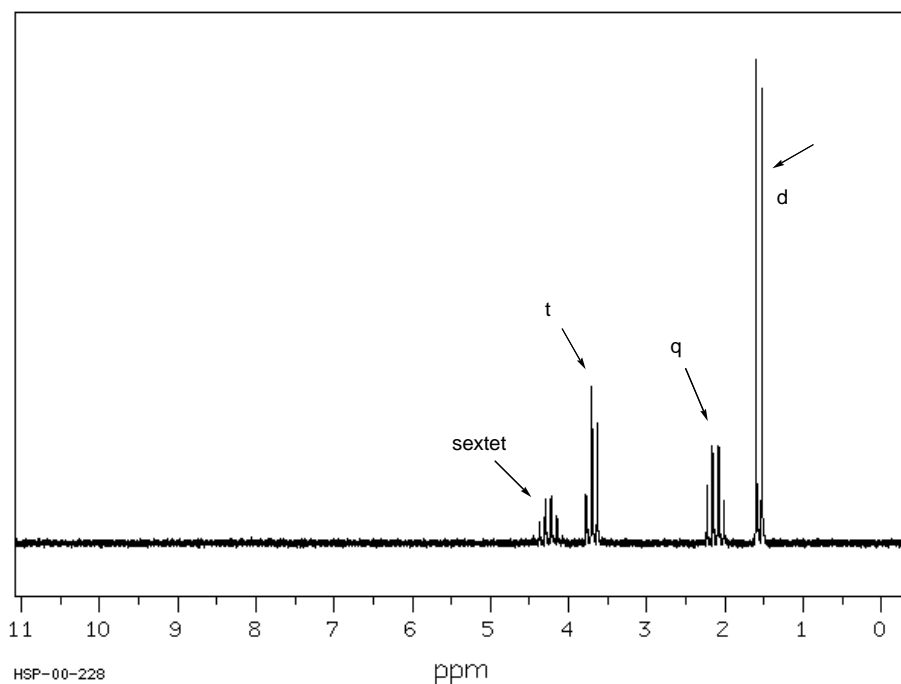
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33. When $^{235}_{92}\text{U}$ collides with one neutron, fission occurs, and the products are four neutrons, $^{90}_{38}\text{Sr}$, and
- (A) $^{139}_{54}\text{Xe}$ (B) $^{140}_{54}\text{Xe}$ (C) $^{141}_{54}\text{Xe}$ (D) $^{142}_{54}\text{Xe}$

The phase diagram below is to be used for Questions 34 - 35



34. The highest point to which line XZ can be extended is called the
- (A) normal boiling point (B) triple point
 (C) melting point (D) critical point
35. The change from point O to point N corresponds to
- (A) condensation (B) evaporation (C) freezing (D) sublimation
36. Which structure of molecular formula $\text{C}_4\text{H}_8\text{Cl}_2$ fits the ^1H NMR spectrum shown below?

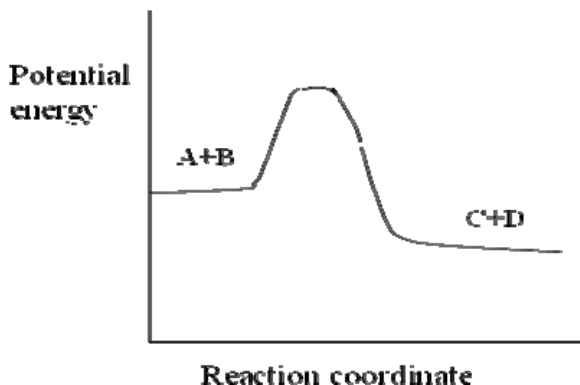


- (A) CC(Cl)C(Cl)C (B) ClCCCCCl (C) CC(Cl)CCl (D) CC(Cl)(Cl)CC

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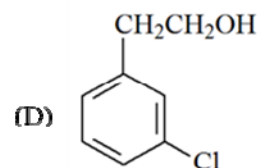
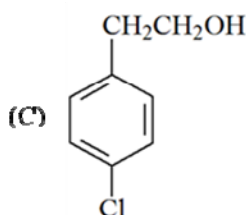
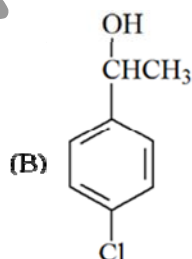
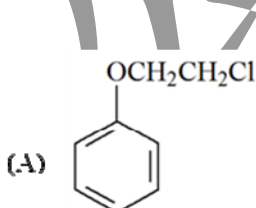
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37. For the system described by the figure below, which statement is **CORRECT**?



- (A) The forward reaction is endothermic
 (B) E_a for the forward reaction is greater than for the reverse reaction
 (C) The effect of a temperature change is greater for the reverse reaction than for the forward reaction
 (D) A and B are more stable than C and D
38. Which of the following concentrations can change with a change in temperature?
 1. molality
 2. molarity
 3. mole percentage
 (A) 1 only (B) 2 only (C) 3 only (D) 1 and 2 only
39. Carbon monoxide is a hazardous air pollutant because it
 (A) reacts with oxygen to form CO_2
 (B) catalyzes smog formation
 (C) forms a stable complex with hemoglobin
 (D) catalyzes the decomposition of ozone
40. The proton NMR of a compound, C_3H_9ClO , has the following peaks. Which compound below best fits the data?

broad singlet 2.00 (1H)
 triplet 2.41 (2H)
 triplet 3.69 (2H)
 doublet 7.02 (2H)
 doublet 7.50 (2H)

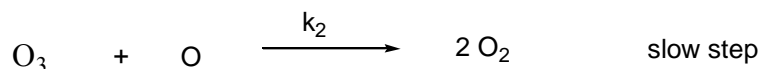
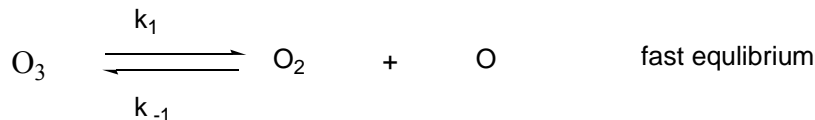


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41. A suggested mechanism for the decomposition of ozone, $2\text{O}_3 \rightarrow 3\text{O}_2$, is



According to this mechanism, the rate law will be

(A) $k_2[\text{O}][\text{O}_3]$

(B) $\frac{k_1 [\text{O}_2][\text{O}]}{k_{-1} [\text{O}_3]}$

(C) $\frac{k_1 k_2}{k_{-1}} [\text{O}_3]^2 [\text{O}]$

(D) $\frac{k_1 k_2 [\text{O}_3]^2}{k_{-1} [\text{O}_2]}$

42. At a given temperature, $K = 0.020$ for the equilibrium



What is K for reaction $\text{Cl}_2(\text{g}) + \text{PCl}_3(\text{g}) \rightleftharpoons \text{PCl}_5(\text{g})$

(A) 0.020

(B) 50

(C) 100

(D) 500

43. The table below lists the solubility product for compounds.

compound	CaCO_3	PbI_2	AgBr	$\text{Fe}(\text{OH})_2$
K_{sp}	4.8×10^{-9}	1.1×10^{-9}	5×10^{-13}	8×10^{-16}

Which salt is the most soluble (mol/L) in water?

(A) CaCO_3

(B) PbI_2

(C) AgBr

(D) $\text{Fe}(\text{OH})_2$

44. The following data were obtained for the reaction

$2\text{A} + \text{B} \longrightarrow \text{products}$		
<u>[A] (mol/L)</u>	<u>[B] (mol/L)</u>	<u>Initial Rate [mol/(L · s)]</u>
0.2	0.1	5
0.2	0.2	20
0.6	0.1	15

What is the order of the reaction with respect to B?

(A) 0

(B) 1/2

(C) 1

(D) 2

45. Which process(es) is (are) most likely to lead to acid rain?

1. pollutants from a copper smelter
2. the burning of coal containing sulfur
3. excessive spraying of herbicides or insecticides

(A) 1 only

(B) 2 only

(C) 3 only

(D) 1 and 2 only

46. Which of the following coordination compounds will immediately form a precipitate when combined with an AgNO_3 solution?

(A) $\text{Cr}(\text{NH}_3)_3\text{Cl}_3$

(B) $\text{K}[\text{Cr}(\text{NH}_3)_2\text{Cl}_4]$

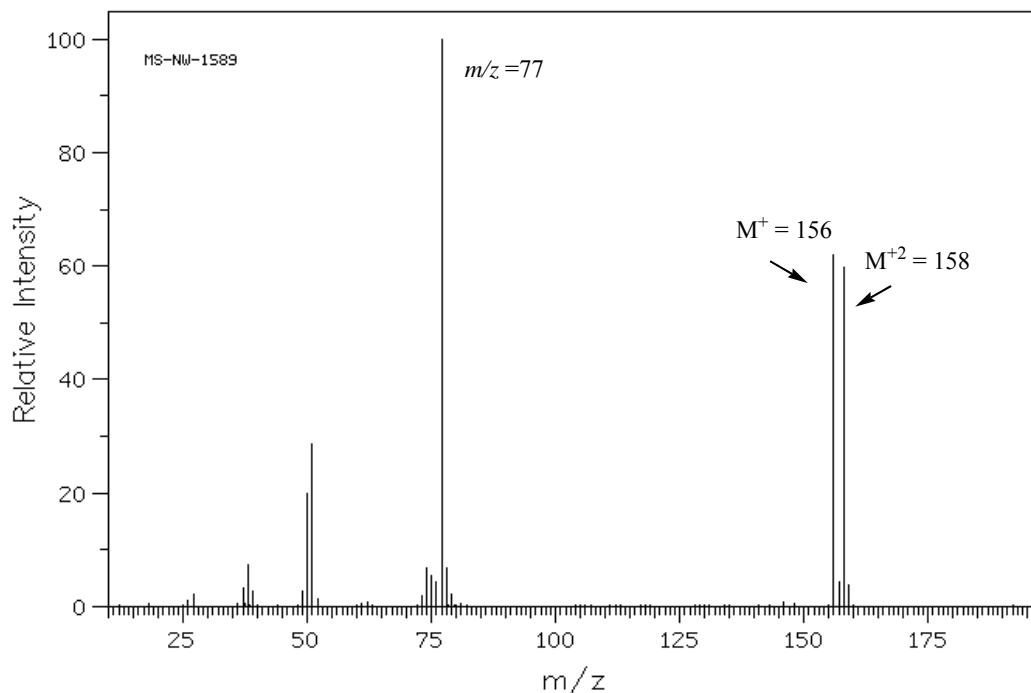
(C) $\text{Cr}(\text{NH}_3)_2(\text{H}_2\text{O})(\text{Cl}_3)$

(D) $[\text{Cr}(\text{NH}_3)_6]\text{Cl}_3$

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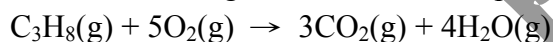
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47. A compound which EI-MS spectrum is shown below, has $M^+ = m/z$ 156, $M^{+2} = m/z$ 158, and $m/z = 77$ (base peak). What is the possible formula for this compound?



- (A) $C_5H_{10}Cl$ (B) $C_5H_{12}Br$ (C) C_6H_5Cl (D) C_6H_5Br

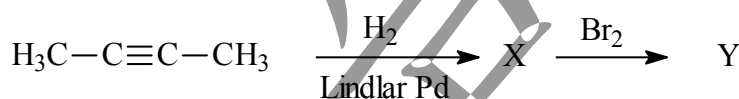
48. Consider the following reaction, which is spontaneous at room temperature:



One would predict that

- (A) ΔH is + and ΔS is + (B) ΔH is - and ΔS is -.
 (C) ΔH is - and ΔS is + (D) ΔH is + and ΔS is -.

49. Identify compound Y.



- (A) 2-bromobutane
 (B) meso-2,3-dibromobutane
 (C) 2,3-dibromo-2-butene
 (D) racemic (2R,3R) and (2S,3S)-2,3-dibromobutane

50. Which of the following cannot undergo an E2 reaction?

- (A) (B) (C) (D) B and C