

## NChO Organic Chemistry Practice Problems

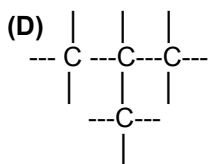
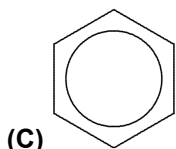
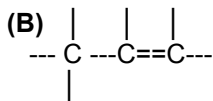
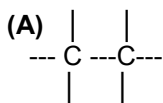
57. How many isomers have the molecular formula  $C_5H_{12}$ ?

(A) 1 (B) 2 (C) 3 (D) 5

58. Carbon is found in the highest oxidation state in which of these classes of organic compounds?

(A) carboxylic acids (B) alcohols  
(C) aldehydes (D) alkynes

59. Which structural formula represents a mono-unsaturated aliphatic hydrocarbon?



60. Which compound has the highest boiling point?

(A)  $CH_3CH_2CH_3$  (B)  $CH_3OCH_2CH_3$   
(C)  $CH_3C(=O)CH_3$  (D)  $CH_3CH_2CH_2OH$



55. Which of these compounds contains a carboxyl group?

(A) propanol (B) propanal  
(C) propanone (D) propanoic acid

56. Which class of compounds consists exclusively of saturated hydrocarbons?

(A) alkanes (B) alkenes  
(C) alkynes (D) aromatics

57. How many different alcohols (not including optical isomers) have the molecular formula  $C_4H_{10}O$ ?

(A) 2 (B) 3 (C) 4 (D) 5

58. What is the position of the bromine atom relative to the methyl group in 3-bromotoluene?

(A) meta (B) ortho (C) para (D) trans

59. Which of these compounds have *cis*- and *trans*- isomers?

(A) dichlorobenzene (B) 1-chloropropene  
(C) 1,2-dichloropropane (D) dichloroethyne

60. If a certain polymer has the formula  $(-CH_2CCl_2CH_2CCl_2-)_n$ , from which monomer is it made?

(A)  $HC\equiv CCl$  (B)  $ClHC=CClH$  (C)  $Cl_2C=CH_2$  (D)  $H_2C=CClH$

56. What is the oxidation product of a primary alcohol?

(A) aldehyde (B) alkene  
(C) ester (D) ketone

57. How many hydrogen atoms are in one molecule of propene?

(A) 3 (B) 4 (C) 6 (D) 8

58. How many different compounds have the formula  $C_5H_{12}$ ?

(A) 2 (B) 3 (C) 4 (D) 5

59. What bonds are present in  $H-C\equiv C-H$ ?

(A) 5 sigma (B) 4 sigma and 1 pi  
(C) 2 sigma and 3 pi (D) 3 sigma and 2 pi

60. In addition to carbon, hydrogen and oxygen, what else is found in every amino acid?

(A) N (B) P (C) N and P (D) N and S

54. In which species are all the carbon atoms considered to be  $sp^2$  hybridized?

(A)  $C_2H_2$  (B)  $C_2H_4$  (C)  $C_3H_8$  (D)  $C_4H_{10}$

55. Which formula can be used to represent an alkyne?

(A)  $C_nH_{2n-2}$  (B)  $C_nH_{2n}$  (C)  $C_nH_{2n+2}$  (D)  $C_nH_{2n+4}$

56. How many different structural isomers exist for dichloropropane,  $C_3H_6Cl_2$ ?

(A) 4 (B) 5 (C) 6 (D) some other number

57. All of the formulas below correspond to stable compounds EXCEPT

(A)  $CH_2O$  (B)  $CH_2O_2$  (C)  $CH_3O$  (D)  $CH_4O$

58. Which of the compounds shown are isomers?

1  $CH_3CH_2OCH_3$   
2  $CH_3CH_2OCH_2CH_3$   
3  $CH_3CH_2CH_2OH$   
4  $CH_2=CHOCH_3$

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

59. Which functional group is present in  $CH_3COOH$ ?

(A) aldehyde (B) carboxylic acid  
(C) alcohol (D) hydroperoxide

60. How many sigma bonds does a molecule of ethene have?

(A) 1 (B) 4 (C) 5 (D) 7

55. Which is an isomer of 1-butanol?

(A) 1-propanol (B) butanone  
(C) 1-chlorobutane (D) diethyl ether

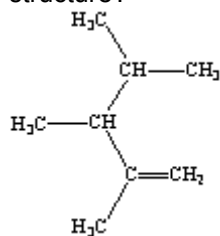
56. Which compound is an aldehyde?

(A)  $CH_3OCH_3$  (B)  $CH_3CHO$   
(C)  $CH_3COOH$  (D)  $CH_3COOCH_3$

57. How many isomers exist for dibromobenzene ( $C_6H_4Br_2$ )?

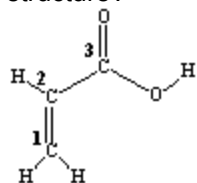
(A) one (B) two (C) three (D) four

58. What is the name for the compound with the structure?



- (A) 2-isopropyl-1-butene  
 (B) 2,3-dimethyl-2-hexene  
 (C) 2-methyl-3-isopropyl-1-butene  
 (D) 2,3,4-trimethyl-1-pentene

59. What is the hybridization of carbon atoms 1, 2, and 3, respectively in the structure?



- (A)  $sp^3$ ,  $sp$ ,  $sp^2$  (B)  $sp^2$ ,  $sp$ ,  $sp^2$   
 (C)  $sp^3$ ,  $sp^2$ ,  $sp^2$  (D)  $sp^2$ ,  $sp^2$ ,  $sp^2$

60. When egg white is coagulated the protein is said to be

- (A) condensed. (B) denatured.  
 (C) hydrolyzed. (D) polymerized.

55. Which is an example of an aromatic compound?

- (A) acetylene (B) benzene  
 (C) polyethylene (D) propanone

56. Which can exist as geometric isomers?

- (A) 1,1-dichloroethane  
 (B) 1,1-dichloroethene  
 (C) 1,2-dichloroethane  
 (D) 1,2-dichloroethene

57. Which substance is formed when  $K_2Cr_2O_7$  is added to  $C_2H_5OH$  in acid solution?

- (A)  $C_2H_6$  (B)  $CH_3COOH$   
 (C)  $K^+C_2H_5O^-$  (D)  $C_2H_5OC_2H_5$

58. Which functional group, present in simple sugars, is responsible for their high solubility in water?

- (A)  $-OH$  (B)  $-COOH$  (C)  $-CONH_2$  (D)  $-NH_2$

59. Which family of compounds is used most frequently as flavoring agents?

- (A) acids (B) alkenes (C) esters (D) ethers

60. In addition to carbon, hydrogen and oxygen, which element is found in all amino acids?

- (A) chlorine (B) nitrogen  
 (C) phosphorus (D) sulfur

55. What is the molecular formula for a saturated compound named 2,2,4-trimethylpentane?

- (A)  $C_7H_{14}$  (B)  $C_8H_{14}$  (C)  $C_8H_{16}$  (D)  $C_8H_{18}$

56. How many different compounds have the formula  $C_3H_8O$ ?

- (A) one (B) two (C) three (D) four

57. Which functional group does NOT contain an oxygen?

- (A) alcohol (B) aldehyde (C) amide (D) amine

58. How many pi bonds are present in a molecule of 1-butyne?

- (A) one (B) two (C) three (D) four

59. Which is NOT an example of an addition polymer?

- (A) polyethylene (B) polyethylene terephthalate  
 (C) polystyrene (D) polyvinyl chloride

60. The conversion of glucose to ethanol is represented:  
 $x C_6H_{12}O_6 \rightarrow y C_2H_5OH + z CO_2$

What are the coefficients x, y, z, respectively, in the balanced equation?

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

55. How many sigma bonds are in a molecule of diethyl ether,  $C_2H_5OC_2H_5$ ?

- (A) 14 (B) 12 (C) 8 (D) 4

56. Which term describes the formation of acetic acid from ethyl alcohol?

- (A) addition (B) esterification  
 (C) neutralization (D) oxidation

57. How many structural isomers have the formula  $C_5H_{12}$ ?

- (A) 2 (B) 3 (C) 4 (D) 5

58. Which class of compounds does not include  $C=O$  double bonds in its molecules?

- (A) esters (B) amides  
 (C) alcohols (D) acids

59. What is the hybridization of the carbon atoms of  $C_2H_4$  (ethene)?

- (A)  $sp$  (B)  $sp^2$  (C)  $sp^3$  (D)  $s_2p_2$

60. Which structure represents a peptide bond?

