

# SAMPLE

## CHEMISTRY ENTRANCE EXAM

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

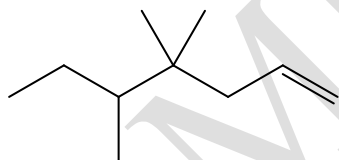
- Which *symbol – element* pair is INCORRECTLY matched?
  - B - bromine
  - Zn - zinc
  - Fe - iron
  - H - hydrogen
  - Ne - neon
- What are the total numbers of bonding and nonbonding electron pairs in an HCl molecule?
  - 3 bonding and 1 nonbonding
  - 1 bonding and 1 nonbonding
  - 1 bonding and 3 nonbonding
  - 2 bonding and 4 nonbonding
  - 1 bonding and 0 nonbonding
- How many neutrons are present in a  $^{65}\text{Cu}$  atom?
  - 29
  - 65
  - 64
  - 27
  - 36
- What mass of neon contains  $1.5 \times 10^{22}$  atoms?
  - 30.27 g
  - $3.03 \times 10^{23}$  g
  - 0.25 g
  - 15 g
  - 0.504 g
- What is the molecular geometry of  $\text{CO}_2$ ?
  - linear
  - bent
  - trigonal planar
  - trigonal pyramidal
  - tetrahedral

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6. What is the empirical formula of calcium carbonate?
- A)  $\text{CaCO}_4$
  - B)  $\text{CaCO}_3$
  - C)  $\text{Ca}_2\text{CO}_3$
  - D)  $\text{Ca}(\text{CO}_3)_2$
  - E)  $\text{Ca}_2\text{CO}_2$
7. What are the coefficients respectively when the following equation is balanced?  
 $\text{___H}_2 + \text{___Br}_2 \rightarrow \text{___HBr}$
- A) 1, 1, 1
  - B) 1, 2, 1
  - C) 2, 1, 1
  - D) 1, 1, 2
  - E) 2, 2, 1
8. Which of the following substances will exhibit dipole-dipole forces?
- A)  $\text{SO}_2$
  - B)  $\text{I}_2$
  - C)  $\text{CO}_2$
  - D)  $\text{CH}_4$
  - E)  $\text{BH}_3$
9. Which of the following is an oxidation-reduction reaction?
- A)  $\text{H}_2\text{SO}_4 + 2 \text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2 \text{H}_2\text{O}$
  - B)  $\text{Pb}(\text{NO}_3)_2 + 2 \text{KI} \rightarrow \text{PbI}_2 + 2 \text{KNO}_3$
  - C)  $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
  - D)  $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2 \text{NaCl}$
  - E)  $\text{CuSO}_4 + \text{Zn} \rightarrow \text{Cu} + \text{ZnSO}_4$
10. Which of the following equilibria will be shifted to the right by decreasing the pressure of the system?
- A)  $2 \text{NOBr}(\text{g}) \rightleftharpoons 2 \text{NO}(\text{g}) + \text{Br}_2(\text{g})$
  - B)  $\text{CS}_2(\text{g}) + 4 \text{H}_2(\text{g}) \rightleftharpoons \text{CH}_4(\text{g}) + 2 \text{H}_2\text{S}(\text{g})$
  - C)  $\text{CO}(\text{g}) + 2 \text{H}_2(\text{g}) \rightleftharpoons \text{CH}_3\text{OH}(\text{g})$
  - D)  $2 \text{NO}(\text{g}) + \text{Br}_2(\text{g}) \rightleftharpoons 2 \text{NOBr}(\text{g})$
  - E)  $\text{N}_2(\text{g}) + 3 \text{H}_2(\text{g}) \rightleftharpoons 2 \text{NH}_3(\text{g})$

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11. Calculate the mass of a 1 M solution that contains 14.91 g of KCl and has a density of 1.03 g/mL.
- A) 1.96 g  
B) 206 g  
C) 10.3 g  
D) 144.76 g  
E) 1461.76 g
12. What is the pH of a  $5 \times 10^{-4}$  M solution of HCl?
- A) 2.30  
B) 10.70  
C) 7.60  
D) 3.30  
E) 11.70
13. What is the oxidation number of O in  $\text{H}_2\text{O}_2$ ?
- A) 0  
B) -2  
C) -1  
D) +1  
E) +2
14. Which of the following can be the molecular formula of an acyclic alkane?
- A)  $\text{C}_5\text{H}_8$   
B)  $\text{C}_3\text{H}_8$   
C)  $\text{C}_6\text{H}_{12}$   
D)  $\text{C}_4\text{H}_8$   
E)  $\text{C}_7\text{H}_{10}$
15. What is the IUPAC name of the following compound?



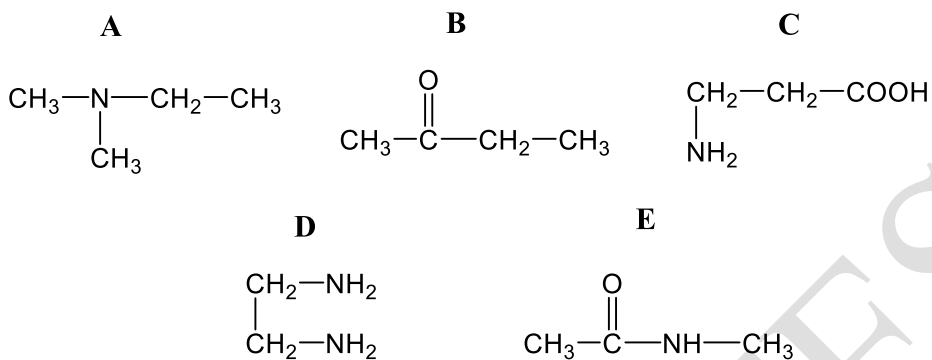
- A) 4,4,5-trimethylhept-1-ene  
B) 3,4,5-trimethylhept-6-ene  
C) isopropylbutylpropene  
D) 4,4,5-trimethylhept-1-ene  
E) 4,5-methylhept-1-ene

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16. Which of the following is a structural (constitutional) isomer of hexan-1-ol?

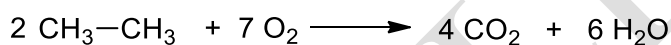
- A) cyclohexanol
- B) hexan-3-ol
- C) pentan-1-ol
- D) pentan-2-ol
- E) cyclopentanol

17. Which of the following compounds is an amide?



- A) Compound **A**
- B) Compound **B**
- C) Compound **C**
- D) Compound **D**
- E) Compound **E**

18. What type of reaction is the following?



- A) substitution
- B) elimination
- C) combustion
- D) addition
- E) hydrolysis

19. What forms when a carboxylic acid reacts with sodium hydroxide?

- A) An alcohol
- B) A salt
- C) An ester
- D) An amide
- E) An ether

20. Which of the following is a polysaccharide?

- A) fructose
- B) lactose
- C) sucrose
- D) ribose
- E) cellulose