

1. Which is not an example of low-energy radiation?
 - A) red light
 - B) infrared
 - C) blue light
 - D) X-ray

2. The bond angles around an sp^3 -hybridized carbon are _____ degrees.
 - A) 109.5
 - B) 120
 - C) 180.5
 - D) 60

3. What are the products of the complete combustion of cyclooctane?
 - I water
 - II carbon monoxide
 - III carbon dioxide
 - IV oxygen
 - A) I and II only
 - B) II and IV only
 - C) I and III only
 - D) III and IV only

4. What is the pH of a $7.5 \times 10^{-4} M$ solution of HNO_3 ?
 - A) 1.00
 - B) 3.10
 - C) 5.60
 - D) 7.40

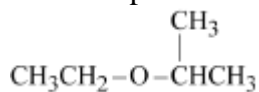
5. If the pH of a 0.10 M solution is 11.00, then $[\text{H}_3\text{O}^+] =$ _____.
 - A) $1.0 \times 10^{-1} M$
 - B) $1.0 \times 10^{-5} M$
 - C) $1.0 \times 10^{-11} M$
 - D) $1.0 \times 10^{-14} M$

6. How many quaternary (4°) carbon atoms are there in this molecule?



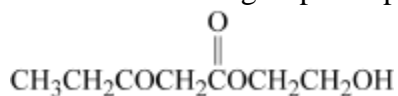
- A) 0
- B) 1
- C) 2
- D) 3

7. This compound is a(an) _____.



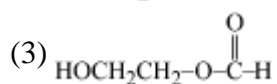
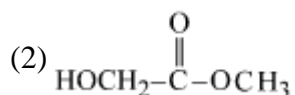
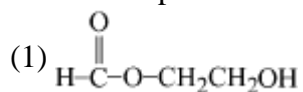
- A) alcohol
- B) ketone
- C) ether
- D) ester

8. Which functional groups are present in this compound?



- A) ether, ketone, alcohol
- B) alcohol, ketone, aldehyde
- C) alcohol, ester, aldehyde
- D) ketone, ester, alcohol

9. Which compounds are isomers?

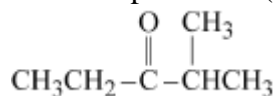


- A) 1 and 2 only
- B) 1 and 3 only
- C) 2 and 3 only
- D) 1, 2, and 3

10. The hybridization of the carbon atoms in all cycloalkanes is:

- A) sp^4
- B) sp^3
- C) sp^2
- D) sp

11. This compound is a(an) _____.

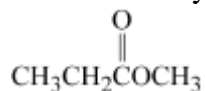


- A) alcohol
- B) ketone
- C) ether
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12. Benzene (C_6H_6):

- A) has a four-membered ring structure with alternating double and single bonds.
- B) readily reacts with H_2 in the presence of a nickel catalyst.
- C) undergoes addition reactions much more readily than aliphatic compounds do.
- D) undergoes substitution reactions take place without the loss of its aromatic structure.

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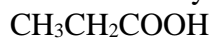


- A) aldehyde
- B) carboxylic acid
- C) ester
- D) alcohol

14. The K_a of formic acid is 1.77×10^{-4} . What is the pH of a 1.5 M solution?

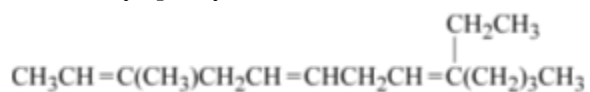
- A) 1.79
- B) 2.34
- C) 4.76
- D) 6.29

15. To what family does this compound belong?



- A) aldehyde
- B) carboxylic acid
- C) ester
- D) alcohol

16. How many sp^2 -hybridized carbon atoms are there in this compound?



- A) 2
- B) 4
- C) 6
- D) 8

17. $\text{CH}_3\text{C}(\text{CH}_3)=\text{CHCH}_2\text{CH}_3$ and $\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)=\text{CHCH}_3$ are:

- A) geometrical (cis-trans) isomers
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18. Which is not true of benzene?

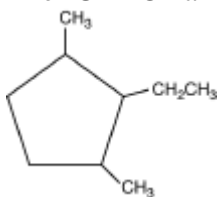
- A) The carbon atoms are sp^2 hybridized.
- B) There is a continuous, circular overlap of the six $2p$ orbitals.
- C) The hydrogen atoms are sp^2 hybridized.
- D) The overlapping $2p$ orbitals are responsible for the high stability of benzene.

19. Which formula is correct for an alkane?

- A) C_3H_7
- B) C_3H_8
- C) CH_3
- D) $\text{C}_2\text{H}_6\text{Cl}$

20. An α -particle:
I is a helium nucleus
II has a atomic mass number of 4
III has a 2+ charge
A) I only
B) I and II only
C) II and III only
D) I, II, and III
21. What is the pH of a $1.0 \times 10^{-5} M$ HCl solution?
A) 2.00
B) 4.00
C) 5.00
D) 10.00
22. Which molecular formula represents a saturated compound?
A) $C_4H_8Cl_2$
B) C_4H_8O
C) C_5H_9
D) C_4H_6
23. The IUPAC name for this compound is:
 $CH_3CH=C(CH_3)CH_2CH_3$
A) 3-methyl-2-pentane
B) 3-methyl-3-pentane
C) 3-methyl-2-pentene
D) 3-methyl-3-pentene
24. The products of the complete combustion of 2-hexene are:
A) water and oxygen
B) carbon dioxide and oxygen
C) carbon dioxide and water
D) water and hexane

25. The IUPAC name of this compound is:



- A) 2-ethyl-1,3-dimethylcyclopentane
- B) 1-ethyl-2,5-dimethylcyclopentane
- C) 2-ethyl-2,3-dimethylcyclopentane
- D) 2-ethyl-1,3-dimethylcyclobutane

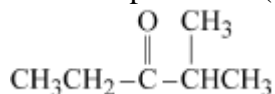
Answer Key Ver A

1. D
2. A
3. C
4. B
5. C
6. C
7. C
8. D
9. D
10. B
11. B
12. D
13. C
14. A
15. B
16. C
17. B
18. C
19. B
20. D
21. C
22. A
23. C
24. C
25. A

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2. This compound is a(an) _____.



- A) alcohol
- B) ketone
- C) ether
- D) ester

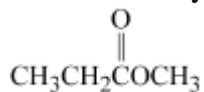
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5. To what family does this compound belong?



- A) aldehyde
- B) carboxylic acid
- C) ester
- D) alcohol

6. How many quaternary (4°) carbon atoms are there in this molecule?
 $(\text{CH}_3)_2\text{CHCH}_2\text{C}(\text{CH}_3)_2\text{CH}_2\text{C}(\text{CH}_3)_3$
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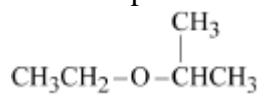
$$\text{CH}_3\text{CH}=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}=\text{CHCH}_2\text{CH}=\overset{\text{CH}_2\text{CH}_3}{\underset{|}{\text{C}}}(\text{CH}_2)_3\text{CH}_3$$

 A) 2
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11. The IUPAC name for this compound is:
 $\text{CH}_3\text{CH}=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}_3$
 A) 3-methyl-2-pentane
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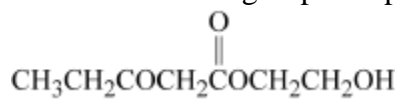
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17. $CH_3C(CH_3)=CHCH_2CH_3$ and $CH_3CH_2C(CH_3)=CHCH_3$ are:
- A) geometrical (cis-trans) isomers
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18. If the pH of a 0.10 M solution is 11.00, then $[H_3O^+] =$ _____.
 A) $1.0 \times 10^{-1} M$
 B) $1.0 \times 10^{-5} M$
 C) $1.0 \times 10^{-11} M$
 D) $1.0 \times 10^{-14} M$
19. What are the products of the complete combustion of cyclooctane?
 I water
 II carbon monoxide
 III carbon dioxide
 IV oxygen
 A) I and II only
 B) II and IV only
 C) I and III only
 D) III and IV only

20. This compound is a(an) _____.

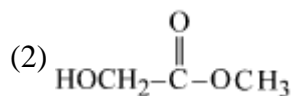
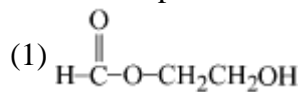


- A) alcohol
 B) ketone
 C) ether
 D) ester
21. Which functional groups are present in this compound?



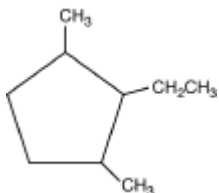
- A) ether, ketone, alcohol
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 C) alcohol, ester, aldehyde
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22. Which compounds are isomers?



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B) 1 and 3 only
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B) 1-ethyl-2,5-dimethylcyclopentane
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I is a helium nucleus

II has a atomic mass number of 4

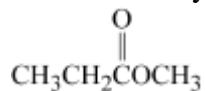
III has a 2+ charge

- A) I only
B) I and II only
C) II and III only
D) I, II, and III

Answer Key Ver B

1. B
2. B
3. A
4. C
5. C
6. C
7. C
8. A
9. D
10. C
11. C
12. D
13. C
14. B
15. A
16. B
17. B
18. C
19. C
20. C
21. D
22. D
23. A
24. B
25. D

1. To what family does this compound belong?



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B) carboxylic acid
C) ester
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2. The products of the complete combustion of 2-hexene are:
A) water and oxygen
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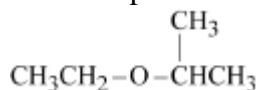
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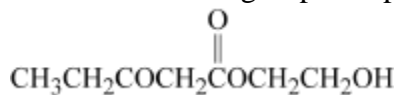
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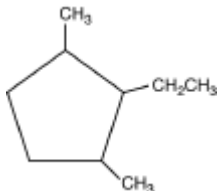
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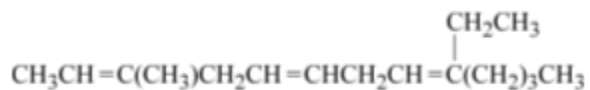


- A) 2-ethyl-1,3-dimethylcyclopentane
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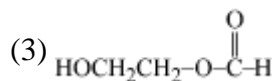
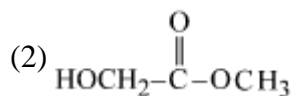
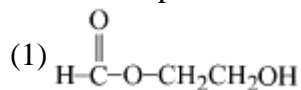
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Answer Key Ver C

1. C
2. C
3. C
4. C
5. B
6. C
7. C
8. B
9. B
10. B
11. B
12. A
13. D
14. C
15. D
16. A
17. B
18. A
19. A
20. C
21. C
22. D
23. D
24. D
25. C