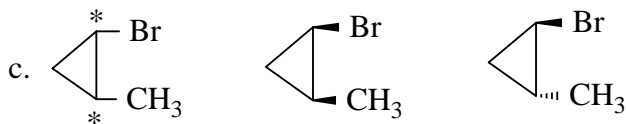
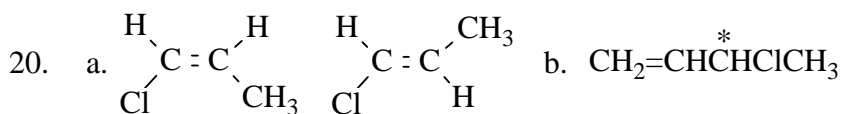
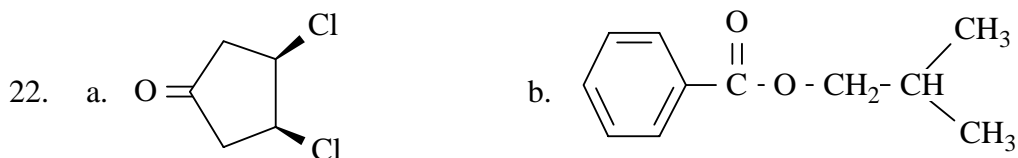


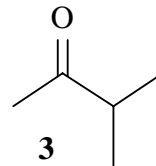
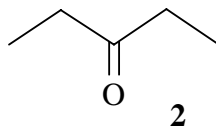
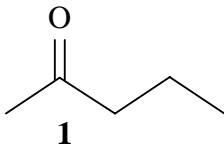
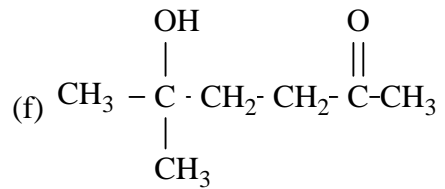
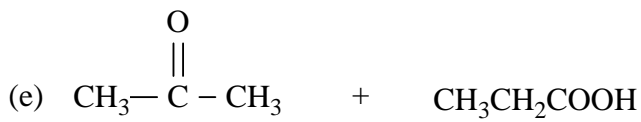
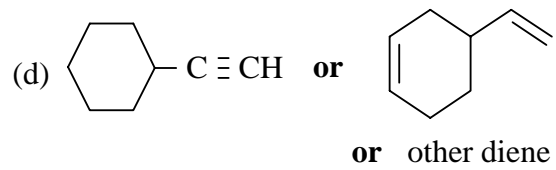
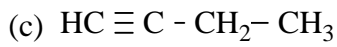
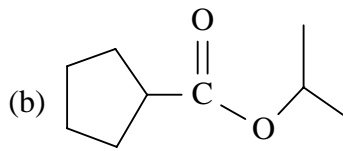
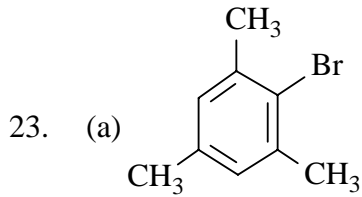
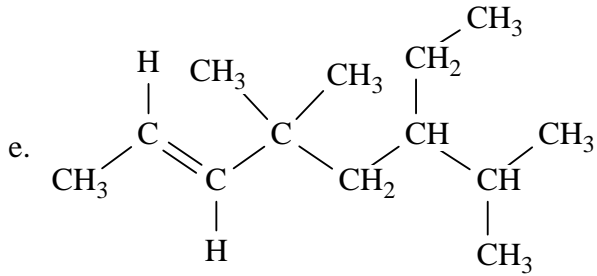
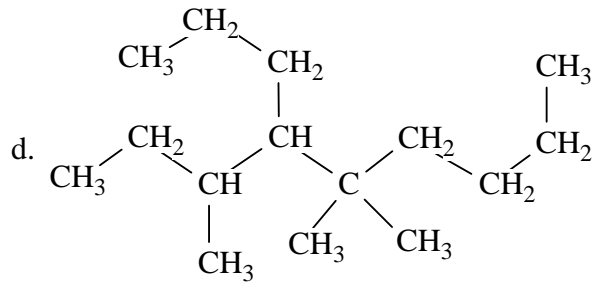
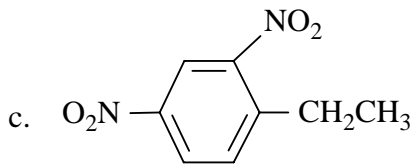
CHEM 1110**Sample Final Exam 2 ANSWERS**

1. X = 6
2. (d) NO₂
3. (d) COCl₂
4. (b) 1.13 g/L
5. (d) 664 nm
6. (d) 25 orbitals
7. (e) 16 electrons
8. Energy = 2.723 x 10⁻¹⁸ Joules and frequency = 4.11 x 10¹⁵ s⁻¹
9. (a) 6 → 1
(b) 6 → 5
(c) 6,5,4,3 → 2
10. (c) Pb
11. (b) 4
12. (e) K⁺
13. (a) F
14. (d) Mg²⁺
15. (b) Cl
16. (c) K
17. (b) Cl
18. (a) Li
19. (c) Al-Cl

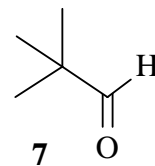
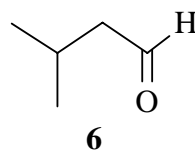
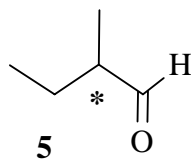
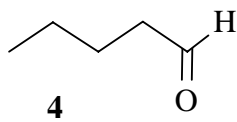


- 21.
- (a) m-chlorophenol or 3-chlorophenol
 - (b) 6-bromo-4-ethylheptanal
 - (c) 2,2-dimethyl-3-hexyne
 - (d) butanoic acid
 - (e) 2-phenyl-2-propanol

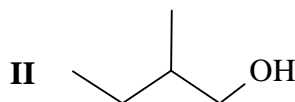
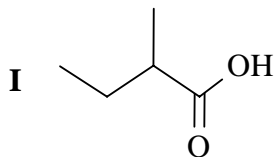




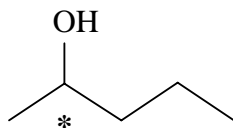
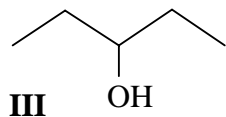
24. (a)



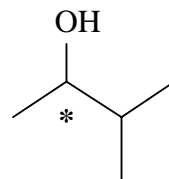
- (b) **A** is **5** [the only one which is optically active (has a C with 4 different groups attached)]. **I** and **II** are the derived carboxylic acid and primary alcohol shown.



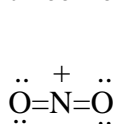
Because **B** and **C** are not oxidized, they are ketones and not aldehydes. **B** is **2** and **C** is **1** or **3**. **III** is the optically inactive alcohol and **IV** is the optically active alcohol.



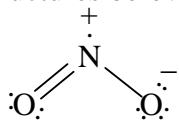
or



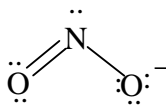
25. (b) trigonal planar
 26. (d) tetrahedral
 27. (b) 120°
 28. (e) $< 90^\circ$ & $< 120^\circ$
 29. (c) sp^3
 30. (b) sp^2
 31. (e) SF_4
 32. (e) 2.5
 33. (a) 1.0
 34. (c) B_2
 35. (b) O_2^+
 36. (b) O_2^+
 37. (e) 3 sigma and 4 pi bonds
 38. Look at the three Lewis structures below and the answer should be obvious.



Linear

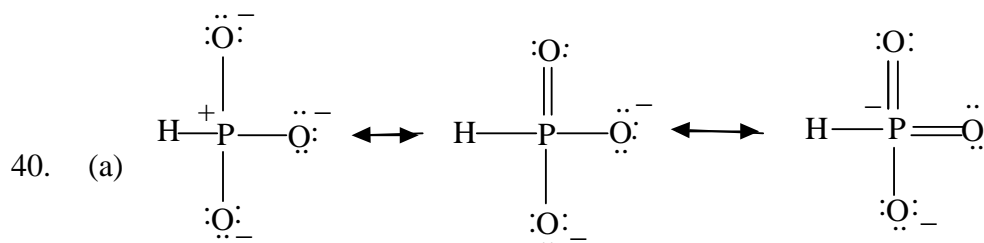


Angular

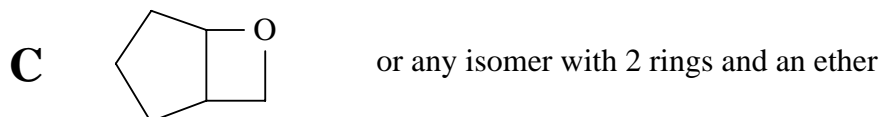
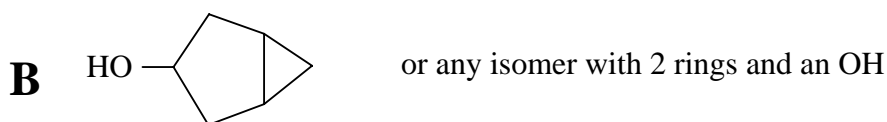
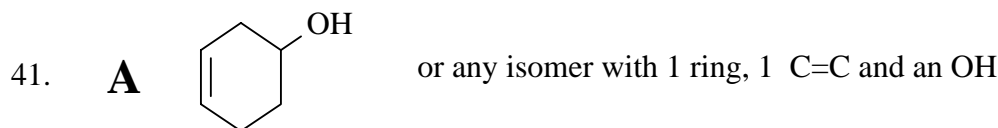
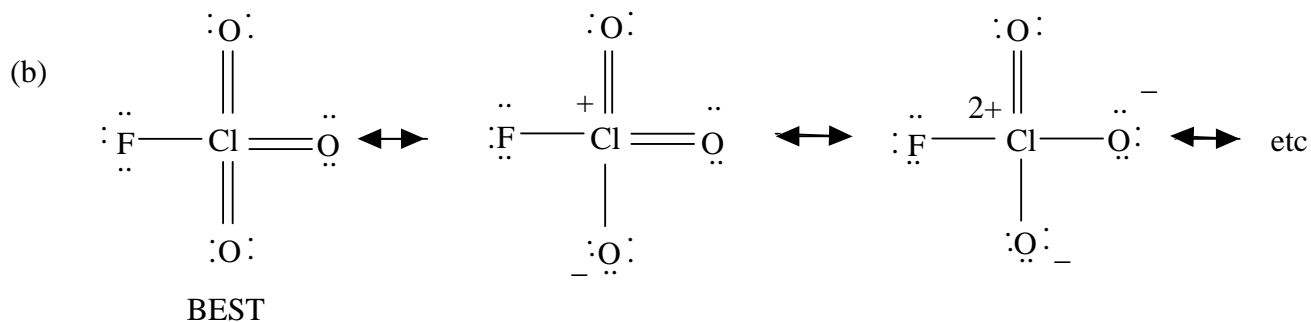


Angular

39. $NaNO_3$ because it is the only ionic compound.



BEST



42. (a) 10 sigma bonds
 (b) 2 pi bonds
 (c) Angle #1 = 120° ; Angle #2 = 109.5° ; Angle #3 = 120°
 (d) 11 non-bonding pairs
 (e) 3 atoms use sp^3 hybrid orbitals
 Total number of sp^3 hybrid orbitals is 12.
 2 atoms use sp^2 hybrid orbitals
 Total number of sp^2 hybrid orbitals is 6.
 0 atoms use sp hybrid orbitals
 Total number of sp hybrid orbitals is 0.

BONUS QUESTION:

In water the angle is 104.5° because the volume of space occupied by the non-bonding pairs is greater than the volume of space occupied by the bonding pairs.

In methanol the bond angle is larger than in water because the methyl group is larger than the H atom in water.

In dimethyl ether the bond angle is larger than 109° because you now have two methyl groups present which are larger than the hydrogens in water and the hydrogen in methanol.