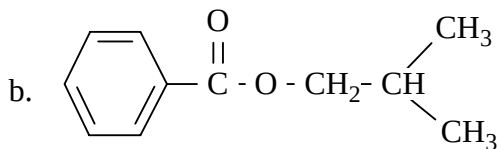
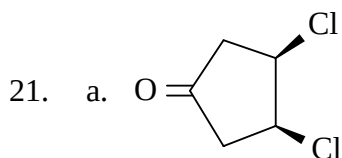
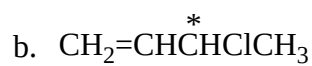
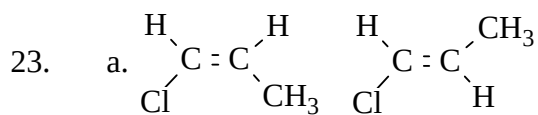
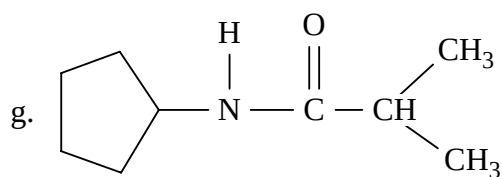
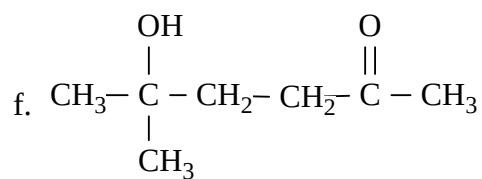
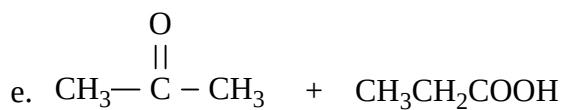
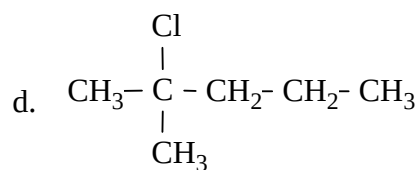
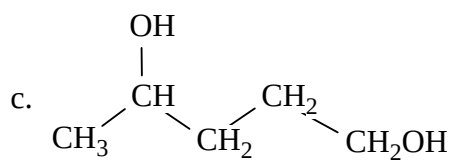
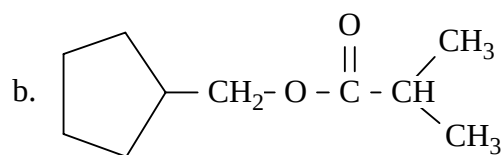
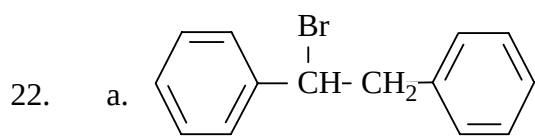
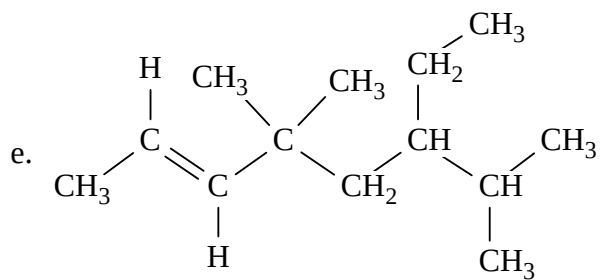
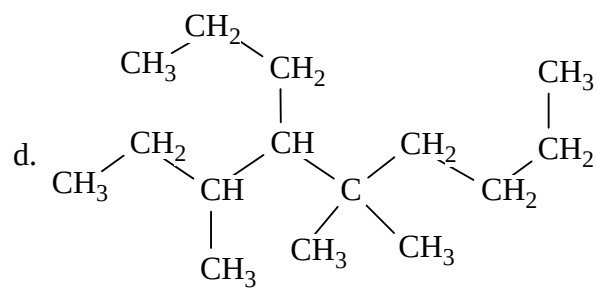
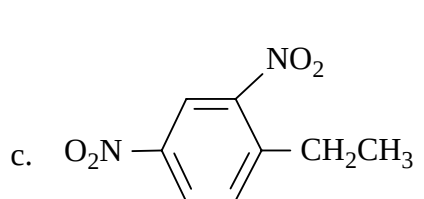
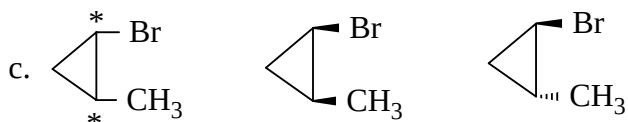


ANSWERS TO CHEM 1110 FINAL FOR FALL 2001

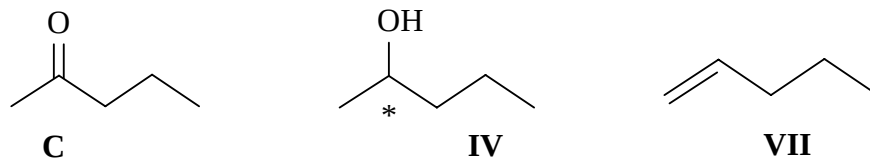
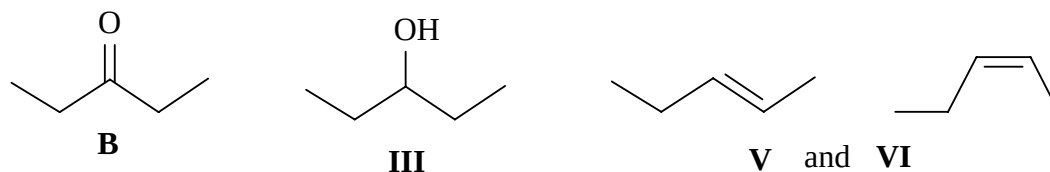
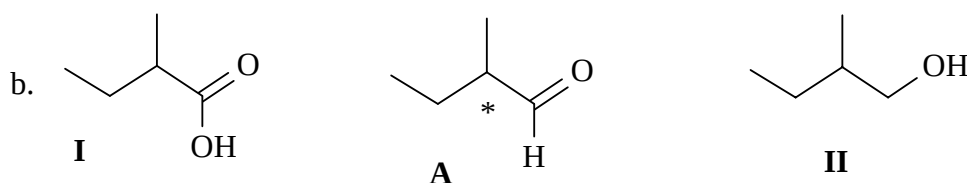
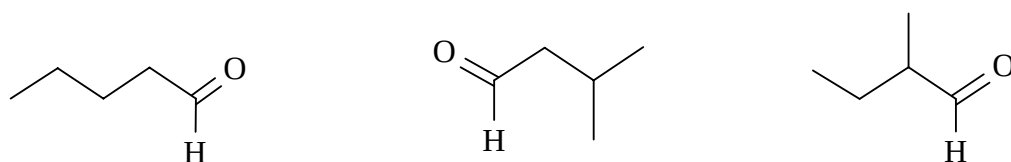
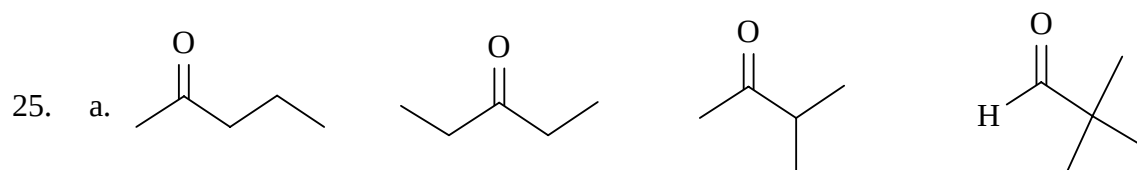
1. Molar mass = 133 g/mol
(If you obtain an answer less than this, it probably means you forgot to subtract out the vapor pressure of the water from the total pressure of the gases.)
2. Molar mass of gas X = 131 g/mol
(The molar mass of gas X must be greater than the molar mass of argon because gas X effuses at a rate of 1.66 mL/minute while argon effuses at a rate of 3.00 mL/minute.)
3. (a) M_2S_3 (b) The metal is aluminum.
4. (a) Oxygen is the limiting reagent because 7.5 L of O_2 are needed to react with 6.00 L of NH_3 and we only have 7.00 L of O_2 available.
(b) The mole fraction of NH_3 = 0.0667
(c) The partial pressure of ammonia = 0.0267 atm
5. (a) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 4f^{14} 5d^{10}$
(b) none
(c) Diamagnetic
(d) (i) 18 (ii) 6 (iii) 16 (iv) 4
6. E
7. A
8. C
9. A
10. C
11. D
12. A
13. E
14. D
15. B
16. B
17. E
18. B
19. E
20. (a) 3-chlorophenol or m-chlorophenol
(b) 6-bromo-4-ethylheptanal
(c) 2,2-dimethyl-3-hexyne
(d) butanoic acid
(e) 2-phenyl-2-propanol







24. (a) $5.84 \times 10^{-5} \text{ cm}$
 (b) $3.83 \times 10^{-8} \text{ m}$ and $7.84 \times 10^{15} \text{ sec}^{-1}$



26. (a) ethanal (Dipole-Dipole and London forces)
 (b) fluoromethane (Dipole-Dipole and London forces)
 (c) cyclohexanol (Hydrogen bonding, Dipole-Dipole and London forces)
 (d) trimethylamine (Dipole-Dipole and London forces)
27. a. Si (118 pm), Ca (197 pm), O (74 pm)
 b. K^+ (133 pm), Ca^{2+} (99 pm), Cl (181 pm)
 c. Ga(1.8), Tl (1.6) S (2.2)
 d. O^+ (3388 kJ/mol), Ne (2081 kJ/mol), Ca^+ (1145 kJ/mol)

e. Sn (-121 kJ/mol), Se (-195 kJ/mol), Br (-325 kJ/mol)

f. Sr (550 kJ/mol), Ne (2080 kJ/mol), P (1012 kJ/mol)

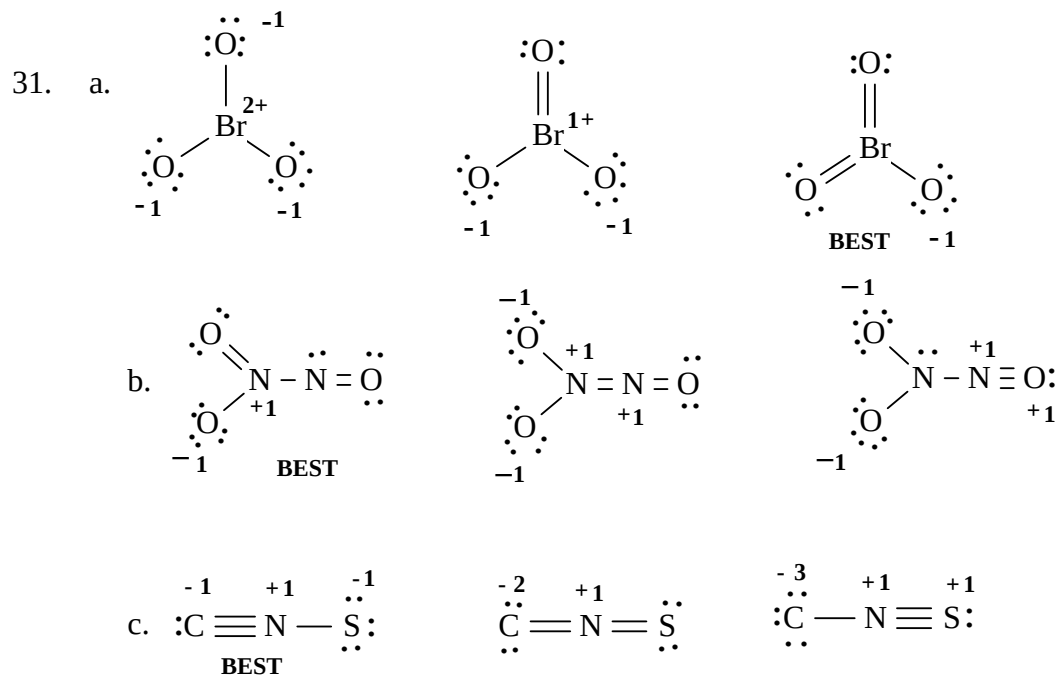
g. NF_3 (0.25 D), NH_3 (1.47 D), SF_6 (0 D)

h. C-F (135 pm), H-F (92 pm), N-Cl (175 pm)

28. D

29. A

30. mmol OH^- /mmol Sc = $11.75/4.00 = 2.94$ and therefore it is $\text{Sc}(\text{OH})_3$



32. (1) sp^2 (2) sp^2 (3) sp^2 (4) sp^3 (5) sp^3 (6) sp