Part I. Multiple choice

Part II. Problems

page 2:
1. B
2. E
3. D
4. A

page 3:
5. A
6. A
7. B
8. A
9. C
10. C

page 4:
11. A
12. B
13. A
14. B

page 5:
15. D
16. D
17. A
18. B

1. each answer worth 2 points, give 1 point partial credit if half correct
a)   sodium chloride
        hydrochloric acid
        chlorous acid
        methane
        nickel (II) nitrite

b)   $CaF_2$
        $N_2O_4$
        $NH_4MnO_4$
        HOBr or HBrO
        $FeSO_4$

2. a) worth 4 pts
        one correct conversion: 2 pts
        both conversions correct: 4 pts
        sig fig error: -1 pt

$$1.39\ g\ Cl_2 \times \frac{1\ mol}{70.90\ g} \times \frac{6.022 \times 10^{23}\ molecules}{1\ mol} = 1.18 \times 10^{23}\ molecules$$

        intermediate answers possible: 0.0196 mol

   b) worth 6 pts
        one correct conversion: 2 pts
        two correct conversions: 4 pts
        three correct conversions: 6 pts
        sig fig error: -1 pt

$$1.39\ g\ Cl_2 \times \frac{1\ mol\ Cl_2}{70.90\ g\ Cl_2} \times \frac{2\ mol\ NO_2Cl}{1\ mol\ Cl_2} \times \frac{81.46\ g\ NO_2Cl}{1\ mol\ NO_2Cl} = 3.19\ g\ NO_2Cl$$

        intermediate answers possible:
            0.0196 mol $Cl_2$ and 0.0392 mol $NO_2Cl$

   Extra credit: There are many ways to approach this. Here is one. Max moles of $NO_2Cl$ that could be made from each reactant if all of it is consumed:

$$2.10\ g\ NO_2 \times \frac{1\ mol\ NO_2}{46.01\ g\ NO_2} \times \frac{2\ mol\ NO_2Cl}{2\ mol\ NO_2} = 0.0456\ mol\ NO_2Cl$$

$$2.00\ g\ Cl_2 \times \frac{1\ mol\ Cl_2}{70.90\ g\ Cl_2} \times \frac{2\ mol\ NO_2Cl}{1\ mol\ Cl_2} = 0.0564\ mol\ NO_2Cl$$

$NO_2$ would get used up first, so it is the limiting reagent