

MT Review Key

Stoichiometry

1. a. 3.67 mol b. 0.157 mol c. 19.35 mol d. 14.4 g HF 2. a. 47.85 L Br₂ b. 741.6 g HBr
3. a. 0.948 g b. 0.450 L 4. a. [HNO₃] = 0.437 M b. 0.004424 L 5. a. Cu in excess. b. 90.0 g
6. a. 440.7 g BF₃ b. 74.0% 7. a. 288.0 g NO b. 192.96 g

Atoms, Periodic Table and Bonding

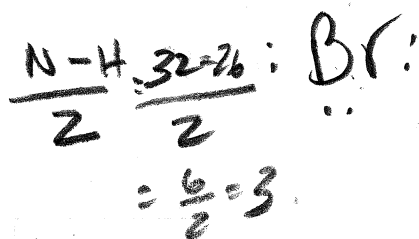
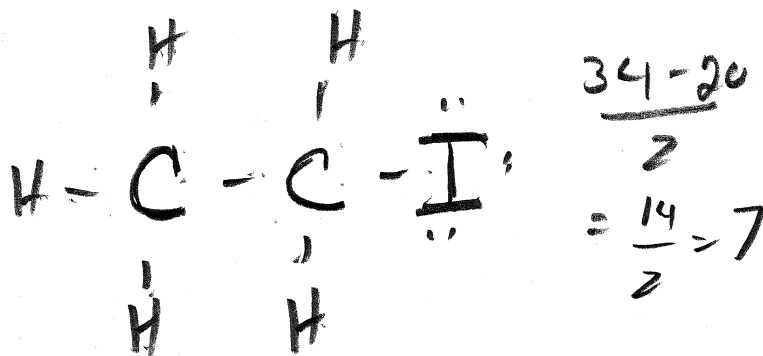
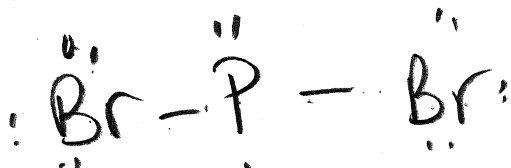
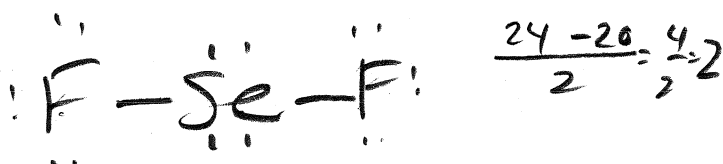
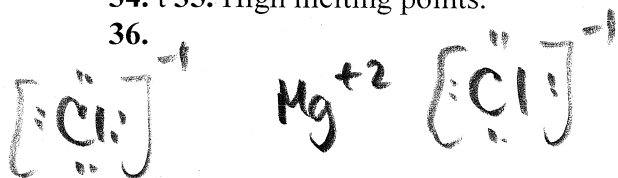
1. Democritus 2. John Dalton; Atomic 3. J.J. Thompson 4. Ernest Rutherford; nucleus
5. a. Hydrogen; energy; orbitals (shells); higher; light (photons); lower b. Only worked for hydrogen; no evidence that e- travel in orbits.

6.

Isotope	Protons	Neutrons	Electrons
¹⁹⁴ Ir ³⁺	77	117	74
²⁰² Hg ²⁺	80	122	78
¹²⁵ Te ²⁻	52	73	54
²⁶³ Sg	106	157	106
² H ⁺	1	1	0

7. a. ²⁶²Pb²⁺ b. ¹²³Sb³⁺ c. ⁷⁵As³⁻ d. ¹³³Xe e. ²⁴⁴Pu³⁺ 8. 79.986 g/mol; Bromine 9. orbitals
10. n; energy 11. a. [Ne] 3s² 3p³ b. [Kr] 5s² 4d⁴ c. [Ar] 4s² 3d¹⁰ 4p⁴ d. [Kr] 5s¹ e. [Ne] 3s² 3p⁶
f. [He] 2s² 2p⁶ g. [Ne] 3s² 3p⁶ h. [Ne] 3s² 3p⁶ 12. lose, 2, Sr²⁺; gain, 3, As³⁻; lose, 3, Al³⁺; gain, 2, Se²⁻; gain, 3, N³⁻; gain, 1, I⁻; lose, 1, Cs⁺; gain, 2, Te²⁻ 13. Ge 14. Na 15. Cs 16. Cl 17. Na 18. Bi
19. Kr 20. C 21. Energy required to remove outermost e-. 22. Pb 23. Cs 24. Mg 25. Cl 26. F
27. The attraction an atom has for the e- of another atom. 28. Ba 29. Tl 30. Ga 31. c 32. F 33. l
34. t 35. High melting points.

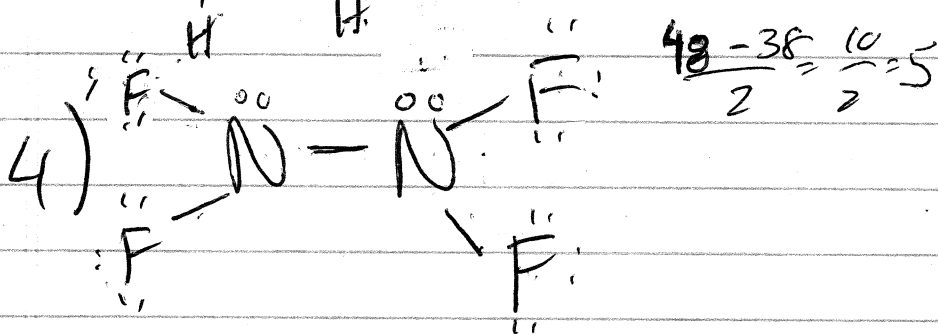
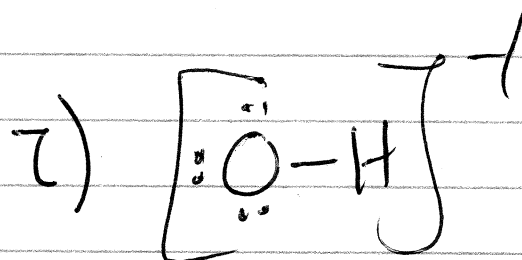
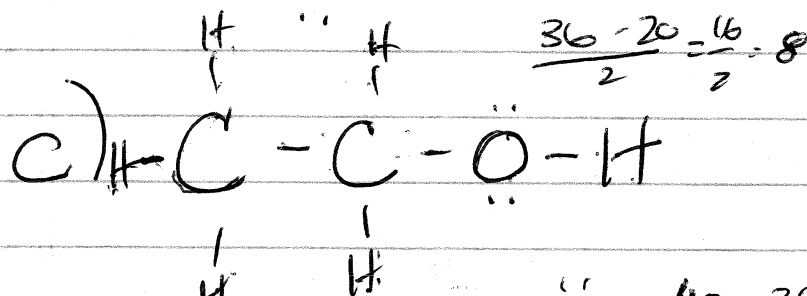
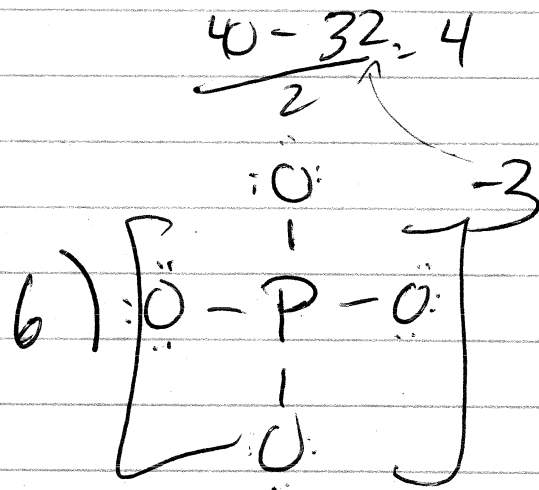
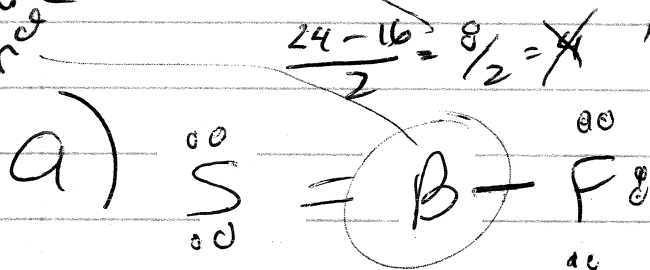
36.



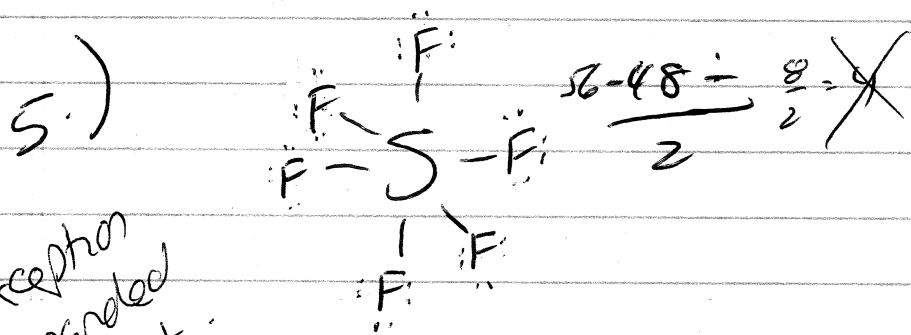
yet more Lewis

Key

* Exception
Reduced Valence



$\frac{10 - 8}{2} = 1$



exception
expanded
octet

Chemistry 11 – Course Review

KEY

Unit 2—Introduction to Chemistry

Pages in Student Workbook	Class Assignments	Extra Questions (SW)
9-40	Hand-In #1—Unit Conversions Hand-In #2—Significant Digits Experiment 3-A - Determining the Mass/Volume Relation for 3 Liquids	p.21, p.26, p.33-34, p.39, p.40

1. 0.0006 mm = ? μm

$$6 \times 10^{-4} \text{ mm} \times \frac{10^{-3} \text{ m}}{1 \text{ mm}} \times \frac{1 \mu\text{m}}{10^{-6} \text{ m}} = 6 \times 10^{-1} \mu\text{m} = 0.6 \mu\text{m}$$

Answer 0.6 μm

2. 0.054 mL = ? nL

$$5.4 \times 10^{-2} \text{ mL} \times \frac{10^{-3} \text{ L}}{1 \text{ mL}} \times \frac{1 \text{ nL}}{10^{-9} \text{ L}} = 5.4 \times 10^4 \text{ nL}$$

Answer $5.4 \times 10^4 \text{ nL}$

3. 3.5 $\mu\text{g/L}$ = ? mg/mL

$$\frac{3.5 \mu\text{g}}{\text{L}} \times \frac{10^{-6} \text{ g}}{1 \mu\text{g}} \times \frac{1 \text{ mg}}{10^{-3} \text{ g}} \times \frac{10^{-3} \text{ L}}{1 \text{ mL}} = 3.5 \times 10^{-6} \frac{\text{mg}}{\text{mL}}$$

Answer $3.5 \times 10^{-6} \text{ mg/mL}$

4. The density of iron is 7860 g/L. Calculate the mass of a 3.2 mL sample of iron.

$\left(\frac{M}{D \cdot V} \right)$
 $M = 0.0032 \text{ L} \times \frac{7860 \text{ g}}{\text{L}} = 25.152 \text{ g}$
 $M = D \times V$

Answer 25.2 g

5. Manganese has a density of 7.20 g/mL. Calculate the volume occupied by a 4.0 kg piece of manganese.

$$V = \frac{M}{D} = \frac{4000 \text{ g}}{7.20 \text{ g/mL}} = 555.56 \text{ mL}$$

Answer 556 mL

Chemistry 11

KEY

Course Review

6. A 0.0460 L piece of copper has a mass of 410.32 g. Calculate the density of copper in g/mL.

$$D = \frac{M}{V} = \frac{410.32 \text{ g}}{46.0 \text{ mL}} = 8.92 \frac{\text{g}}{\text{mL}}$$

Answer 8.92 g/mL

7. Give the number of significant digits in each of the following. Assume they are all measurements.

- a) 0.0023 2 d) 3.2×10^{-4} 2
 b) 3953 000 4 e) 50020.000 8
 c) 1.0200×10^5 5 f) 3450 3

8. Perform the following calculations and round the answers off to the correct number of significant digits as justified by the data. Assume all numbers are measurements.

- a) 2.1500×0.31 0.67 d) $8.90 \times 10^3 \div 4.400 \times 10^{-6}$ 2.02×10^9
 b) $0.05 + 394.7322$ 394.78 e) $83.00 \div 1.2300 \times 10^2$ 0.6748
 c) $4.905 \times 10^6 \div 4 \times 10^{-2}$ 1×10^8 h) $98.0076 - 2.195$ 95.813
 d) $(3.33 \times 9.52) + 13.983$ 45.7 i) $0.00000200 \times 245.912$ 4.92×10^{-4}
 e) $3.813 + 98.98 + 2.669$ 105.46 j) $(5.802 \div 6.21) + (2.41 \div 9.2565)$ 1.195
 (350 = 1 dp) (3 dp) (3 dp = 3 dp) (350 = 3 dp)

9. Round the following numbers to 2 significant digits. (4 marks)

- a) 2 000 000 000 2.0×10^9 c) 3.88945×10^{28} 3.9×10^{28}
 b) 106 000 1.1×10^5 d) 0.000 000 7895 7.9×10^{-7}
 (110 000)

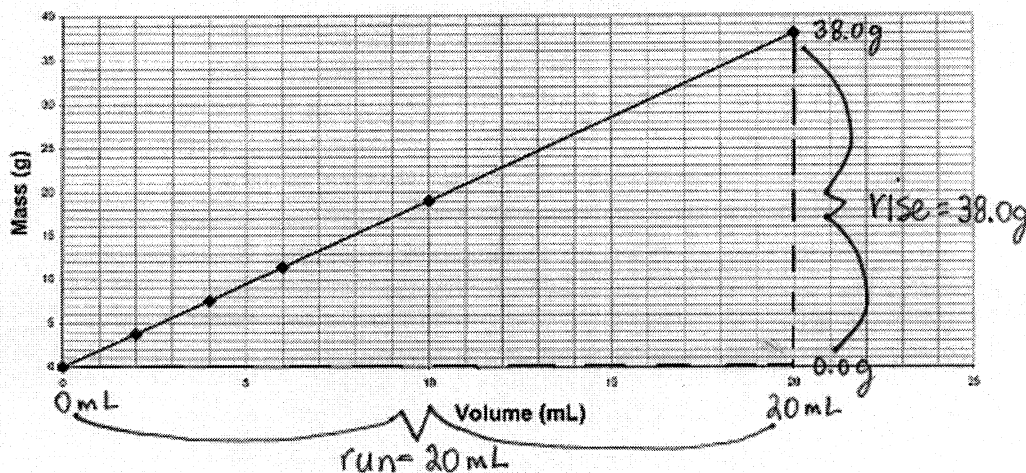
Chemistry 11

Course Review

KEY

10. Given the following graph of Mass (g) vs. Volume (mL) for Liquid "E", answer the questions below it:

Mass vs. Volume for Liquid "E"



- Calculate the slope of the line and express it in the correct units.

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{38.0\text{g}}{20.0\text{mL}} = 1.9\text{ g/mL}$$
- What is the Y-Intercept for the line? 0.0 g
- Write a mathematical equation for the line in terms of Mass and Volume.

$$\text{Mass(g)} = 1.9\text{ g/mL} \times \text{Volume(mL)}$$
- Predict the mass of 150 mL of Liquid "E". (Use the equation from (c))

$$M = 1.9V$$

$$= 1.9\text{ g/mL} \times 150\text{ mL} = 285\text{ g}$$
- Predict the volume occupied by a 240 g sample of Liquid "E"

$$V = \frac{M}{1.9} = \frac{240\text{ g}}{1.9\text{ g/mL}} = 126\text{ mL}$$
- What is the density of Liquid "E" in g/mL? $D = \text{slope} = 1.9\text{ g/mL}$

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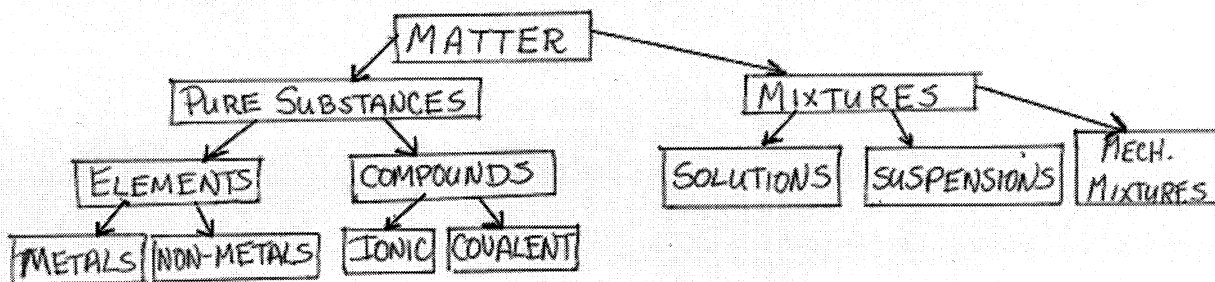
Unit 3—Properties of Matter

Pages in Student Workbook	Class Assignments	Extra Questions (SW)
41- 61	Experiment 2C – Elements, Compounds & Mixtures Experiment on Methods of Physical Separation of Mixtures Experiment 2A-Warming Behavior of Solid Paradichlorobenzene	p.43, p.52, p.58-59

1. Define: Observation, Interpretation, Qualitative, Quantitative, Data, Experiment, Hypothesis, Theory, Laws, Matter, Chemistry, Physical and Chemical Properties, Malleability, Ductility, Lustre, Viscosity and Diffusion. Review the Phases of Matter.

see page 41-46 of S.W.

2. Draw the diagram from your notes outlining the Classification of Matter. Make sure you can define each classification.



see SW. p 49-52