

## Exam #8 (Chp 8) SOLUTIONS

(110 points total)

Mark answers on your scantron for Questions 1-27. Mark only one answer unless directed otherwise. Each question is worth 2 pt.

(8.1) A 5 gallon tank filled with methane (gas) and a small amount of methyl mercaptan gives a noticeable odor.

Use these answers for Questions 1 and 2.      A) solvent      B) solution      C) solute      D) water

1. Methyl mercaptan is the \_\_\_\_\_ in this mixture.

2. Methane is the \_\_\_\_\_ in this mixture.

3. (8.1) Mayonnaise, fog and milk are examples of this.

A) solution

4. (8.1) Normal saline, Ringers and 5% glucose are examples of this.

B) suspension

5. (8.1) This is a mixture like muddy water where the particles settle out over time.

C) colloid

(8.2) Use these answers for Questions 3 and 6.

A) unsaturated      B) saturated      C) increase      D) decrease      E) stay the same

6. (8.2) A pinch of salt added to a pot of boiling water makes a \_\_\_\_\_ solution.

7. (8.2) If the temperature of a solution increases, the solubility of most solid solutes will \_\_\_\_\_.

8. (8.2) If the pressure above a solution increases the solubility of a gaseous solute will \_\_\_\_\_.

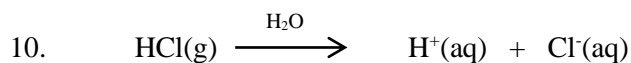
9. (8.2) When a bottle of soda is opened the solubility of the CO<sub>2</sub> \_\_\_\_\_s.

(8.3) (4 pt) Write the balanced equation for NH<sub>4</sub>OH, a weak electrolyte, when it dissolves in water.

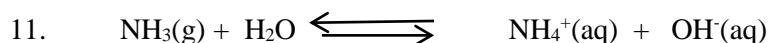
(8.3) (4 pt) Write a balanced equation for CaCl<sub>2</sub>(s), a strong electrolyte, when it dissolves in water.

(8.3) (4 pt) Draw a picture of the hydrated ions of CaCl<sub>2</sub> when it dissolves in water.

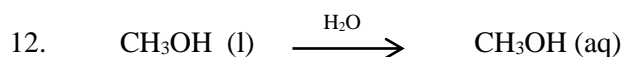
(8.3) Select the answer on the right that corresponds to each of the following solubility equations.



A) Strong electrolyte



B) Weak electrolyte



C) Non-electrolyte

13. (8.3) In Question 9, the solute is    A) totally ionic    B) only molecular    C) both ionic and molecular.
14. (8.3) Which cation and anion are present at the highest concentrations in blood (extracellular fluid)?  
*Mark two.*  
A)  $K^+$     B)  $Na^+$     C)  $Cl^-$     D)  $PO_3^{3-}$     E)  $HCO_3^-$
15. (8.3) How many equivalents are there in a solution that contains 4.25 moles of  $Mg^{2+}$ ?  
A) 4.25 Eq    B) 8.50 Eq    C) 2.13 Eq    D) 1.00 Eq

**Answer all of the following question using a 15% aqueous solution of NaCl**

(8.4) (6 pt) How many grams of NaCl are present in 1.0 L of this solution?

(8.4) (4 pt) How many moles of NaCl are there in 1.0 L of this solution?  
*The molar mass of NaCl is  $22.99 + 35.45 = 58.44$  g/mol*

(8.4) (4 pt) What is the molarity of NaCl in 1 L of this solution?

(8.4) (8 pt) What is the Eq/L concentration of  $Na^+$  and  $Cl^-$  in this solution.

(8.5) (6 pt) What volume will 1 L of this solution have to be diluted to in order to make a 0.90% aqueous solution of NaCl?

(8.5) (6 pt) What is the final % concentration of NaCl in a solution that was serially diluted (1.0 mL to 5.0 mL) five times?

(8.4) (6 pt) What is the ppm concentration of glucose that is 112 mg glucose/dL blood?

16. (8.4) What is the molar mass of calcium chloride?

- A) 75.53      B) 47.46      C) 82.91      D) 110.98

17. (8.4) What is the mass of 3.61 moles of Ca?

- A) 0.090 g      B) 144 g      C) 40.0 g      D) 150 g

(8.4) (10 pt) A child weighs 75 lb. The dose of drug C is specified as 25 mg/kg/24 hr in three doses. The drug is administered as an injection of a 50.0 mg drug C/mL solution. How many mL of drug should be administered in each dose. (2.2 lb = 1 kg)

(7.6) Use the answers on the right for Questions 18-23

18. In the “naked egg” experiment the tap water was _____ to the egg.	A) into	AC) diffusion
19. A red blood cell in 0.9% NaCl will _____	B) out of	AD) crenate
20. As the blood of a patient undergoing hemodialysis leaves the patient, its solute concentration is _____ to the dialyzing solution.	C) hypotonic	AE) swell
21. As the blood of a patient undergoing hemodialysis re-enters the patient, its osmotic pressure is _____ than the dialyzing solution.	D) hypertonic	BC) neither crenate or swell
22. The word for water movement across a semipermeable membrane is _____	E) isotonic	BD) higher
23. In the naked egg experiment the water moved _____ the egg that was in the Karo syrup.	AB) osmosis	BE) lower
		CD) the same as

Use these answers for Questions 24 to 27.

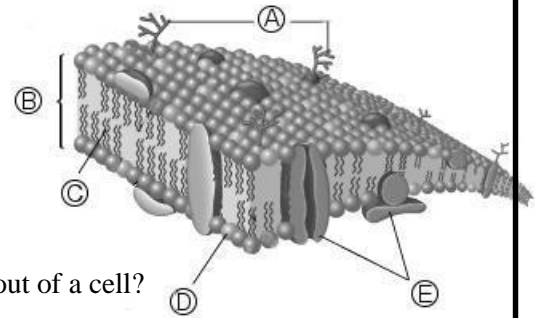
A) passive    B) facilitated    C) active    D) exocytosis    E) endocytosis

24. In this diagram of a cell membrane \_\_\_\_\_ transport occurs in region E (*mark two answers*)

25. \_\_\_\_\_ transport occurs in region C of the membrane.

26. What kind of transport occurs with the movement of  $H^+$  (energy required)

27. Which transport process occurs when proteins are transported by vesicles out of a cell?



8 pt

**SCRATCH**

## USEFUL CONVERSION FACTORS AND RELATIONSHIPS

**Length***SI unit: meter (m)*

$$\begin{aligned}
 1 \text{ km} &= 0.62137 \text{ mi} \\
 1 \text{ mi} &= 5280 \text{ ft} \\
 &= 1.6093 \text{ km} \\
 1 \text{ m} &= 1.0936 \text{ yd} \\
 1 \text{ in.} &= 2.54 \text{ cm (exactly)} \\
 1 \text{ cm} &= 0.39370 \text{ in.} \\
 1 \text{ \AA} &= 10^{-10} \text{ m}
 \end{aligned}$$

**Mass***SI unit: kilogram (kg)*

$$\begin{aligned}
 1 \text{ kg} &= 2.2046 \text{ lb} \\
 1 \text{ lb} &= 453.59 \text{ g} \\
 &= 16 \text{ oz} \\
 1 \text{ amu} &= 1.6605402 \times 10^{-24} \text{ g}
 \end{aligned}$$

**Temperature***SI unit: Kelvin (K)*

$$\begin{aligned}
 0 \text{ K} &= -273.15^\circ\text{C} \\
 &= -459.67^\circ\text{F} \\
 \text{K} &= ^\circ\text{C} + 273.15 \\
 ^\circ\text{C} &= \frac{5}{9} (^{\circ}\text{F} - 32^{\circ}) \\
 ^\circ\text{F} &= \frac{9}{5} ^\circ\text{C} + 32^{\circ}
 \end{aligned}$$

**Energy (derived)***SI unit: joule (J)*

$$\begin{aligned}
 1 \text{ J} &= 1 \text{ kg}\cdot\text{m}^2/\text{s}^2 \\
 1 \text{ J} &= 0.2390 \text{ cal} \\
 &= 1 \text{ C} \times 1 \text{ V} \\
 1 \text{ cal} &= 4.184 \text{ J} \\
 1 \text{ eV} &= 1.602 \times 10^{-19} \text{ J}
 \end{aligned}$$

**Pressure (derived)***SI unit: Pascal (Pa)*

$$\begin{aligned}
 1 \text{ Pa} &= 1 \text{ N}/\text{m}^2 \\
 &= 1 \text{ kg}/\text{m}\cdot\text{s}^2 \\
 1 \text{ atm} &= 101,325 \text{ Pa} \\
 &= 760 \text{ torr} \\
 &= 14.70 \text{ lb}/\text{in}^2 \\
 1 \text{ bar} &= 10^5 \text{ Pa}
 \end{aligned}$$

**Volume (derived)***SI unit: cubic meter (m<sup>3</sup>)*

$$\begin{aligned}
 1 \text{ L} &= 10^{-3} \text{ m}^3 \\
 &= 1 \text{ dm}^3 \\
 &= 10^3 \text{ cm}^3 \\
 &= 1.0567 \text{ qt} \\
 1 \text{ gal} &= 4 \text{ qt} \\
 &= 3.7854 \text{ L} \\
 1 \text{ cm}^3 &= 1 \text{ mL} \\
 1 \text{ in}^3 &= 16.4 \text{ cm}^3
 \end{aligned}$$

**SCRATCH**

1 H 1.00797																	1 H 1.00797	2 He 4.0026					
3 Li 6.939	4 Be 9.0122																	5 B 10.811	6 C 12.0112	7 N 14.0067	8 O 15.9994	9 F 18.9984	10 Ne 20.183
11 Na 22.9898	12 Mg 24.312																	13 Al 26.9815	14 Si 28.086	15 P 30.9738	16 S 32.064	17 Cl 35.453	18 Ar 39.948
19 K 39.102	20 Ca 40.08	21 Sc 44.956	22 Ti 47.90	23 V 50.942	24 Cr 51.996	25 Mn 54.9380	26 Fe 55.847	27 Co 58.9332	28 Ni 58.71	29 Cu 63.54	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.909	36 Kr 83.80						
37 Rb 85.47	38 Sr 87.62	39 Y 88.905	40 Zr 91.22	41 Nb 92.906	42 Mo 95.94	43 Tc (99)	44 Ru 101.07	45 Rh 102.905	46 Pd 106.4	47 Ag 107.870	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.904	54 Xe 131.30						
55 Cs 132.905	56 Ba 137.34	*57 La 138.91	72 Hf 178.49	73 Ta 180.948	74 W 183.85	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.09	79 Au 196.967	80 Hg 200.59	81 Tl 204.37	82 Pb 207.19	83 Bi 208.980	84 Po (210)	85 At (210)	86 Rn (222)						
87 Fr (223)	88 Ra (226)	†89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 ? (271)	111 ? (272)	112 ? (277)												

\* Lanthanide Series

58 Ce 140.12	59 Pr 140.907	60 Nd 144.24	61 Pm (147)	62 Sm 150.35	63 Eu 151.96	64 Gd 157.25	65 Tb 158.924	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.04	71 Lu 174.97
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† Actinide Series

90 Th 232.038	91 Pa (231)	92 U 238.03	93 Np (237)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (249)	99 Es (254)	100 Fm (253)	101 Md (256)	102 No (256)	103 Lr (257)
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**Electronegativity Chart  
of the Elements**

1A	2A	Current American Usage										3A	4A	5A	6A	H	
1A	8A	IUPAC Notation										13	14	15	16	2.1	
1	2																
17	18																
H 2.1	Li 1.0	Be 1.5											B 2.0	C 2.5	N 3.0	O 3.5	F 4.0
Na 0.9	Mg 1.2	3B 3	4B 4	5B 5	6B 6	7B 7	8B 8	9 9	10 10	11 11	12 12	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	
K 0.8	Ca 1.0	Sc 1.3	Ti 1.5	V 1.6	Cr 1.6	Mn 1.5	Fe 1.8	Co 1.8	Ni 1.8	Cu 1.9	Zn 1.6	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8	
Rb 0.8	Sr 1.0	Y 1.3	Zr 1.4	Nb 1.6	Mo 1.8	Tc 1.9	Ru 2.2	Rh 2.2	Pd 2.2	Ag 1.9	Cd 1.7	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5	
Cs 0.7	Ba 0.9	La* 1.1	Hf 1.3	Ta 1.5	W 1.7	Re 1.9	Os 2.2	Ir 2.2	Pt 2.2	Au 2.4	Hg 1.9	Tl 1.8	Pb 1.8	Bi 1.9	Po 2.0	At 2.2	
Fr 0.7	Ra 0.9	Ac† 1.1	Rf	Db	Sg	Bh	Hs	Mt	‡	‡	‡	* Lanthanide Series † Actinide Series					

‡ IUPAC has not yet named these elements.

Ce 1.1	Pr 1.1	Nd 1.2	Pm --	Sm 1.2	Eu --	Gd 1.1	Tb 1.2	Dy --	Ho 1.2	Er 1.2	Tm 1.2	Yb 1.1	Lu 1.2
Th 1.3	Pa 1.5	U 1.7	Np 1.3	Pu 1.3	Am 1.3	Cm 1.3	Bk 1.3	Cf 1.3	Es 1.3	Fm 1.3	Md 1.3	No 1.3	Lr 1.3