

12

General Chem. 101
First Exam

Date: 29/3/2012
Time: 70 min.

Name: ~~.....~~ Reg. No.: ~~.....~~

اشبع 11 بجاب

Instructor Name: ~~.....~~ Seat No.: 48



$$^{\circ}\text{F} = (^{\circ}\text{C} \times \frac{9}{5}) + 32, \quad \text{K} = ^{\circ}\text{C} + 273.15$$



ANSWER SHEET

- | | | | | | | | | | | | |
|----|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|-----|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| 1. | a | b | <input checked="" type="radio"/> c | d | e | 10. | a | b | <input checked="" type="radio"/> c | d | e |
| 2. | a | <input checked="" type="radio"/> b | c | d | e | 11. | a | <input checked="" type="radio"/> b | c | d | e |
| 3. | a | b | c | <input checked="" type="radio"/> d | e | 12. | <input checked="" type="radio"/> a | b | c | d | e |
| 4. | a | b | <input checked="" type="radio"/> c | d | e | 13. | <input checked="" type="radio"/> a | b | c | d | e |
| 5. | <input checked="" type="radio"/> a | b | c | d | <input checked="" type="radio"/> e | 14. | a | b | <input checked="" type="radio"/> c | <input checked="" type="radio"/> d | e |
| 6. | a | <input checked="" type="radio"/> b | c | d | <input checked="" type="radio"/> e | 15. | a | b | <input checked="" type="radio"/> c | d | <input checked="" type="radio"/> e |
| 7. | a | b | <input checked="" type="radio"/> c | d | e | 16. | a | <input checked="" type="radio"/> b | c | d | <input checked="" type="radio"/> e |
| 8. | a | b | c | d | <input checked="" type="radio"/> e | 17. | a | b | <input checked="" type="radio"/> c | d | e |
| 9. | a | b | c | <input checked="" type="radio"/> d | e | 18. | a | <input checked="" type="radio"/> b | c | d | <input checked="" type="radio"/> e |

GOOD LUCK
GOOD LUCK

- 1) Express the temperature 122 °F in K. (0°C=273.15K)
 a) 341 b) 50.0 c) 323 d) 493 e) 221

$$C = \frac{5}{9}(F - 32)$$

$$= 50$$

$$K = C + 273$$

$$=$$

- 2) The answer to the expression: $\{[(0.04616 \times 0.082057 \times 293.30)/0.654] + 0.246\}$ rounded to the proper number of significant figures is:
 a) 1.945 b) 1.94 c) 1.96 d) 1.69870 e) 1.946

- 3) The volume of an atom is $5.44 \times 10^{-23} \text{ cm}^3$. express this value in nm^3 .
 (1m=1 x 10²cm) (1m=1 x 10⁹nm)
 a) 5.44×10^1 b) 5.44×10^{-19} c) 2.35×10^{-15} d) 5.44×10^{-2} e) 1.81×10^{-9}

- 4) The name of the compound HNO_2 is:
 a) hydrogen nitrite b) nitric acid c) nitrous acid d) hydrogen nitrate e) hyponitrous acid

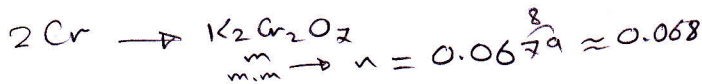
- 5) How many sulfur atoms are there in 5.00 g of $\text{Al}_2(\text{SO}_4)_3$? (M.M.= 342.14) ($N_A = 6.022 \times 10^{23}$)
 $n = \frac{m}{m.m} = \frac{5}{342.14} = 0.014613$

- a) 2.64×10^{22} b) 1.83×10^{22} c) 4.08×10^{21} d) 7.62×10^{21} e) 6.02×10^{23}

- 6) 10.00 g of phosphorus react with oxygen to produce a compound with a mass of 17.77 g. What is the empirical formula of the compound? (A.M.: P= 30.97, O= 16.00)

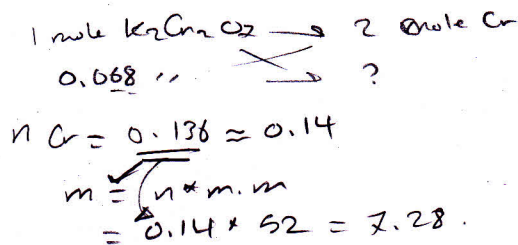
- a) P_2O_5 b) P_2O_3 c) PO d) PO_2 e) P_2O_7

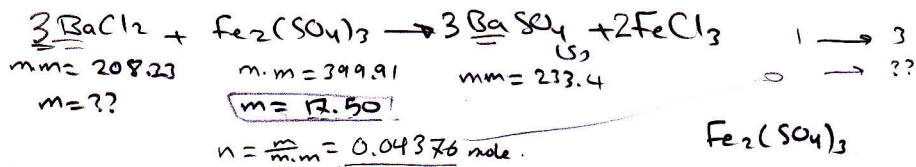
17.77g
 P
 10.00
 $7.77g$



- 7) What mass in grams of chromium, Cr, is required to prepare 20.00 g of $\text{K}_2\text{Cr}_2\text{O}_7$? (M.M.: 294.2) (A.M.: K= 39.10, Cr=52.00, O=16.00)

- a) 8.72 b) 4.84 c) 7.07 d) 10.6 e) 4.90



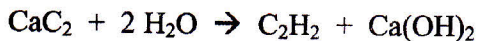


8) Barium chloride, BaCl_2 (M.M.=208.23) reacts with iron(III) sulfate, $\text{Fe}_2(\text{SO}_4)_3$ (M.M.=399.91), to produce barium sulfate, BaSO_4 , (M.M.=233.4) as a precipitate. What minimum mass of barium chloride is required to react completely with 17.50 g of $\text{Fe}_2(\text{SO}_4)_3$?

- a) 15.62 g b) 17.6 g c) 10.8 g d) 17.50 g e) 27.34 g

$n_{\text{BaCl}_2} = 0.13128$
 $m = 0.13128 * 208.23$
 $= 27.34 \text{ g}$

9) What is the mass of acetylene, C_2H_2 (M.M.=26.04), that would be produced from the reaction of 2.37 g of calcium carbide, CaC_2 (M.M.=64.1), with excess water?



- a) 0.0369 g b) 1.247 g c) 0.0370 g d) 0.963 g e) 0.865 g

$\text{CaC}_2 + \text{H}_2\text{O} \rightarrow \text{C}_2\text{H}_2$
 $m = 2.37 \text{ g}$ $m = ??$
 $m.m = 64.1 \text{ g/mol}$ $m.m = 26.04$
 $n = \frac{m}{m.m} = 0.037$ $n = 0.037$
 $m = 0.037 * 26.04$
 $= 0.963$

10) Which of the following is a weak electrolyte in aqueous solution?

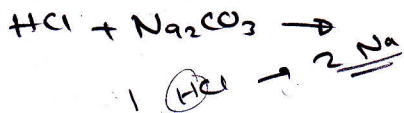
- a) H_2SO_4 b) HNO_3 c) H_2S d) NaCl e) FeCl_3

11) A precipitate is expected when an aqueous solution of potassium sulfate is added to an aqueous solution of

- a) Sodium chloride b) Lead(II) nitrate c) Lithium hydroxide
d) Ammonium nitrate e) Zinc nitrate

12) Which of the following compounds is soluble in water?

- a) MgSO_4 b) CaCO_3 c) $\text{Cr}_3(\text{PO}_4)_2$ d) Al(OH)_3 e) BaSO_4



$$n = M \cdot V$$

$$M = ??$$

17) What will be the molarity of $\text{HCl}_{(aq)}$ solution if 25.4 mL of it is required to titrate a solution made by dissolving $0.425 \text{ g Na}_2\text{CO}_3$ (M.M.=106) in water? $n = M \cdot V$

- a) 0.158 b) 0.264 c) 0.316 d) 0.124 e) 0.0401

$$n = \frac{m}{\text{m.m.}} = \frac{0.425}{106}$$

$$n = 4.009 \times 10^{-3}$$

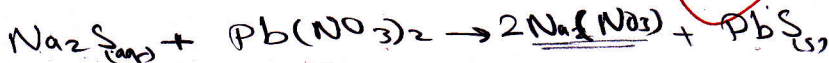
$$0.078$$

$$\div 2$$

$$= 2.0047 \times 10^{-3}$$

18) $0.64 \text{ g Na}_2\text{S}$ (M.M.=78) is dissolved in water. $1.35 \text{ g Pb}(\text{NO}_3)_2$ (M.M.=331) is also dissolved in water. The two solutions were mixed to produce PbS (M.M.=239) precipitate. What is the mass of PbS produced?

- a) 0.64g b) 1.99g c) 1.35g d) 0.84g e) 0.97g



$$m = 0.64$$

$$m = 1.35$$

$$\text{m.m.} = 239$$

$$\text{m.m.} = 78$$

$$\text{m.m.} = 331$$

$$m = ??$$

$$n = 0.0082$$

$$n = 0.0041$$

$$n = 0.008$$

$$m = 0.0041$$

$$m =$$

PERIODIC TABLE OF THE ELEMENTS

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| IA | 1 H 1.0079 | 2 He 4.0026 | 3 Li 6.941 | 4 Be 9.0122 | 5 B 10.81 | 6 C 12.011 | 7 N 14.0067 | 8 O 15.9994 | 9 F 18.9984 | 10 Ne 20.179 | 11 Na 22.9898 | 12 Mg 24.305 | 13 Al 26.9815 | 14 Si 28.086 | 15 P 30.9738 | 16 S 32.06 | 17 Cl 35.453 | 18 Ar 39.948 | 19 K 39.098 | 20 Ca 40.08 | 21 Sc 44.9559 | 22 Ti 47.88 | 23 V 50.9414 | 24 Cr 51.996 | 25 Mn 54.9380 | 26 Fe 55.847 | 27 Co 58.9332 | 28 Ni 58.71 | 29 Cu 63.546 | 30 Zn 65.38 | 31 Ga 69.72 | 32 Ge 72.60 | 33 As 74.91 | 34 Se 78.96 | 35 Br 79.916 | 36 Kr 83.80 | 37 Rb 85.4678 | 38 Sr 87.62 | 39 Y 88.9059 | 40 Zr 91.22 | 41 Nb 92.9064 | 42 Mo 95.94 | 43 Tc 98.7062 | 44 Ru 101.07 | 45 Rh 102.9055 | 46 Pd 106.4 | 47 Ag 107.8682 | 48 Cd 112.40 | 49 In 114.82 | 50 Sn 118.59 | 51 Sb 121.75 | 52 Te 127.60 | 53 I 126.9045 | 54 Xe 131.30 | 55 Cs 132.9054 | 56 Ba 137.34 | 57 *La 138.9055 | 58 Ce 140.12 | 59 Pr 140.9077 | 60 Nd 144.24 | 61 Pm (147) | 62 Sm 150.4 | 57 Fr (223) | 58 Ra 226.0754 | 59 *Ac (227) | 63 Eu 151.96 | 64 Gd 157.25 | 65 Tb 158.9254 | 66 Dy 162.50 | 67 Ho 164.930 | 68 Er 167.26 | 69 Tm 168.9342 | 70 Yb 173.04 | 71 Lu 174.97 | 72 Hf 178.49 | 73 Ta 180.9479 | 74 W 183.85 | 75 Re 186.2 | 76 Os 190.2 | 77 Ir 192.22 | 78 Pt 195.09 | 79 Au 196.9665 | 80 Hg 200.59 | 81 Tl 204.37 | 82 Pb 207.2 | 83 Bi 208.9804 | 84 Po (210) | 85 At (210) | 86 Rn (222) | 87 Rf (261) | 88 Db (262) | 89 Sg (266) | 90 Th 232.038 | 91 Pa 231.0359 | 92 U 238.029 | 93 Np 237.0482 | 94 Pu (244) | 95 Am (243) | 96 Cm (245) | 97 Bk (247) | 98 Cf (249) | 99 Es (249) | 100 Fm (255) | 101 Md (258) | 102 (No) (254) | 103 Lr (257) |
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* LANTHANIDE SERIES

† ACTINIDE SERIES