## 淡江大學 109 學年度日間部轉學生招生考試試題

系別:水環系環工組二年級

科目:化

考試日期:7月22日(星期三) 第1節

本試題共 10 大題,

- 1. Carry out the following arithmetic operations to the correct number of significant figures and unit: (12 pts)
  - (a) 3.70 g 2.9133 g (b)  $0.01542 \text{ kg} \div 88.3 \text{ mL}$  (c)  $(2.64 \times 10^3 \text{ cm}) \times (3.27 \times 10^2 \text{ cm})$
- 2. Write the appropriate symbol for an atom of uranium whose mass number is 235. (5 pts)
- 3. Which of the following compounds are likely to be ionic? Which are likely to be molecular? LiF, H<sub>2</sub>O, CCl<sub>4</sub>, Na<sub>2</sub>CO<sub>3</sub>. (8 pts)
- 4. Name the following species:
  - (a) Ba(OH)<sub>2</sub>, (b) PF<sub>5</sub>, (c) VSO<sub>4</sub> (d) FeCl<sub>3</sub> 6H<sub>2</sub>O, (e) HNO<sub>3</sub>. (15 pts)
- 5. Ammonia (NH<sub>3</sub>) is a principal nitrogen fertilizer. It is prepared by the following reaction between hydrogen and nitrogen.
  - (a) Write the balance chemical equation for the formation of ammonia. (6 pts)
  - (b) If the theoretical yield of NH<sub>3</sub> is 102.2 g, how many grams of H<sub>2</sub> and how many grams of N<sub>2</sub> are reacted to produce this amount of NH<sub>3</sub>? (6 pts)
  - (c) If the actual yield of the above reaction is 88.2 g, what is the percent yield of the reaction? (4 pts)
- 6. Identify the major ionic species present in an aqueous solution of K<sub>2</sub>SO<sub>4</sub>. (6 pts)
- 7. What is the equation of chemical reaction that involved in the formation of scale (水垢)? What is the strategy to remove the scale? (8 pts)
- 8. A 20.00 mL sample of 0.1015 M nitric acid is introduced into a flask, and water is added until the volume of the solution reaches 500. mL. What is the concentration of nitric acid in the final solution? (6 pts)
- 9. Write the ground-state electron configurations for (a) C, (b) Pd, which is diamagnetic (c) N<sup>3</sup>-. (12 pts)
- 10. Write the Lewis structure of (a) Cl<sup>-</sup> (b) CO<sub>3</sub><sup>2-</sup> (c) water molecule (d) nitrate ion. (12 pts)

IA																	Ar supplied
1																	VIII A
Н		Transition metals															He
1.01	ПА	Metals									ША	IVA	VA	VIA	VIIA	4.00	
3	4					Nonmetals						5	6	7	8	9	10
Li	Be	Metaloids									В	C	N	0	F	Ne	
6.94	9.01	Noble gases										10.81	12.01	14.01	16.00	19.00	20.18
11	12	Inner transition metals										13	14	15	16	17	18
Na	Mg											AI	Si	P	S	CI	Ar
22,99	24.30	ШВ	IVB	VB	VIB	VIIB	4	VIII B	>	IB	пв	26.98	28.09	30.97	32.06	35.45	39.95
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	NI	Cu	Zn	Ga	Ge	As	Se	Br	Kr
39.10	40.08	44.96	47.87	50.94	52.00	54.94	55.84	58.93	58.69	63.55	65.41	69.72	72.64	74.92	78.69	79.90	83.80
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te		Xe
85.47	87.62	88.91	91.22	92.91	95.94	(98)	101.07	102.91	106.42	_	112.41	114.82	118.71	121.76	127.60	126.60	
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	TI	Pb	Bi	Po	At	Rn
132.91	137.33	138.91	178.49	180.95	183.84	186.21	190.23	192.22	195.08		200.59	204.38			(209)	(210)	(222)