系級	微生物學系二年級	考試時間	100 分鐘
科目	普通化學	本科總分	100 分

1. What is the atomic <u>number</u> of Phosphorous (P)? (5%)

    (A) 31, (B) 15,(C) 209, (D) 84

2. What is the <u>name</u> of the element with the symbol <u>Fe</u>? (5%)

    (A) Selenium, (B) Fermium, (C) Iron, (D) Francium

3. Indicate the oxidation state of the underlined elements in (A) $\underline{P}_4$ (B) $\underline{Fe}O_4^{2-}$ (10%)

4. Which of the following sets of quantum numbers is not matched with the orbital designation. (5%)

    （A）$n=1, \ell=0 : a\ 1s\ orbital$
    （B）$n=2, \ell=0 : a\ 2p\ orbital$
    （C）$n=3, \ell=0 : a\ 3s\ orbital$
    （D）$n=3, \ell=1 : a\ 3p\ orbital$
    （E）$n=3, \ell=2 : a\ 3d\ orbital$

5. Which orbital-filling diagram represents the anomalous ground state of chromium? (5%)

(A)

(B)

(C)

(D)

6. What is the ground-state electron configuration of Co? (5%)

   (A) $[Ar]3d^9$ (B) $[Ar]4s^13d^8$ (C) $[Ar]4s^23d^7$ (D) $[Ar]4s^24p^64d^1$

7. Name these compounds (a) and (b), and write formulas for the compounds (c) and (d): (20%)

    (a) SrO (b) ZnS (c) silicon tetrafluoride (d) 3-pentanol

8. To what volume should you dilute 0.200 L of a 15.0 M NaOH solution to obtain a 3.00 M NaOH solution? (10%)

9. Titanium metal can be obtained from its oxide according to the balanced equation: | 背面尚有試題 |

$$TiO_2(s) + 2\ C(s) \rightarrow Ti(s) + 2\ CO(g)$$

When 28.6 kg of C reacts with 88.2 kg of TiO_2, 42.8 kg of Ti is produced. Find the limiting reactant, theoretical yield (in kg), and percent yield. (M.W. C = 12.01, Ti = 47.87, O = 16.0) (15%)

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For the reaction: A + B → C + D

Experiment	[A], M	[B], M	Initial rate, M s^{-1}
1	0.185	0.133	3.35×10^{-4}
2	0.185	0.266	1.35×10^{-3}
3	0.370	0.133	6.75×10^{-4}
4	0.370	0.266	2.70×10^{-3}

10. What is the order of reaction with respect to A? (5 %)

   (A) 1 (B) 2 (C) 3 (D) 4

11. What is the order of reaction with respect to B? (5 %)

   (A) 1 (B) 2 (C) 3 (D) 4

12. What is the overall reaction order? (5 %)

   (A) 1 (B) 2 (C) 3 (D) 4

13. What is the value of the rate constant, k? (5 %)

   (A) 0.77 (B) 0.07 (C) 0.55 (D) 0.10