

# 淡江大學 109 學年度日間部寒假轉學生招生考試試題

系別：化學工程與材料工程學系二  
年級

科目：普通化學

55

考試日期：1月18日(星期一) 第1節

本試題共

大題，

頁

1. (15 pts) How do 2p and 3p orbitals differ from each other?
2. (15 pts) In terms of the MO model, which species of  $O_2^{2+}$  or  $N_2^{2+}$  will most likely be the one to gain an electron? Explain your answer.
3. (10 pts) In defining the sizes of orbitals, why must we use an arbitrary value, such as 90% of the probability of finding an electron in that region?

4. (10 pts)

	mass value (u)	natural abundance (%)
$^{35}\text{Cl}$	34.97	75.77
$^{37}\text{Cl}$	36.97	24.23

X = atomic weight of chlorine; Y = atomic number of  $^{35}\text{Cl}$

Which of the following is correct?

- (A) X = 35.45, Y = 17
  - (B) X = 35.97, Y = 17.5
  - (C) X = 34.97, Y = 18
  - (D) X = 36.97, Y = 20
5. (20 pts) Using VSEPR to predict the structures of molecules with 5 electron pairs around the central atom for (a)  $\text{AB}_5$  (b)  $\text{AB}_4$ .
  6. (20 pts)
    - (a) Draw  $d_{xy}$  orbital with coordinate axis.
    - (b) Define 'formal charge'.
    - (c) reaction intermediate
    - (d) rate determining step
  7. (10 pts) For constructing homonuclear diatomic MO energy-level diagrams of 2<sup>nd</sup> period elements, why only valence orbitals are considered? Or, why 1s orbital is not considered?