

淡江大學 109 學年度日間部轉學生招生考試試題

系別：化學系、尖端材料學程二年級 科目：普通化學

12-

考試日期：7月22日(星期三) 第2節

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- (20 pts) Answer the following questions.
 - Draw d_{xy} and d_{z^2} orbitals with coordinate axis.
 - Define 'formal charge'.
 - Define 'isoelectronic'.
 - Explain 'lanthanide contraction'
- (10 pts) How do 2p and 3p orbitals differ from each other?
- (15 pts) Use formal charge arguments to explain why CO has a much smaller dipole moment than would be expected on the basis of electronegativity.
- (10 pts) In terms of the molecular orbital (MO) model, which species of CN or NO will most likely be the one to gain an electron? Explain.
- (15 pts) For X_2 where X has the electronic configuration of $2s^2 2p^3$,
 - Give the valance MO energy level diagram of the ground state (g.s.) and excited state (e.s.). Label the frontier molecular orbitals.
 - Give the bond orders in g.s. and e.s.
- (15 pts) (a) Give electronic configurations of Cr and W.
(b) Explain the electronic configuration of Cr.
- (15 pts) For an endothermic reaction, draw curves of an uncatalyzed and a catalyzed reactions to show the change in potential energy as a function of reaction progress. Indicate the difference.