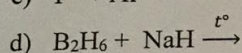
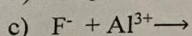
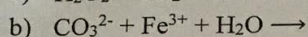
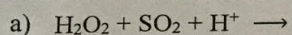


Final ExaminationModule: *Inorganic Chemistry - CHE1077E*Duration: **90 mins**Examinees/ Dành cho sinh viên lớp: *E1CLCCNH; E2CLCHD and E3CLCHD***Đề thi cuối kỳ (đề số 1)**Môn học: *Hóa vô cơ - CHE1077E*Thời gian làm bài: **90 phút**

*This is an open book examination/ Sinh viên được phép sử dụng tài liệu khi làm bài
Answer 10 out of the following 12 questions/ Thí sinh trả lời 10 trong số 12 câu hỏi sau*

Question 1. Write **balanced** chemical equations for the following chemical reactions



✗ **Question 2.** Explain the trends in the boiling point and bond energy of NH_3 , PH_3 , AsH_3 .

✗ **Question 3.** Using VSEPR theory, predict the molecular shape of BCl_3 , SO_2Cl_2 , POCl_3 , PCl_5 .

✗ **Question 4.** Draw the MO diagram of O_2 . Compare the bond lengths in O_2 , O_2^- , and O_2^{2-} .

Question 5. Explain the trend in the acidity of HOCl , HClO_2 , HClO_3 , HClO_4 .

Question 6. Explain the reverse trends in solubility (g/100 g H_2O at 20 °C) of alkaline earth metal hydroxides and sulfates.

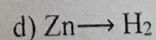
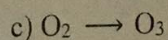
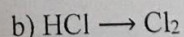
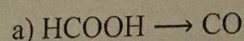
	M = Be	M = Mg	M = Ca	M = Sr	M = Ba
$\text{M}(\text{OH})_2$	2.4×10^{-6}	6.4×10^{-3}	0.173	1.77	3.89
MSO_4	39.1	33.7	2.10	13.2×10^{-3}	2.5×10^{-3}

✗ **Question 7.** Describe the bonding in B_2H_6 . Briefly explain the difference in bond lengths of B–H_{terminal} (1.19 Å) and B–H_{bridging} (1.31 Å).

Question 8. Explain why white phosphorus is much more reactive than red phosphorus.

Question 9. While burning in oxygen, lithium forms the oxide Li_2O but sodium forms the peroxide Na_2O_2 . Explain why.

Question 10. Choose suitable reagents and conditions to complete the following chemical reactions:



✗ **Question 11.** Briefly give plausible reason why $\text{N}(\text{CH}_3)_3$ molecule possesses trigonal pyramidal geometries while $\text{N}(\text{SiH}_3)_3$ is trigonal planar.

✗ **Question 12.** Briefly give plausible reason why the HOH bond angle in H_2O is 104.5° while the HSH bond angle in H_2S is close to 90° .

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