CHEM 624 Fall 2012 Exam #1A (Blue)

September 13, 2012, 6:00 PM

Print Name__**KEY**_____ _____ _____
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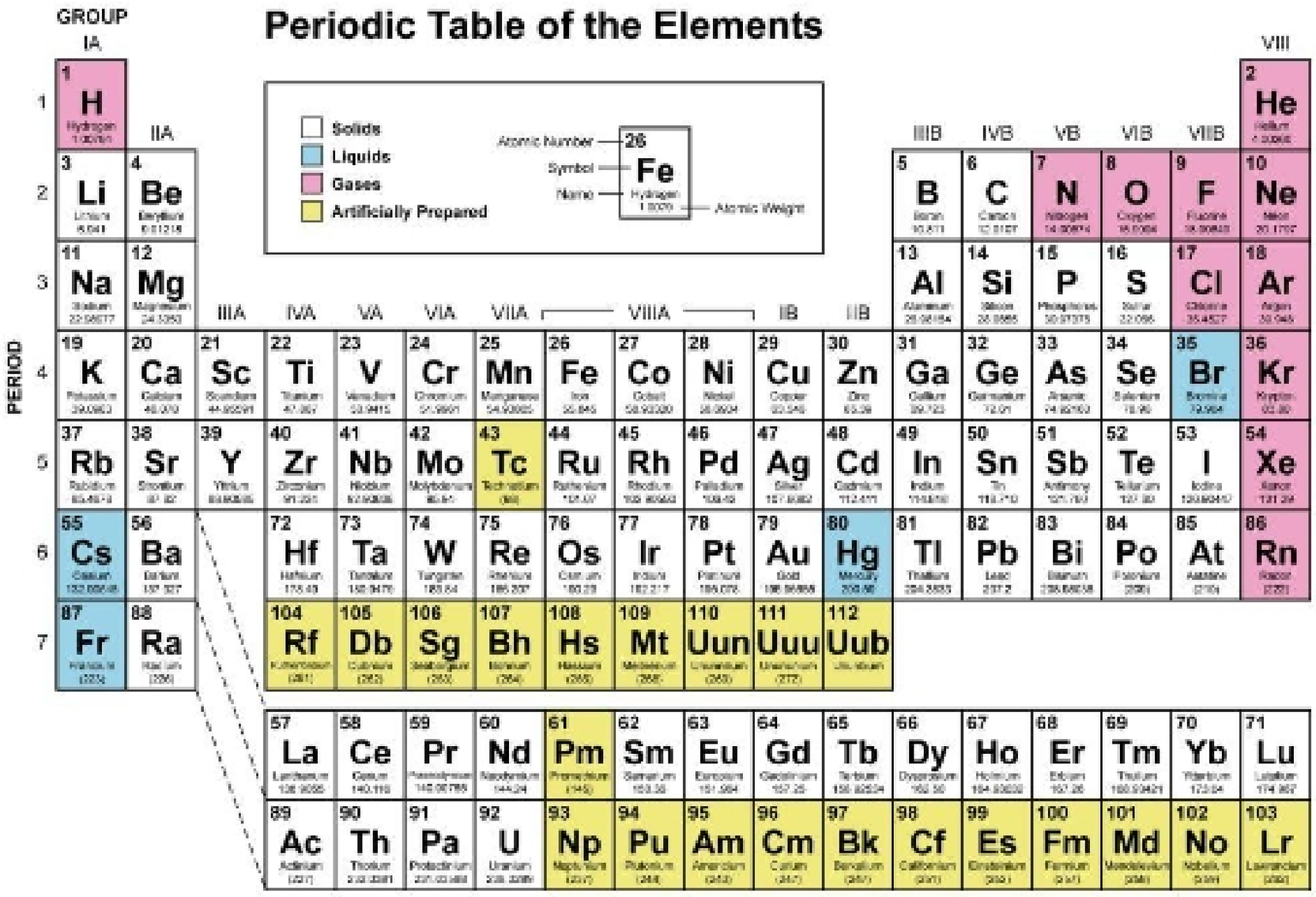
Page 6 (20 pts) _____

Page 7 (21 pts) _____

Page 8 (11 pts) _____

Total pages 6-8
(52 possible)



**Note: the last page of the exam is meant to be torn off and used as scratch paper

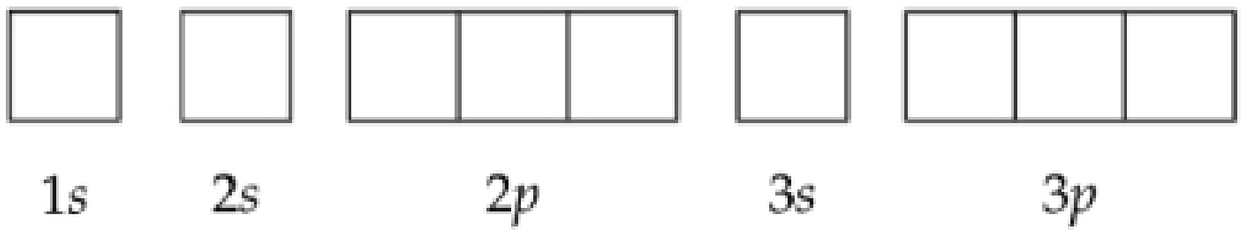
Enter your answers to Problems 1-24 on the SCANTRON SHEET

Multiple Choice (48 points total; 2 points each)

1. Which of the following indicates the **actual charges of subatomic particles**?

   A. protons (+); neutrons (-); electrons (0)
   B. protons (+); neutrons (0); electrons (-)
   C. protons (-); neutrons (+); electrons (0)
   D. protons (-); neutrons (0); electrons (+)

2. In the element with electron configuration $1s^2 2s^2 2p^6 3s^2 3p^2$, the two **3p electrons** are:



   A. in a single 3p orbital with opposite spins
   B. in a single 3p orbital with identical spins
   C. in different 3p orbitals with opposite spins
   D. in different 3p orbitals with identical spins

3. For the atom in Question 2, the **core electron configuration** is:

   A. $1s^2$ **B.** $1s^2 2s^2$ **C.** $1s^2 2s^2 2p^6$ **D.** $1s^2 2s^2 2p^6 3s^2$

4. Bonds that involve **sharing of electrons** between atoms are called:

   A. Covalent **B.** Ionic **C.** Molecular **D.** Hybrid

5. The total number of **valence (i.e. bonding and lone pair) electrons** in the sulfate ion, SO_4^{2-}

   A. 30 **B.** 31 **C.** 32 **D.** 34

6. An element that can accommodate **more than 8 electrons in its valence shell**

   A. Be **B.** O **C.** F **D.** P

7. The **bond angle** predicted by the VSEPR theory for **H_2S**

   A. 90° **B.** 109.5° **C.** 120° **D.** 180°

8. The **hybridization** predicted for sulfur in **H_2S**

   A. sp **B.** sp^2 **C.** sp^3 **D.** s^2p

9. The **bond angles** predicted by the VSEPR theory for CH_3^+

A. 90° **B.** 109.5° **C.** 120° **D.** 180°

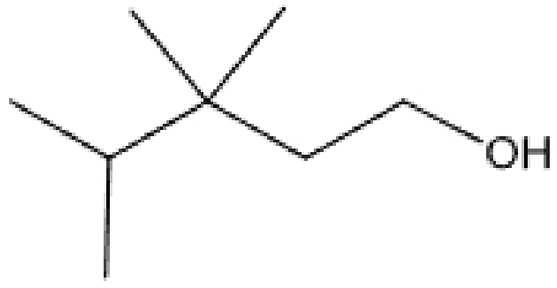
10. The **hybridization** predicted for carbon in CH_3^+

A. sp **B.** sp^2 **C.** sp^3 **D.** p

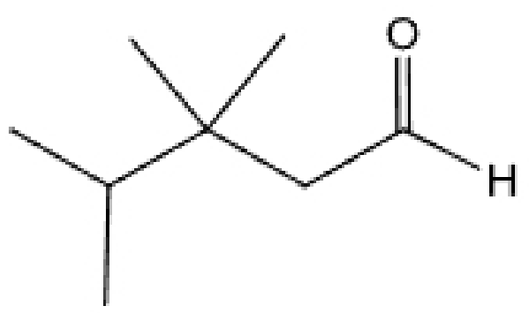
11. Which **skeletal formula** matches the following **condensed formula**?

$(CH_3)_2CCH_2CH(CH_3)CH_2CHO$

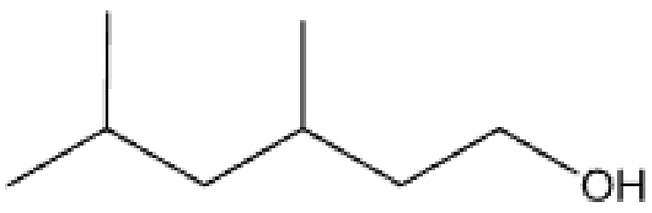
A.



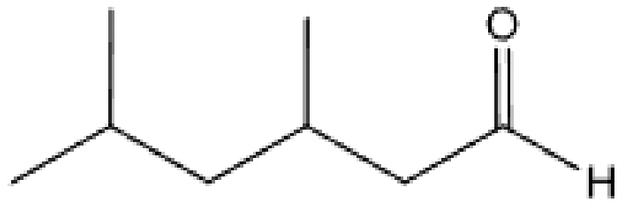
B.



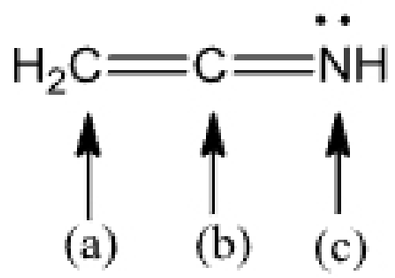
C.



D.



12. Indicate the **hybridization** of all of the second-row elements in the following compound.



A. a - sp^2; b - sp^2; c - sp^2

B. a - sp; b - sp^2; c - sp^2

C. a - sp^2; b - sp; c - sp^3

D a - sp^2; b - sp; c- sp^2

13. The **polar molecule**.

A. NCl_3 **B.** CF_4 **C.** $AlCl_3$ **D.**