

CHEM 624 Fall 2012 Exam #1A (Blue)

September 13, 2012, 6:00 PM

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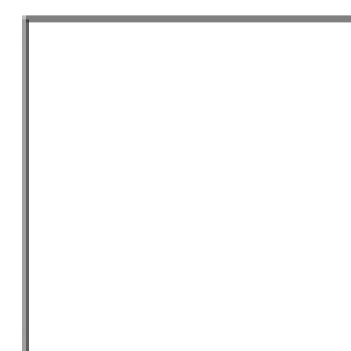
Page 6 (20 pts) _____

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Page 7 (21 pts) _____

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Page 8 (11 pts) _____



Total pages 6-8
(52 possible)

Periodic Table of the Elements

Legend:

- Solids
- Liquids
- Gases
- Artificially Prepared

Example: Fe

Atomic Number: 26

Symbol: Fe

Name: Hydrogen

Atomic Weight: 1.0079

GROUP		PERIODIC TABLE OF THE ELEMENTS																GROUP					
IA																		VIII					
1	2																	10	18				
1	2																	10	18				
3	4																	5	6	7	8	9	10
3	4																	5	6	7	8	9	10
11	12																	13	14	15	16	17	18
11	12																	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36						
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36						
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54						
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54						
55	56	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86							
55	56	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86							
87	88	104	105	106	107	108	109	110	111	112													
87	88	104	105	106	107	108	109	110	111	112													
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71									
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71									
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103									
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103									

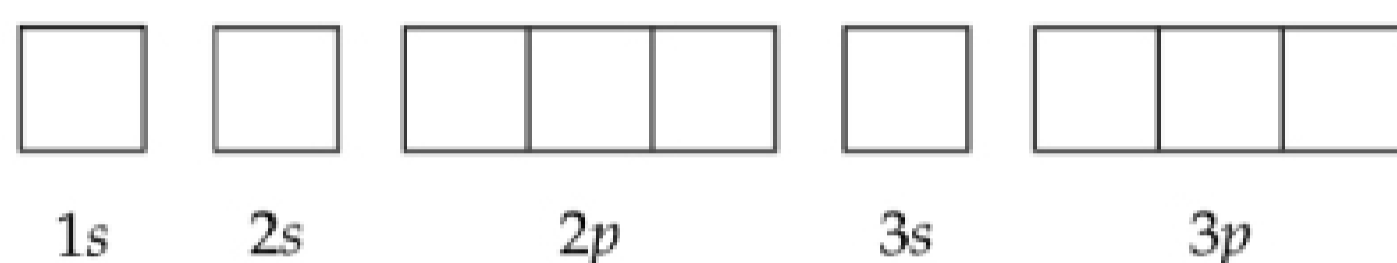
****Note:** the last page of the exam is meant to be torn off and used as scratch paper
Enter your answers to Problems 1-24 on the SCANTRON SHEET

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

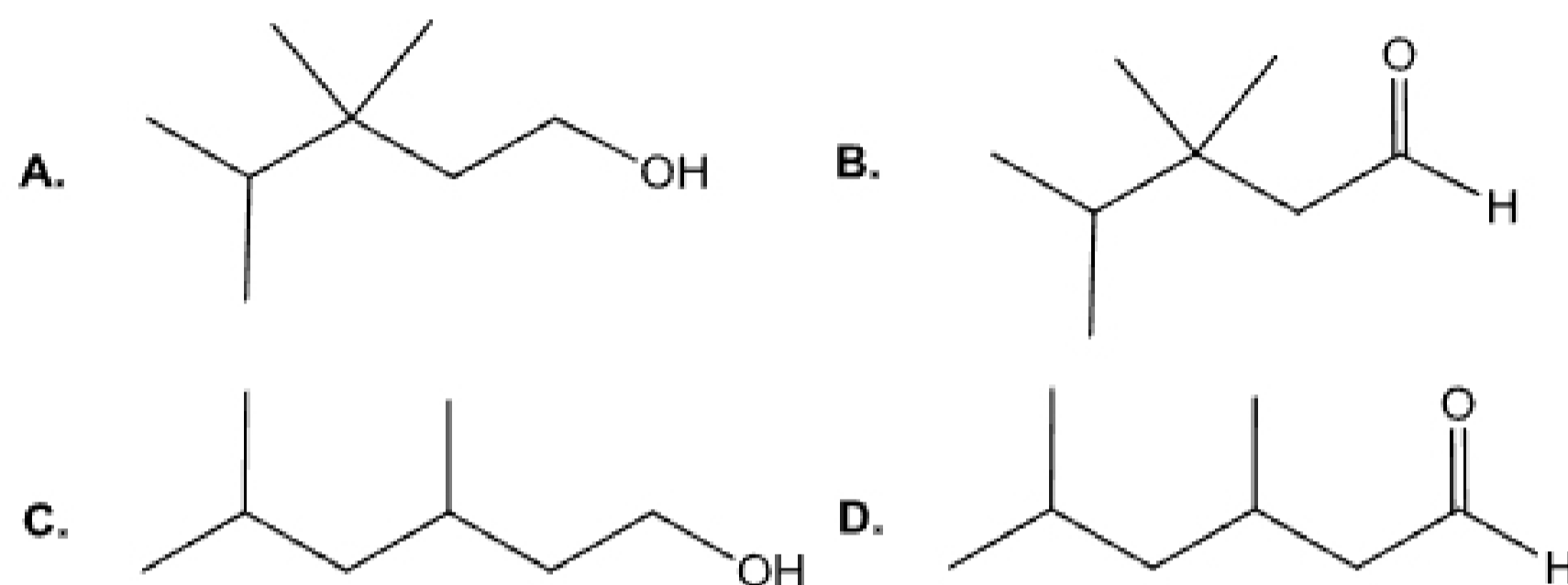
9. The **bond angles** predicted by the VSEPR theory for CH_3^+

- A. 90° B. 109.5° C. 120° D. 180°

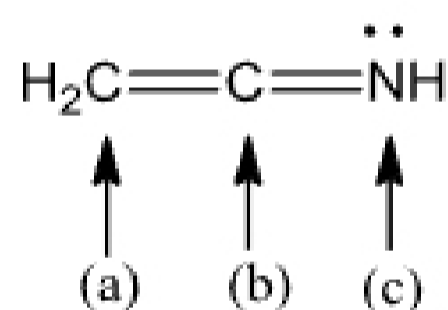
10. The **hybridization** predicted for carbon in CH_3^+

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

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



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**.

