Exam 1 **Chemistry 117** Fall 2002

Important Instructions:

1) Use a soft (#2) graphite pencil only in filling out the answer sheet. **Make dark marks** in the correct circles on your answer sheet.

2) Print your name in the boxes on the upper left of Side 1 and blacken the respective circle under each letter of your name. Fill in **your last name first.**

3) Enter the first letter of the test color in the last box of the name grid and blacken the corresponding circle under the letter. **This is a Yellow exam.**

4) You must enter a 10-digit identification code on your answer sheet as follows. The **left most digits** will be **117**, followed by the **7-digits of your NDSU NAID** number (the numbers before the dash). Next, blacken the respective circle under each digit of this identification code.

5) **Sign your name (do not print)** in the upper left hand corner of the answer sheet.

6) Answer each question by blackening the circle of the letter corresponding to the best or most correct answer to that question. **There is only one correct answer to each question**. If you blacken more than one circle for a question it will be scored as incorrect.

7) There should be **25 answers filled** in when you are finished.

8) Be prepared to **show a picture I. D.** when you turn in your quiz.

Match the names with the terms.

1. City of worst nuclear disaster
2. Coined term "fission".
3. First atomic bomb dropped on this city.
4. Scientific director of Manhatten project.
5. One of the scientists credited with first fission reactor.

(a) Oppenheimer
(b) Meitner
(c) Chernobyl
(d) Fermi
(e) Hiroshima

6. Use the periodic table of the elements to correctly identify a halogen, an alkaline earth metal, a transition metal, and an alkali metal in left to right order.

(a) Cl, K, V, Mg (b) F, Sr, Fe, Sn (c) Br, Ba, Cr, Na (d) S, Sr, Si, Sn (e) O, Ca, Cs, Al

7. How H atoms are there in 25 molecules of $C_4H_4S_2$?

(a) 25 (b) 100 (c) 3.8×10^{24} (d) 6.0×10^{25} (e) 1.5×10^{25}

8. Positron emission tomography is used medically to:

(a) destroy cancer cells
(b) reduce the size of the thyroid gland
(c) produce graphic views of the functioning of bodily organs
(d) determine the age of skeletal bones
(e) reduce the pain of arthritis

9. When a radioactive isotope loses an alpha particle:

(a) Z decreases by one unit and A increases by one unit
(b) Z increases by one unit but A remains unchanged
(c) A decreases by one unit but Z remains unchanged
(d) neither Z nor A changes
(e) Z decreases by two units and A decreases by four units

10. Given mole amounts of each of the following substances, which one weighs the most in grams?

(a) 1 mole of iron atoms
(b) 2 moles of O_2 gas
(c) 3 moles of water (H_2O)
(d) 1 mole of butane gas (C_4H_{10})
(e) 2 moles of carbon monoxide (CO)

11. Which neutral atom has the most electrons in its valence shell?

(a) Ba (b) Na (c) I (d) B (e) S

12. Which one of the following is the correct formula for the compound, ferric sulfate?

(a) $FeSO_4$ (b) $Fe(SO_4)_2$ (c) Fe_2SO_4 (d) $Fe_2(SO_4)_3$ (e) $Fe_3(SO_4)_2$

13. What region of the U.S. has the highest concentration of nuclear power plants?

(a) Eastern (b) Western (c) Northern (d) Southern

14. Which of the following is a covalent compound?

(a) $Al_2(SO_4)_3$ (b) NO_2 (c) $NaNO_2$ (d) FeS (e) NaCl

15. A household smoke detector uses which of the following radioactive isotopes in its operation:

(a) Co-60 (b) Am-241 (c) I-131 (d) Tc-99m (e) U-238

16. A chemical bond between atoms that involves a transfer of electrons is called a(n) _____ bond and the compound that is formed is called a(n) _____ substance.

(a) ionic, ionic
(b) covalent, molecular
(c) molecular, ionic
(d) ionic, covalent
(e) ionic, molecular

17. How many moles of C atoms are there in 4 moles of the covalent compound, C_2H_6SO, also known as dimethylsulfoxide?

(a) 2 (b) 6 (c) 8 (d) 4 (e) 3

Match the ionic species with the name in questions 18-22.

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(a) CrO_4^{2-} (b) NO_2^- (c) OH^- (d) NH_4^+ (e) $Cr_2O_7^{2-}$

18. Dichromate _____

19. Nitrite _____

20. Chromate _____

21. Hydroxide _____

22. Ammonium _____

23. The diameter of an atom was determined to be 2.35×10^{-8} cm. How many nanometers does this correspond to?

(a) 23.5 (b) 0.235 (c) 2.35×10^{-10} (d) 2.35×10^{-15} (e) 2.35×10^{-19}

24. When the reaction below is **correctly balanced**, the **coefficient** for **ammonia** (NH_3) is:

$$NH_3 + O_2 \longrightarrow NO_2 + H_2O$$

(a) 6 (b) 1 (c) 3 (d) 2 (e) 4

25. The atomic weight of boron is 10.811. What is the mass of a boron sample which contains 0.585 moles of B atoms?

(a) 6.32 g (b) 18.5 g (c) 3.52 g (d) 1.80 g (e) 0.00541 g