

Answer the following questions on the answer sheet. Give your answer to 3 significant figures.

$$E = 1/2mv^2 \quad \lambda p = h \quad \Delta x \Delta p = h \quad p = mv$$

$$m_{\text{electron}} = 9.11 \times 10^{-31} \text{ kg} \quad h = 6.626 \times 10^{-34} \text{ m}^2 \text{ kg s}^{-1} \quad m_{\text{proton}} = 1.67 \times 10^{-27}$$

- 1) What is(are) the product(s) for the following reaction? $Y + S_8 \rightarrow ?$
- 2) What is(are) the product(s) for the following reaction? $Rb + O_2 \rightarrow ?$ dry conditions
- 3) What is(are) the product(s) for the following reaction? $Br_2 + O_2 \rightarrow ?$
- 4) What is(are) the product(s) for the following reaction? $C + O_2 \rightarrow ?$
- 5) What is(are) the product(s) for the following reaction? $Ca + H_2 \rightarrow ?$

6) – 9) Draw the Lewis dot structure for the following compounds or ions. For Lewis dot structures, if there is a resonance structure indicate this!

- 6) NO_3 7) NH_3 8) $HCOOH$ 9) SF_5^-

10) – 13) Write the electron configuration for the following atoms and ions.

For all electron configurations, use the aufbau principle based on the hydrogen atom. For electron configurations, if the noble gas structure is the final structure and you are using the core designation, back up to the previous core.

- 10) P 11) Pd 12) Ce 13) S^{2-}

Missing units if needed = no credit!

- 14) What is the wave length of an electron whose energy is 2.53×10^{-17} ?
- 15) What is the uncertainty in the momentum for a proton confined to a space of 0.308 nm?
- 16) Which of the following has the largest atomic radius? Rb Sr Y Zr
- 17) Which of the following has the largest ionic radius? Rb^+ Sr^{2+} Y^{3+} Zr^{4+}
- 18) Which of the following has the highest electronegativity? Na K Rb Cs
- 19) Which of the following has the highest ionization energy? P As Sb Bi
- 20) In which of the following compounds is rotation hindered and why?
(There might be more than one.)



NAME _____

1) _____

2) _____

3) _____

4) _____

5) _____

6) _____

7) _____

8) _____

9) _____

10) _____

11) _____

12) _____

13) _____

14) _____

15) _____

16) _____

17) _____

18) _____

19) _____

20) _____

KEY

- 1) Y_2S_3
- 2) RbO_2
- 3) Br_2O or Br_2O_7
- 4) CO or CO_2
- 5) CaH_2
- 6) Lewis structure for: NO_3^-
- 7) Lewis structure for: NH_3
- 8) Lewis structure for: HCOOH
- 9) Lewis structure for: SF_5^-
- 10) $1s^2 2s^2 2p^6 3s^2 3p^3$ or $[\text{Ne}]s^2 3p^3$
- 11) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^8$ or $[\text{Kr}]5s^2 4d^8$
- 12) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^2$ or $[\text{Xe}]6s^2 4f^2$
- 13) $1s^2 2s^2 2p^6 3s^2 3p^6$ or $[\text{Ne}]3s^2 3p^6$
- 14) $9.76\text{E}-11 \text{ m}$
- 15) $2.15\text{E}-24 \text{ kg m s}^{-1}$
- 16) Rb
- 17) Rb^+
- 18) Na
- 19) P
- 20) H_2CCH_2 and HNNH , both have double bonds