

ACDB4011 CHEMISTRY QUIZ 1

NAME Katie Byrne DATE: Sept 29, 2022

5p

1. (6 points) Indicate whether each of the following statements is true or false:

T	F
☒	☐

Chemical energy is stored in the nucleus.

☐	☒
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There are three d orbitals.

☐	☒
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Strontium ion used in pyrotechnics produces green light in fireworks.

☐	☒
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X-rays have a longer wavelength than ultraviolet.

☒	☒
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Isotopes of the same element always have the same number of protons.

☐	☒
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If the velocity of a moving object increased two times its kinetic energy increased two times as well

2p

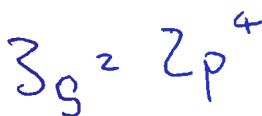
2. (6 points) How many of each type of sub-atomic particles are contained in an atom ^{110}Cd ?Protons: 48 ✓Neutrons: 48Electrons: 62

3. a) (6 points) Write the full and shorthand electronic configuration for manganese, Mn, atom.



- b) (3 points) How many unpaired electrons are there in a sulphur, S, atom in the ground state?

S



4. (6 points) The radio station 92.1 FM broadcasts at a frequency of 9.21×10^7 Hz (92.1 MHz). Calculate the wavelength of the broadcast, and the energy of one photon.

~~or~~
~~for~~

5. A 200 g mass is held at a height of 0.8 m above the ground.

a) (3 points) Calculate the gravitational potential energy stored in the mass before it is dropped.

Ans

$$E = mgh$$
$$E = \cancel{200}g^{0.2kg} \times 9.81 \times 0.8$$
$$E = 1569.6 \text{ J}$$

b) (2 points) State the kinetic energy of the mass just before it hits the ground?

Op

$$KE = h \frac{c}{\lambda}$$
$$= 0.8 \frac{9.81}{1569.6}$$
$$= 5 \times 10^{-3}$$

c) (3 points) Calculate the speed of the mass just before it hits the ground.

Op

$$f = \frac{c}{\lambda}$$

$$\lambda = \frac{c}{f}$$

$$= \frac{5 \times 10^{-3}}{1569.6}$$

$$\lambda = 3.186 \times 10^{-6}$$