

Answers to Chapter 4 Review

20. Dalton's Theory

- a) All matter is composed of atoms
- b) Atoms of the same element are identical; atoms of different elements are dissimilar
- c) Atoms can unite with other elements in simple numerical ratios to form compounds

21. Avogadro's hypothesis: Equal volumes of gases at the same temperature have the same number of molecules. 1 mole = 6.023×10^{23} particles

22. Cathode rays are beams of electrons in an electrified gas tube. They are called cathode rays b/c they begin at the cathode (-) of the tube.

23.

Proton	+	$1.673 \times 10^{-24} \text{ kg} = 1.0073\text{u}$
Neutron	0	$1.675 \times 10^{-24} \text{ kg} = 1.0087\text{u}$
electron	-	$9.109 \times 10^{-28} \text{ kg} = 0.000549\text{u}$

24. carbon – 12

25. $Z=19$; $A=39$; ${}_{19}^{39}K$

26. Chlorine – 17 protons, 18 neutrons, 17 electrons

- Th: 90 protons ; 142 neutrons ; 90 electrons

27. $Y = 39$ electrons , 39 protons , 49 neutrons

28. Energy involved in a chemical change is much less than the energy involved in a nuclear changes b/c it involves no conversion of mass to energy. Mass is converted to energy in a nuclear change

- 29. Two broad classes of subatomic particles are leptons and hadrons. Leptons are not made up of smaller particles (elementary particles), but hadrons are. An electron is a lepton. Protons and neutrons are hadrons.
- 30. alpha particle α ; Helium nucleus ; positive charge
- beta particle β ; electron ; negative charge
- gamma γ ray ; high energy X-ray ; neutral

31.

element	protons	neutrons
C-14	6	8
P-35	15	17
Ni-63	28	35
Ir-192	77	115
Fe-54	26	28
Np-235	93	142

- 32. A gaseous sample is ionized by a beam of electrons. These ions are deflected by electric and magnetic fields. Lighter atoms are deflected more than heavier atoms, and they can be separated.
- 33. 107.9amu or 107.9u
- 34. 83.8amu or 83.8u