SS 3 PHYSICS ASSIGNMENT FOR WEEK 3

DEADLINE: **FRIDAY MAY 01ST, 2020**

E MAIL: physics4prince@yahoo.com

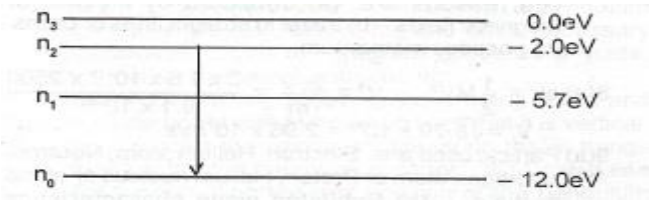
SS 3 PHYSICS ASSIGNMENT 3

1 (a) Explain the statement "wave particle duality of matter"

(b) List four properties each which show that matter have dual nature.

(b) Explain the uncertainty principle.

1 (a) State three conclusions that can be drawn from Rutherford's experiment on the scattering of alpha particles by a thin metal foil in relation to the structure of the atom



The diagram above illustrates th3 energy levels of an electron in an atom. If an excited electron moves from n2to nθ, calculate the:

(i) frequency;

(ii) wavelength of the emitted radiation. [h = 6.6 x 10−34Js; le V = .6 x 10−19 J; C = 3.0 x 108 ms−1]

(c) The following nuclear equations represent two types of radioactivity.

$^{226}_{88}Ra \longrightarrow ^{222}_{86}Rn + ^{a}_{2}a$ (Equation A)

$^{14}_{7}N + ^{4}_{2}a \longrightarrow ^{17}_{8}O + ^{1}_{1}p$ (Equation B)

Identify each type and explain briefly the difference between them

2 (a) Explain the terms:

(i) transmutation as it relates to radioactivity; (ii) stopping potential.

(b) $^{23}_{11}A + ^{2}_{1}B \longrightarrow ^{p}_{q}C$ + proton $^{p}_{q}C \longrightarrow ^{r}_{s}E$ + beta

A nucleus C, formed artificially from A and B radioactive and quickly decays to another nuclei as indicated in the nuclear equations abc Determine the values of p, q, r and s.

(c) A certain metal of work function 1.6 eV is irradiated with ultra-violet light of wavelength 3.6 x 10^{-7}Calculate the maximum

(i) kinetic energy of ejected electron in joules;

(ii) speed of an emitted electron. (1eV = 1.6 x 10^{-18}J; C = 3.0 x 10^{8} ms^{-1}; m, = 9.1 x 10^{-31} kg; h = 6.6 x 10^{-34}Js)

(d) If source of the ultra-violet light in (c) above is mo away from the surface of the metal, state the of on the maximum speed of the ejected electron