



EASTERN UNIVERSITY SRI LANKA
FIRST EXAMINATION IN SCIENCE
FIRST SEMESTER- 2003/2004 (Repeat)
CH101 PERIODICITY & BONDINGS

Answer all Questions

Time: 01 hour

01. a) Define the following terms
- (i) Wave length
 - (ii) Amplitude
 - (iii) Frequency
 - (iv) Electromagnetic radiation
- b) State Planck's quantum theory.
- c) A lamp gives out 1.5kJ of energy in one minute in the form of yellow light of wavelength 580nm. How many photons of yellow light are generated in one second? (Planck's const. = 6.63×10^{-34} Js, speed of the light = 3×10^8 ms⁻¹)
- d) Show that the Bohr radius of the hydrogen atom (r) = $\frac{h^2 \epsilon_0}{\pi m e^2}$
- where h – Planck's constant
 ϵ_0 – Permittivity of free space
m – Mass of electron
e - Charge of electron
02. a) Explain the followings:
- (i) Pauli's exclusion principle
 - (ii) Hund's rule
- b) (i) List the values of n,l and m_l for orbitals in the 4d sub shell.
(ii) Write the electronic configuration of phosphorus atom (atomic number 15).
(iii) Give the quantum numbers n,l, m_l and m_s for each of the unpaired electrons in the phosphorus atom.
- c) (i) What do you understand by Valence Shell Electron Pair Repulsion (VSEPR) theory?
(ii) Predict the shapes of the following using VSEPR theory.
BeCl₂, CCl₄
