# Atomic structure: Check your learning: Part-1

## Total: 35 ; Time: 70 min

1. The wavelength of the green light from a traffic signal is 522 nm. What is the frequency and wavenumber of this radiation. (3)

2. The energy of a photon is 3.98 x $10^{-21}$J. What is the wavelength in nm? (3)

3. Calculate the energy of one mole photons of radiation whose frequency is 5 x $10^{14}$ Hz (2)

4. Why are there so many lines in hydrogen spectrum although there is only one electron in its atom. Justify. (3)

5. What is the quantization? How quantization of energy was introduced in Bohr model? (3)

6. Write down electronic configuration of $Fe^{3+}$ ion and answer the following. (i) What is the number of unpaired electrons in it? (ii) How many electrons in it have n = 3 and m = 0 (3)

7. Calculate the wavelength and energy of radiation emitted for the electronic transition from infinity to stationary state one of the hydrogen atoms. (3)

8. Explain Pauli's exclusion principle with an example. (2)

9. The unpaired electrons in Al and Si are present in 3p orbital. Which electrons will experience more effective nuclear charge from the nucleus? (2)

10. Write down the electronic configuration of Cr and Cu. (2)

11. Name the orbitals described by the following quantum number (0.5 x 4 = 2)

**a. n = 3, l = 0**
**b. n = 3, l = 1**
**c. n = 3, l = 2**
**d. n = 5, l = 0**

12. (a) What are the shapes of s, and p, orbitals respectively? (b) Write a set of quantum numbers for a 4f orbital. (c) Name the five d orbitals and draw all the d orbitals (1 + 1.5 + 2.5 = 5)

13. What is the spin multiplicity of Ni and $Ni^{+2}$. (Ni: 28) (2)

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