Physics - ICS Part 2 Physics Chapter 20 Short Questions Preparation

Q1. Define population inversion and metastable stable.

Ans 1: A condition of matter in which more electrons are in a high energy state than in a lower energy state is called population inversion.
A particular excited state of an atom that has longer lifetime than the ordinary excited states is called metastable state.

Q2. List of color of line spectra of an excited hydrogen atom.

Ans 1: The color of line spectrum of hydrogen atom are

- Red
- Blue
- Blue-Green
- Violet
- Ultraviolet

Q3. How does a K_ax-rays differ K_bX-rays?

Ans 1: When an electron from L -shell jumps to occupy the hole in K- shell K_ax-rays is emitted .
And
When an electron from M -shells jumps to occupy the hole in K-Shell K_bX-rays is emited.

Q4. Write use of x-rays.

Ans 1: X-rays are used

1. To visualize the interior of the material opaque to ordinary light.
2. In computerized axial tomography.
3. In photographic films.

Q5. Is energy conserved when an atom emits a photon of light?

Ans 1: Yes energy is conserved when an excited atom emits a photon of light.When atom is excited ,energy is supplied .The same energy is emitted in the form of photon when it return back to its ground state.

Q6. Distinguished between stimulated emission and spontaneous emission.

Ans 1: Stimulated emission: If a atom is excited for a longer lifetime of about 10^{-3}sec than an incident photon of energy equal to the difference of two energy levels induces the atom to decay by emitting a photon that travel in the direction of incident photon.This process is called stimulated or induced emission.

Ans 2: Spontaneous Emission: As excited is highly unstable with life time of 10^{-8}sec,so electron will de excite itself with emission of a photon in any arbitrarydirection is called spontaneous emission.

Q7. What is meant by line spectrum? How line spectrum can be used for the identification of elements?

Ans 1: When an electron jumps from higher energy state to lower energy state than emits energy and make a spectral line.
$E_2 - E_{1=hf}$
This is called line spectrum.And different elements emit line spectrum of different wavelengths,So they can be identifiedeasily.

Q8. Write down use of laser in industry.

Ans 1: It can be used for telecommunication in fibre optics.
It is used to read bar codes,
It is used to generate 3D image of objects by holography.

Q9. Write two properties of x-rays.

Ans 1:

1. They cause ionization.
2. They have very short wavelength.

Q10. Can electron reside inside the nucleus?

Ans 1: No,electron cannot reside inside the nucleus .If electron resides inside nucleus then uncertainty in position.