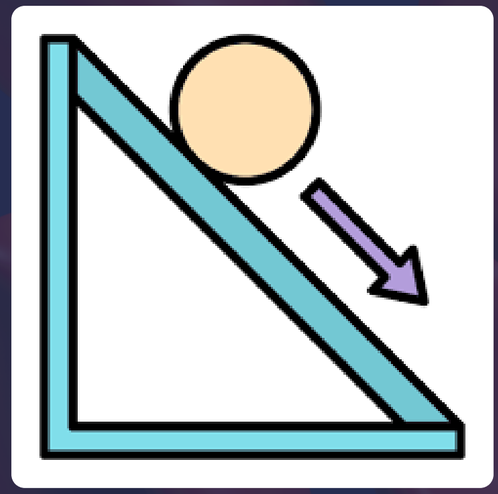
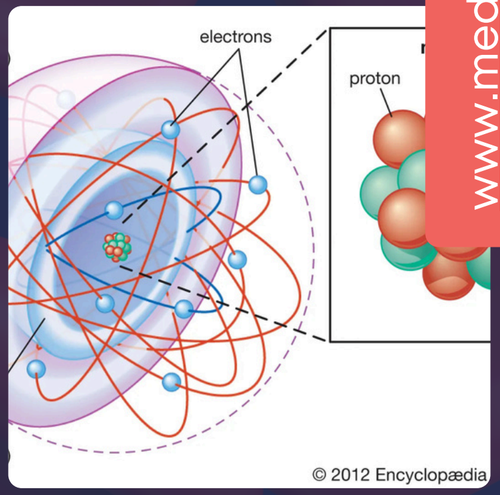
FSC- MIT-1

LEC#6 (28/10/2024)

FIRST-YEAR PHYSICS
FOR RADIOGRAPHERS





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CHAPTER# 2 & 3

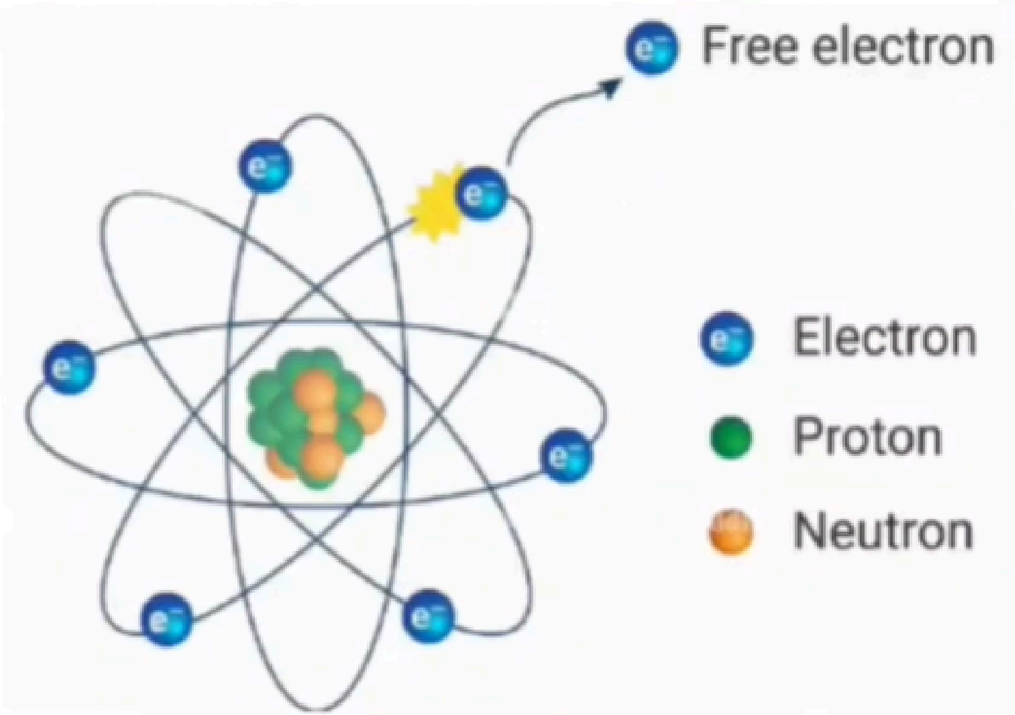
IONIZATION
EXCITATION
BINDING ENERGY

H/ DR. AYESHA RAUF

Ionization

- *A atom is normally electrically neutral, if one or more orbital electrons are removed from the atom, the remaining atom is left positively charged,*

  this process of removal of an orbital é from the neutral atom is known as ionization.

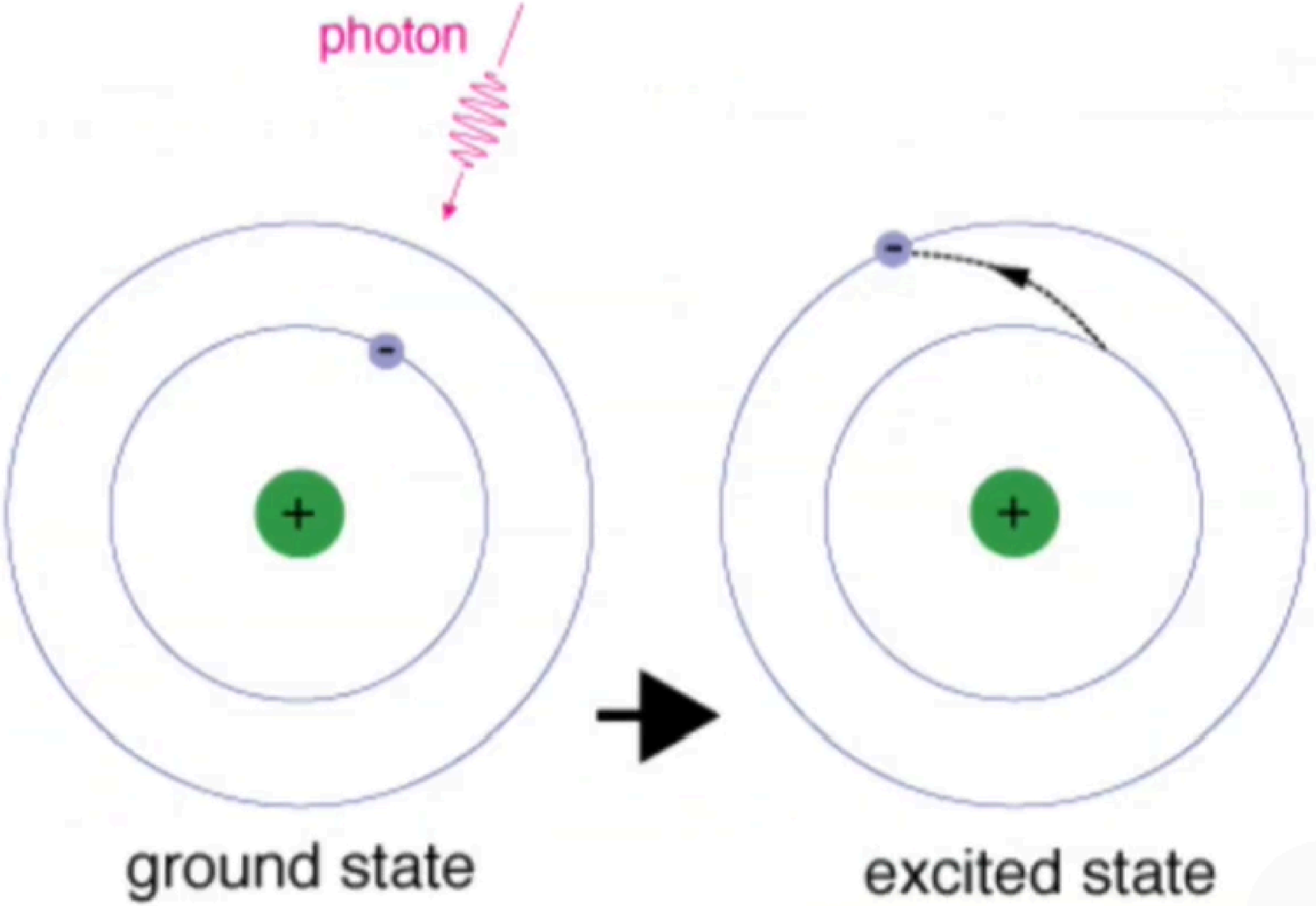


Excitation

- *A atom is normally electrically neutral and its orbital electrons in ground state.*
- *If enough energy supplied to the atom then its inner orbital electrons move into outer orbit, and atom gain more energy than ground state is said to be an excited state and the process is known as excitation.*
- *Ex:- To move an electron from*

  K to L Shell of the hydrogen atom, the energy required is = 10.1 eV.

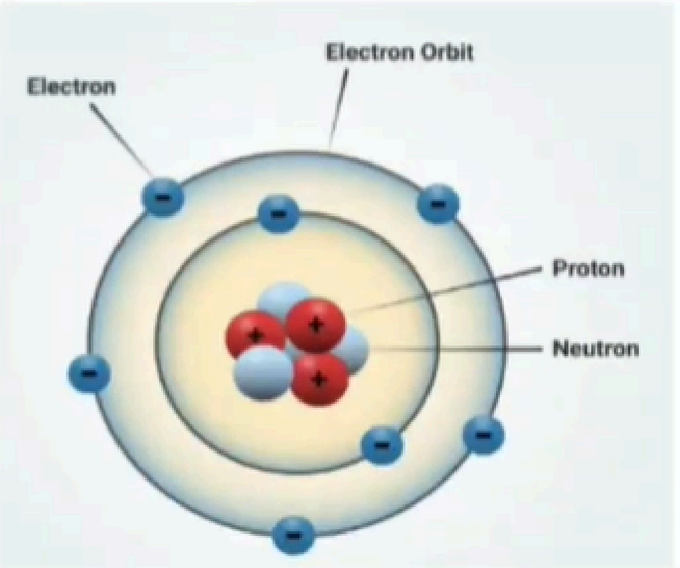
Excitation Contn....



Binding Energy

- To produce ionization sufficient energy is given to the orbital electrons to remove from atom, there is a force of attraction between electrons and positively charged nucleus.
- Therefore the amount of energy which just sufficient to remove an electron from the orbit is known as binding energy .
- Binding energy is negative.
- Ex :- Binding energy for hydrogen

  K-shell = 13.6 eV.



K-shell binding energy (E_k) or K_{edge} Of different Atoms

1. Lead (Pb-82) :- 88 keV
2. Tungsten (W-74) :- 70 keV
3. Barium (Ba-56) :- 37 keV
4. Iodine (I-53) :- 33 keV
5. Rhodium (Rh-45) :- 23 keV
6. Molybdenum (Mo-42) :- 20 keV