DAV NANDRAJ PUBLIC SCHOOL

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FREQUENTLY ASK QUESTIONS IN BOARD EXAMINATION (XII)

SUBJECT: PHYSICS

CHAPTER NAME:

1.a) Define the term, stopping potential and threshold frequency in relation to photoelectric effects.

b) The work function of metal is 2.31 electron volt. Photoelectric emission occurs when light of frequency 6.4. X10 ^{14} Hz is incident on the metal surface. Calculate

i) the energy of the incident radiation.

ii) the maximum kinetic energy of the emitted, electron .

iii)the stopping potential of the surface.

2.a) In an experiment of photoelectric effect, the slope of cut-off voltage versus frequency of incident light is found to be $4.12X10^{-15}$ Vs.Calculate the value of Planck's constant.

b)the threshold frequency for a certain metal is $3.3X10^{14}$ Hz. If light of frequency $8.2X10^{14}$ Hz is incident on the metal, predict the cut-off voltage for photo electric emission.

c)a proton and an electron have same velocity, which one has greater de -Broglie wavelength and why?

3.a) A proton and a deuteron are accelerated through the same accelerating potential. Which one of the two has

i) greater value of the de -Broglie wavelength associated with it, and

ii) less momentum ?

Give reasons to justify your answer.

b)A proton and alpha particle have the same de -Broglie wavelength. Determine the ratio of their accelerating potential, and their speeds.

4.Using Bohr's postulates, obtain the expression for the total energy of the electron in the stationary state of the hydrogen atom.Hence draw the energy level diagram showing how the line spectra corresponding to Balmer series occur due to transition between energy levels.

5.a)A hydrogen atom is in its third excited stage.

i) How many spectral lines can be emitted by it before coming to the ground state? Show these transitions in the energy level diagram.

ii) In which of the above transitions will the spectral line of shortest wavelength be emitted?

b)The energy of hydrogen atom in an orbit is -1.51 eV. What are kinetic and potential energies of the electron in this orbit?

6.a)An electron jumps from 4th to 1st orbit in an atom.How many maximum number of spectral lines can be emitted by the atom? To which series these lines correspond?

b)Prove that the speed with which the electron revolves in nth orbit is proportional to (1/n).

7.a)Describe alpha particle scattering experiment by a thin foil of gold. What are its observations and conclusions?

b)Draw graph to show the variation of the number of scattered particles as detected (N) in the above experiment as a function of scattering angle.

8.a)Describe Rutherford's model of atom. Explain its drawbacks.

b)Explain the postulates of Bohr's model of atom.

9.a)Draw a graph showing the variation of binding energy per nucleon as a function of mass number A.

b)Show that the density of nucleus over a wide range of nuclei is constant independent of mass number A.

c)Define the term mass defect. How is it related to stability of the nucleus?

10.a) Distinguish between nuclear fission and fusion giving an example of a each.

b)Explain the release of energy in nuclear fission and fusion on the basis binding energy per nucleon curve.

11.a)Two nuclei have mass numbers in the ratio 1:8. What is the ratio of their nuclear radii?

b)A heavy nucleus P of mass number 240 and binding energy 7.6 MeV per nucleon splits into two nuclei. Q and R of mass number 110 and 130 and binding energy per nucleon 8.5 MeV and 8.4 MeV respectively. Calculate the energy released in the fission.

12.a)Name the important process that occurs during the formation of a PN junction. Explain briefly, with the help of a suitable diagram, how a PN junction is formed. Define the term barrier potential.

b)Distinguish between intrinsic and extrinsic semiconductors.

13.Explain, with the help of a circuit diagram, the working of a PN junction diode as a half wave rectifier. Draw a sketch of the input and output waveforms.

14.State the principle of working of PN diode as a rectifier. Explain with the help of a circuit diagram,the use of PN diode as a full wave rectifier Draw a sketch of the input and output waveforms.