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SUBJECT CODE NO: - BB-2398
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. (CBCGS)(Pattern 2022) S.Y SEM III
Examination November / December 2024
Physics-VIII Modern and Nuclear Physics

[Time: 1:30 Hours]**[Max. Marks: 40]**

Please check whether you have got the right question paper.

N. B

- 1) Attempt all questions
- 2) Use of logarithmic table
- 3) All questions carry equal marks
- 4) Figures to the right indicates full Marks
- 5) Draw neat diagram and gives equation wherever necessary.

Q.1 Long answer questions (solve any one)**10**

- A) Explain photo electric cell and Explain construction and working of
 - a) Photovoltaic cell
 - b) Photo conductive cell
- B) Define the theory of nuclear Fission and calculate energy released in nuclear Fission?

Q.2 Long answer questions (solve any one)**10**

- A) Give the types of LASER and Explain construction and working of (O_2 LASER)
- B) Explain in detail synchrocyclotron?

Q.3 Short answer question/problem**10**

- A) Calculate the Frequency and wavelength of photon equivalent to energy 1ev
 (given: $1\text{ ev} = 1.6 \times 10^{-19}\text{ J}$, $h = 6.63 \times 10^{-34}\text{ J.s}$, $c = 3 \times 10^8\text{ m/s}$)
- B) Explain nuclear Binding energy?

OR

- A) Write a note on LASER and give its applications?
- B) A α -particle loses all of its energy in a gas and produces 150,000 ion pairs. If energy needed to create 1 ion pair is 30eV what is the energy of α -particle.

Q.4 Multiple choice questions**10**

- 1) In Lenard's method e/m ratio is calculated by

a) $\frac{V^2}{B^2 R^2}$

b) $\frac{2V}{B^2 R^2}$

c) $\frac{2V^2}{B^2 R^2}$

d) $\frac{V^2}{B^2 R}$



- 2) Photocell is a device to,
- Measure light intensity
 - Store photons.
 - Convert photon energy into Mechanical energy
 - None of these
- 3) Which of the Following is used in atomic clocks?
- LASER
 - Quartz
 - MASER
 - Helium
- 4) Laser beam is made up of,
- Highly coherent photon
 - Highly coherent electron
 - Highly coherent phonons
 - None a these
- 5) Nuclear Force is _____
- Attractive
 - Repulsive
 - Weak
 - Strong
- 6) How many Fission takes place per second in a 300 MW reactor, assuming each fission releases 200 MeV of energy?
- 2.38×10^{18}
 - 4.38×10^{18}
 - 8.38×10^{18}
 - 9.38×10^{18}
- 7) The ionization chamber works on the principle that charged particles passing through the matter remove _____ from the atoms
- Protons
 - Electrons
 - Neutrons
 - None of these
- 8) A cyclotron uses two dees while there is only _____ dee in a synchrocyclotron
- Two
 - Three
 - One
 - Four
- 9) The Following is not a candidate material for laser source in fiber optics
- Nd-YAG
 - He-Ne
 - Argon
 - Phosphorous
- 10) The photo electric effect involves only
- Free electrons
 - Bound elections
 - Both a & b
 - None of these
