

Total No. of Printed Pages: 3

**SUBJECT CODE NO: - Y-2022**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**B.Sc. S.Y (Sem-III)**  
**Examination March / April - 2023**  
**Physics -VIII Modern and Nuclear Physics**

[Time: 1:30 Hours]

[Max. Marks: 50]

Please check whether you have got the right question paper.

N. B

- 1) Attempt all questions.
- 2) Use of logarithmic table and electronic Pocket calculator is allowed.

Q1 a) Explain Lenard's method to determine elm of photoelectrons. 10

b) Explain in detail Bragg's X-ray Spectrometer. 10

**OR**

a) Explain in detail binding energy of the nucleus. 10

b) Write the construction and operation of ionisation chamber. 10

Q2 a) Explain in short types of photocell. 05

b) Using Bragg's spectrometer the glancing angle of first order spectrum is  $6^\circ$ . Find the wavelength of X-ray if inter-planer distance is  $2.8 \times 10^{-10}$ m. 05

c) Explain shell model of nucleus. 05

d) In a cyclotron, the frequency of an electron orbit is 7.6 MHz. Calculate the value of the magnetic induction applied. 05

**OR**

a) What will be the maximum velocity of photoelectrons if anode potential is 1KV. 05

b) Write a short note on X-ray Spectra. 05

c) Masses of the following isotopes are given. Calculate the BE of a neutron in the  ${}^7_3\text{Li}$  nucleus. 05Given  ${}^7_3\text{Li} = 7.016004$  amu ${}^6_3\text{Li} = 6.015125$  amuAnd  $n^1 = 1.008665$  amu

d) Write short note on Betatron 05

## Q3 Multiple choice questions

10

- 1) The momentum of a photon is given by \_\_\_\_\_  
a)  $h/\lambda$       b)  $h\nu$       c)  $h\nu/c$       d) All of the above
- 2) The photoelectric effect proves that light consists of ...  
a) Photons      b) Electrons  
c) Electromagnetic wave      d) Mechanical wave
- 3) Which of the following is/are photosensitive material (s) ?  
a) Wood, Paper      b) plastic, Wax  
c) Glass, Water      d) Alkali metals
- 4) What is the Source of X-ray Photons in the tube?  
a) Cathode      b) Rotor      c) Filament      d) Anode
- 5) The most intense in x-ray Spectral line is –  
a)  $K\alpha$       b)  $K\beta$       c)  $L\alpha$       d) None of these
- 6) Unit of X-ray intensity is \_\_\_\_\_  
a) Coulomb      b) Candela      c) Roentgen      d) Lux
- 7) The process by which a heavy nucleus is splitted into two light nuclei is Known as \_\_\_\_\_  
a) Nuclear splitting      b) Nuclear fission  
c) Nuclear fusion      d) chain reaction
- 8) The liquid drop model was proposed by the scientist  
a) Coulomb      b) Yukawa      c) Bohr      d) Faraday

- 9) Nucleons are held together by.....
- a) Magnetic force      b) Electrostatic force
  - c) Nuclear force      d) Gravitational force

- 10) A cyclotron can accelerate \_\_\_\_\_
- a)  $\beta$  particles      b)  $\alpha$  particles
  - c) High-velocity X-rays      d) None of these