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**SUBJECT CODE NO:- B-2022**  
**FACULTY OF SCIENCE & TECHNOLOGY**  
**B.Sc. S.Y (Sem-III)**  
**Examination November/December- 2022**  
**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
- i. Attempt all questions
  - ii. Use of logarithmic table and electronic pocket calculations allowed
- Q.1
- a) Explain laws experiment for x-ray diffraction 10
  - b) Explain the construction and working a photovoltaic cell 10
- OR
- c) Describe construction and working of nuclear reactor 10
  - d) Explain construction and working of linear accelerator 10
- Q.2
- a) Write a short note on photo emissive cell 05
  - b) The stopping potential is 2.3 V for light of frequency  $1 \times 10^{15} \text{HZ}$ , When light of frequency  $2 \times 10^{15}$  is used, the stopping potential is 6.5V. calculate the value of planks constant 05
  - c) write a short note on chain reaction 05
  - d) calculate the energy released by the fission of 2gm of  $92 \text{ U}^{235}$  in Joule if energy released per fission is 200 MeV 05
- OR
- a) Write a short note on characteristics X-ray spectra 05
  - b) An X-ray tube operated at 30kv emits a continuous X-ray spectrum with a short wavelength limit  $\lambda \text{ min} = 0.414 \text{ \AA}$  calculate plancks constant h, if  $e = 1.602 \times 10^{-19} \text{C}$  and  $c = 3 \times 10^8 \text{m/s}$  05
  - c) Write a short note on cyclotron 05

- d) A 10 MeV alpha particle loses all its energy in proportional counter ,one electron ion pair is produced for each 30 ev of energy loss.the proportional counter has a multiplication  $A=500$  and the total capacitance between wire and ground is 30pf.calculate the voltage pulse height. 05

Q.3 Multiple choice question

10

1. Which of the following has the highest frequency
  - a) Visible light
  - b) Ultra violet light
  - c) X-rays
  - d) infra-red rays
2. absorption coefficient is equal to the fractional decrease in the intensity of x-ray per unit \_\_\_\_\_ of absorber sheet
  - a) intensity
  - b) length
  - c) thickness
  - d) current
3. If an electron can be stopped by a potential of 5 volts, its kinetic energy is
  - a) 5 volt
  - b) 5 Joules
  - c) 5 eV
  - d) 5 ev
4. The phenomenon which points towards the corpuscular nature of electromagnetic waves is
  - a) Interference
  - b) Diffraction
  - c) Polarization
  - d) Photoelectric effect
5. Energy liberated when one  $U^{235}$  undergoes fission reaction is \_\_\_\_\_
  - a) 200MeV
  - b) 40Mev
  - c) 30Mev
  - d) 20Mev

6. Which of the following force is strong force
  - a) Magnetic
  - b) Nuclear
  - c) Electrostatic
  - d) Gravitational
7. In cyclic Accelerator particles are forced by \_\_\_\_\_
  - a) Magnetic Field
  - b) Electric Field
  - c) Gravitational Field
  - d) Electrostatic Field
8. A Cyclotron uses two dees while there is only \_\_\_\_\_ dee in a synchro Cyclotron
  - a) Two
  - b) One
  - c) Three
  - d) Four
9. Neutrons and protons commonly knows as,
  - a) Mesons
  - b) Bosons
  - c) Nucleons
  - d) Pions
10. The strength of photoelectric current is directly proportional to
  - a) Intensity of incident light
  - b) Threshold frequency
  - c) None of Those
  - d) Intensity of Light