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SUBJECT CODE NO:- B-2016
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. S.Y. (Sem-III) Examination Oct/Nov 2019
Physics -VIII
Modern and Nuclear Physics

[Time: 1:30 Hours]

[Max.Marks:50]

Please check whether you have got the right question paper.

- i) Attempt all questions.
- ii) Use of logarithmic table and electronic pocket calculator is allowed.

- Q.1
- a) Draw a schematic arrangement of Richardson and Compton experiment and obtain a relation between velocity of photo electrons and frequency of light. 10
 - b) What are the various nuclear models? Give briefly the liquid drop model of nucleus. 10
- OR
- a) Explain in details Laue experiment. 10
 - b) Explain in detail the working principle of cyclotron. 10
- Q.2
- a) Write the general characteristics and features of photo conductive cell 05
 - b) Write a note on characteristics of X-rays. 05
 - c) Calculate the binding energy of an α particle from given data 05
 mass of helium nucleus = 4.001265 amu
 mass of proton = 1.007277 amu
 mass of neutron = 1.008666 amu
 - d) A 15 mcV alpha particles losses all its energy in propotional counter one ion pair is produced for each 30 ev of energy loss. The proportional counter has a multiplication $A=600$ and the total capacitance between wire and ground is 25 pf. Calculate the voltage pulse height. 05
- OR
- a) What will be the maximum velocity of a photo-electrons if anode. Potential is 2 KV. 05
 - b) The glancing angle for the first order spectrum is 7° find the wavelength of X-rays if $d = 2.85 \times 10^{-10}$ m. 05
 - c) Give the importance of Deuteron binding energy. 05
 - d) Write a note on ionization chamber. 05
- Q.3 Attempt all 10
- 1) Photo-electric cells are used to convert
 - a) Electrical energy into light energy
 - b) Light energy into electrical energy
 - c) Light energy into magnetic field
 - d) None of these
 - 2) The photo-electric effects involves only for
 - a) Free electrons
 - b) Bound electrons
 - c) Both free and bound electrons
 - d) None of these

- 3) Which is the following method is used when crystals of reasonably long size are not available
- (a) Powder crystal method (b) Laue method
(c) Bragg's X-ray spectrometer (d) none of these
- 4) Which of the following has highest frequency
- (a) Visible light (b) X-rays
(c) UV light (d) IR rays
- 5) The intensity of X-rays is determine by
- (a) Filament voltage (b) size of cathode
(c) Filament Current (d) None of these
- 6) The production of continuous spectrum is the result of
- (a) Compton effect (b) Inverse photo electric effect
(c) photoelectric effect (d) None of these
- 7) Heavy water is used in nuclear reactor as:
- a) Coolent
b) moderator
c) Both coolant and moderator
d) Shutdown
- 8) A device in which energy is released at given rate is known as
- (a) A nuclear reactor (b) particle accelerator
(c) A nuclear detector (d) None of these
- 9) Van de Graff accelerators imparts -----to change particles by accelerating high DC voltage.
- a) High K.E.
b) High P.E.
c) High K.E and P.E.
d) Low K.E.
- 10) Betatron is used to accelerate electrons to
- a) Very low energy
b) Very high energy
c) High as well as low energy
d) None of these