



AB-3118
Third Year B.Sc. (Sem. V) Examination
March/April – 2015
Physics : Paper - VIII

Time : 2 Hours]

[Total Marks : 50

Instructions :

(1)

<p>नीचे दृष्टावेक निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : THIRD YEAR B.SC. (SEM. V)</p> <p>Name of the Subject : PHYSICS : PAPER - VIII</p> <p>Subject Code No. : 3 1 1 8 Section No. (1, 2,.....): Nil</p>	<p>Seat No. : <input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/></p> <div style="border: 1px solid black; border-radius: 15px; height: 60px; margin-top: 10px; display: flex; align-items: center; justify-content: center; padding: 10px;">Student's Signature</div>
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- (2) Students can use non programmable scientific calculator wherever necessary.
- (3) Draw a neat diagram wherever necessary.
- (4) Symbols used in the paper have their usual meaning.
- (5) Figures to the right indicate full marks of the question.

1 Answer in brief :

8

- (1) State an expression for the orbital radius of the electron in hydrogen atom.
- (2) Define: distance of closest approach.
- (3) Define range of the particle.
- (4) Define linear absorption coefficient.
- (5) Define Plateau.
- (6) What is Synchrotron?
- (7) Define East- West effect.
- (8) What is a positron?

2 (a) Answer any one :

10

- (1) Obtain expressions for the orbital radius and energy of electron in Bohr's atom model.
- (2) State Schrödinger's equation for H atom in spherical polar coordinates. Using the method of separation of variables, obtain expressions for the radial, zenith and azimuthal parts of the wave function for hydrogen atom.

- (b) Attempt any one : 4
- (1) Calculate energy of the electron in hydrogen atom having orbital radius 5.3×10^{-11} m.
($e=1.6 \times 10^{-19}$ C, $\epsilon_0 = 8.85 \times 10^{-12}$ F/m)
- (2) Calculate the de Broglie wavelength of an alpha particle moving at a speed of 2.0×10^7 m/s.
($h = 6.63 \times 10^{-34}$ Js, $m = 6.6 \times 10^{-27}$ kg)
- 3 (a) Answer any one : 10
- (1) Describe the construction and working of an ionization chamber.
- (2) Describe necessary theory and working of a betatron.
- (b) Attempt any one : 4
- (1) The linear attenuation coefficient for 2 MeV gamma rays in water is about 5 m^{-1} . How far must such a beam travel in water before its intensity is reduced to 1 percent of its original value?
- (2) Deuterons in a Cyclotron describe a circle of radius 0.32 m just before emerging from the dees. The frequency of the applied emf is 10 MHz. Find the flux density of the magnetic field.
(Mass of deuteron = 3.32×10^{-27} kg and its charge = 1.6×10^{-19} C).
- 4 Write short note on any two 14
- (1) Magnetic orbital quantum number (m_l)
- (2) Diffusion Cloud chamber
- (3) Synchrocyclotron
- (4) Altitude effect of cosmic rays.