

Applied Physics - II : 2 S 2

P. Pages : 2

Time : Two Hours



AW - 3539

Max. Marks : 40

- Notes :
1. All question carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) Obtain an expression for energy of an electron in n^{th} orbit of Bohr's atom. 4
- b) State and explain two important concepts of vector atom model. 4
- c) Enlist and describe all seven quantum numbers. 3
- d) The wavelength of the first member of the Balmer series in hydrogen spectrum is 6563 \AA . Calculate the wavelength of the first member of Lyman series in the same spectrum. 3

OR

2. a) Draw an energy level diagram for hydrogen atom and explain spectral series of hydrogen atom. 5
- b) Describe Frank-Hertz experiment to prove the existence of discrete energy states for electrons in atoms. 5
- c) What is wave packet? Give physical significance of wave function Ψ . 4
3. a) Explain the principle and working of cyclotron. 5
- b) Draw the block diagram of CRO. 3
- c) Derive an expression for vertical deflection Y of electron beam in transverse electric field. 3
- d) Explain that electron travels parabolic path in transverse electric field. 2

OR

4. a) Explain construction and working of Bainbridge Mass-Spectrograph. 5
- b) What is positive rays? State its properties. 3
- c) Explain motion of electron in crossed electric and magnetic fields. 3
- d) The electron is passed through uniform magnetic field $B = 20 \times 10^{-4} \text{ Wb/m}^2$ follows a circular path. If orbital velocity of electron is $4.396 \times 10^7 \text{ m/sec}$. Calculate the radius of electron orbit. 2

5. a) Discuss the theory of interference of light and obtain formula for bright fringe and dark fringe. 7
- b) How will you determine wavelength of sodium light by using Newton's ring expt.? 4
- c) What is wavelength of light that is deviated in first order through an angle 20° by transmission grating having 6000 Lines /cm? 2

OR

6. a) In Newton's ring experiment show that radius of dark ring is directly proportional to the root of number of rings. 7
- b) What is plane transmission grating? How it is prepared? 3
- c) In Newton's ring experiment the diameter of 20th ring was found to be 0.59 cm and that of 10th ring was 0.336 cm. If the radius of curvature of plano-convex lens is 1m; Calculate the wavelength of light used. 3
