IMPORTANT QUESTION

UNIT-1

Q.1 Derive Heisenberg’s uncertainty principle, Show that electron cannot reside inside the nucleus.

Q.2 Define phase velocity, group velocity and particle velocity. Derive their expression, show that in a non-dispersive medium, the group velocity equal to the phase velocity.

Q.3 Derive a moving matter particle is equal to the wave packet.(Vg= v relativity relation)

Q.4 What is wave function. Explain Normalization wave function.

Q.5 Derive time dependent Schrodinger wave equation.

Q.6 Derive time independent Schrodinger wave equation.

Q.7 Derive momentum operator.

Q.8 Derive energy operator.

Q.9 Explain the Schrodinger wave equation for a particle in a three- dimensional box. Solve it to Obtain Eigen function and show the Eigen energy are discrete.

Q.10 Explain de-Broglie wavelength. Calculate the de –Broglie wavelength associated with a proton moving with a velocity equal to 1/20 velocity of light.

Q.11 An electron has a speed of 3.5 x107m/sec. within the accuracy of 0.0098%.Calculate the uncertainty in the position of electron.

UNIT-2

Q.1 Explain Young’s double slit experiment. Derive fringe width.

Q.2 Explain the formation of Newton’s ring in reflected monochromatic light. Derive the wavelength of sodium light.

Q.3How can Newton’s ring be used to determine the refractive index of a liquid? Derive the necessary formula.

q.4 Explain briefly why Newton’s rings are circular. Explain difference between interference and diffraction. Explain difference between Fresnel’s diffraction and Fraunhofer differaction.

Q.5 Describe Michelson’s interferometer and explain the formation of fringes in it. How this Can be used to measure the wave length of monochromatic light.

Q.6 Discuss the phenomena of Fraunhofer diffraction at a single slit an show that the relative intensities of the Successive maximum are nearly 1:4/ 92 : 4/252 : 4/492 ……………..

Q.7 Explain difference between Fresnel’s diffraction and Fraunhofer diffraction

Q.8 Explain Rayleigh criterion and resolving power of grating.

Q.9 Explain application of Michelson’s interferometer.

Q.10 Explain plain transmission diffraction grating. Derive the maxima and minima.

Q.11 In Newton’s ring shows the diameter of 4th and 12thdark rings are .400cm. and .700cm. find the diameter of 20 dark rings.

Q.12 .In Newton’s ring shows the diameter of bright rings is proportional to the square root of odd natural number. The diameter of 10th dark ring due to wavelength 6000A° in air is 0.5cm. Find the radius of curvature of the lens.

Q.13 A Parallel beam of sodium light is allowed to be incident normally on a plane grating having 4250 lines per/cm and a second order spectral lines is observed to be deviated through 30° .Calculate the wavelength of spectral line.

Q.14 In a Michelson’s interferometer 200 fringes cross the field of view when the movable mirror is displaced through 0.0589mm. Calculate the wavelength of monochromatic light used.