

JK Lakshmipat University, Jaipur

Institute of Engineering and Technology

End Term – Examination

B. Tech I Year/I Semester 2013-14(Batch: 2013-2017)

Course Name: Engineering Physics-I

Course Code: PH101

Max Marks: 40

Time: 03.00 hr

Instructions:

1. Mobile phones are not allowed during Examination.
2. Use of calculator is allowed during Examination.

Section A

(Q1A) Write true or false/Fill in the blanks/Choose the correct answer

(1*5=5)

- (i) The axis of symmetry in a crystal is called-----axis.
- (ii) A plane containing the optic axis and perpendicular to two opposite faces of a crystal is defined as the ----- section of the crystal
- (iii) Newton's rings are produced with a planoconvex lens of radius of curvature of 1m. If the diameter of the 10th dark fringe is 4.48 mm as viewed normally the wavelength of light used is 5893 Å(T/F).
- (iv) Wave function must possess the property of superpositions(T/F)
- (v) The specific rotation of a given sugar solution when 20% sugar solution rotates the plane of polarization through 26.4° (the length of the tube= 0.2m) is ----/dm/(gm/cm³)
(a) 33° (b) 44° (c) 55° (d) 66°

(Q1B)

(2.5*2=5)

- (i) What is nanotechnology?
- (ii) What is the difference between a solar cell and a photodiode?

Section B

(5*4=20)

Out of five questions, four questions are to be attempted.

Q2(a) The speed of a proton is $c/20$, where c is the velocity of light. Determine the wavelength of waves associated with it. (mass of proton = 1.67×10^{-27} kg)

(b) An electron has a speed of 300m/s with an accuracy of 0.001%. Calculate the uncertainty in measurement of its position. [2.5+2.5]

Q3 (a) How will you analyze the three sources of light having the same physical appearance; partially polarized, elliptically polarized and mixture of unpolarized & circularly polarized light?

(b) How will you differentiate between Half wave and Quarter wave plates? [3+2]

Q4. The coherence length for sodium light is 2.945×10^{-2} m. The wavelength of sodium light is 5890 Å. Calculate (a) the number of oscillations corresponding to the coherence length and (b) the coherence time. [2.5+2.5]

Q5.(a) Explain how will you determine the wavelength difference of two components of a line by Michelson's interferometer.

(b) For Michelson's interferometer, calculate the distance between the two successive positions of the movable mirror giving well defined fringes in the case of sodium source of wavelengths of 589.0 nm and 589.6 nm. [3+2]

Q6. Explain Compton scattering. Derive an expression for the Compton shift. [0.5+4.5]

Section-C

(5*2=10)

Q7 Write down and solve Schrödinger's equation of a particle confined in one dimensional box for energy values and wave functions.

Q8 Derive an expression for the resultant intensity on the screen produced by Fraunhofer diffraction due to N parallel slits.