Dr. Pankaj

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- SEPTEMBER 2018

B.Tech. I Semester (BI & BT)

COURSE CODE: 18B11PH112 MAX. MARKS:15

COURSE NAME: BASIC ENGINEERING PHYSICS - I

COURSE CREDITS: 4 MAX. TIME: 1 Hr

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Scientific calculator is allowed.*

Q1 What is Compton effect? Discuss the origin of modified wavelength in Compton effect using quantum concept. **[4]**

(CO-1)

Q2 What is wave function? Give its physical significance. **[2]**

(CO-1)

Q3 What are coherent sources? Give the analytical treatment of interference. **[3]**

(CO-4)

Q4 (a) Selenium has a work function of 5.11 eV. What frequency of light would just eject electrons? **[1]**

(b) Calculate the de Broglie wavelength for an electron accelerated through a potential of 54 V. **[1]**

(CO-2)

Q5 (a) An X-ray photon is accelerated with a voltage 340 V. The X-ray photon is scattered from the target at an angle 90°. Calculate the wavelength of scattered X-ray photon. **[2]**

(b) A beam of electrons is kinetically accelerated via a temperature 340K and is reflected from a crystal. The first order reflection maxima occur when incident angle is 60°. Determine the lattice spacing of the crystal. **[2]**

(CO-2)

Constants:

$m_e = 9.1 \times 10^{-31}$ kg; $e = 1.6 \times 10^{-19}$ C; $k_B = 1.38 \times 10^{-23}$ J/K; $h = 6.6 \times 10^{-34}$ Js; $c = 3 \times 10^8$ ms^{-1}; 1 eV = 1.6×10^{-19} J