

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
TEST -1 EXAMINATIONS-2022

B.Tech-I Semester (BI/BT)

COURSE CODE (CREDITS): 18B11PH112 (4)

MAX. MARKS: 15

COURSE NAME: Basic Engineering Physics

COURSE INSTRUCTORS: Dr. Ragini Raj Singh

MAX. TIME: 1 Hour

*Note: All questions are compulsory. Marks are indicated against each question in square brackets.  
Calculators are allowed.*

**Q.1.** Discuss the photoelectric effect with reference to classical theory and experimental evidences  
[CO: 1, 5; Marks: 2]

**Q.2.** Define: [CO: 1, 5; Marks: 2]

1. Cubic and hexagonal crystal structure
2. Characteristic x-rays
3. Single and polycrystalline materials
4. Operators for position, momentum and energy

**Q.3.** What is the importance of quantum mechanics? Discuss with the help of quantum tunneling.  
[CO: 1, 5; Marks: 2]

**Q.4.** Does the de Broglie wavelength relationship applied to all particles? Discuss this with reference to one classical and one quantum particle.  
[CO: 1, 5; Marks: 2]

**Q.5.** Derive the equation which gives the interference term and discuss the maximum, minimum intensity conditions. Also discuss how you can find the intensity when waves are having phase difference  $0 < \delta < \pi$ .  
[CO: 1, 2, 5; Marks: 3]

**Q.6.** In YDS experiment, the wavelength of monochromatic light used is 500 nm. The optical path difference between the rays from the two coherent sources at point p on the screen is 0.0050 mm and at a point Q on the screen is 0.0020 mm. How many bright bands are observed between the two points P and Q. Given that Point P and Q are on the either side of the central maxima.  
[CO: 1, 2, 5; Marks: 2.5]

**Q.7.** In a Compton scattering experiment, the incident X-rays have a wavelength of 0.2685 nm, and the scattered X-rays have a wavelength of 0.2703 nm. Through what angle the X-rays are scattered. (Given  $m=9.11 \times 10^{-31}$  Kg).  
[CO: 1, 2, 5; Marks: 1.5]