

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS-2022

B.Tech-I Semester (CS/IT/ECE/Civil/BT)

COURSE CODE (CREDITS): 18B11PH211 (4)

MAX. MARKS: 25

COURSE NAME: ENGINEERING PHYSICS-II

COURSE INSTRUCTORS: Dr. P.B. Barman, Dr. Vineet Sharma, Dr. S.K. Tiwari, Dr. S.K. Hazra

MAX. TIME: 1 Hour 30 Min

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

- Q1.** The reciprocal lattice of BCC lattice is FCC. Justify. [3] [CO-5]
- Q2.** Determine the nearest neighbor distance in BCC & FCC structures when the atomic radius is 10 Å. [3] [CO-5]
- Q3.** Write the Schrodinger equation and wave function for a periodic potential in a crystal lattice. [3] [CO-5]
- Q4.** Calculate the Hall coefficient of a specimen whose electrical conductivity is $2.12\Omega^{-1}\text{m}^{-1}$ and charge carrier mobility is $0.36\text{ m}^2/\text{Vs}$. Also, calculate carrier concentration. Given $e=1.6\times 10^{-19}\text{ C}$ [3] [CO-6]
- Q5.** How forward biasing across P-N junction reduces the potential barrier?
The emitted wavelength of GaAsP LED is 6500Å . Calculate the energy gap of the LED. [3] [CO-6]
- Q6.** On the basis of variation in refractive index with distance from centre of core, analyze the step index and graded index fibers. [2] [CO-3]
- Q7.** Compute the maximum value of Δ and cladding refractive index of a single mode fibre of core diameter $10\mu\text{m}$ and core refractive index 1.5. The fiber is coupled to a light source with a wavelength $1.3\mu\text{m}$. $V_{\text{cut off}}$ for single mode propagation is 2.405. Also calculate the acceptance angle. [3] [CO-3]
- Q8.** An optical fiber cable 6 km long is made up of three 2 km lengths spliced together. The losses due to each length and splice are 5 dB & 1 dB respectively. Calculate the output power if the input power is 10 mW. [3] [CO-3]
- Q9.** Calculate the number of macrostates and microstates for a distribution 3-particle in 2-compartments. [2] [CO-4]