

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-V Semester (CSE/IT/ECE/)

COURSE CODE (CREDITS): APPLIED MATERIALS SCIENCE

MAX. MARKS: 25

COURSE NAME: 18B1WPH532

COURSE INSTRUCTORS: PBB, VSA, RRS, HAZ, SKT

MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	Derive an expression for the modification of angular frequency of an electron orbiting around nucleus under the effect of magnetic field.	CO 1	5
Q2	Derive the Lorentz-Lorenz equation and analyze the same for vacuum.	CO 2	5
Q3	Discuss the L-S coupling with respect to the precession of the orbital and spin angular momentum vectors using suitable illustrations.	CO 2	5
Q4 (a)	Sodium metal with a BCC structure has two atoms per unit cell. The radius of the Sodium atom is 0.185 nm. Estimate the order of diamagnetic susceptibility in Sodium.	CO 3	3
Q4 (b)	Discuss the procedure to create piezoelectric behaviour in a ceramic.	CO 4	2
Q5	Taking into consideration the exchange interactions, give an account for ferromagnetic behaviour. Further highlight the application ferromagnetic materials in magnetic storage devices.	CO 5	5

Constants: $m_e = 9.11 \times 10^{-31}$ kg; $e = 1.6 \times 10^{-19}$ C; $\mu_0 = 4\pi \times 10^{-7}$ H/m