

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech-V Semester (CSE/IT)

COURSE CODE (CREDITS): 18B1WPH532 (03)

MAX. MARKS: 15

COURSE NAME: Applied Materials Science

COURSE INSTRUCTOR: HAZ

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory. (b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems (c) Use of calculator is allowed (d) Symbols have their usual meaning.

Q.No	Question	CO	Marks
Q1	For NaCl, calculate the ionic contribution of dielectric constant. Given, $\omega_{oi}=3.2 \times 10^{13}$ rad/s, and nearest neighbour distance between ions is $2.81 \text{ \AA}$.	3	3
Q2	In the microwave region of the electromagnetic spectrum, discuss the variation of dielectric constant (real and imaginary components).	1	3
Q3	If the diameter of argon atom be $3 \text{ \AA}$, calculate the index of refraction for argon gas at NTP.	3	3
Q4	Discuss the poling technique in ceramic processing. Also, highlight its importance.	4	3
Q5	What is cause of non-linear stress-strain characteristics in a material. How it is useful to increase the ultimate mechanical strength of a ceramic material.	2	3

$$m_e = 9.11 \times 10^{-31} \text{ kg}; m_p = 1.67 \times 10^{-27} \text{ kg}; e = 1.6 \times 10^{-19} \text{ C}; N_A = 6.023 \times 10^{23}; k_B = 1.38 \times 10^{-23} \text{ J/K}; \epsilon_0 = 8.85 \times 10^{-12} \text{ F/m}; \mu_B = 9.27 \times 10^{-24} \text{ Am}^2;$$