

B. Tech. (Mechanical Engineering), IV SEMESTER
Materials Engineering (PCC-ME-402/21)
I Sesssional Test, February 2026

Time: 90 Minutes

Max. Marks: 30

Note: Attempt all the following questions.

Q1.	Iodine has an orthorhombic unit cell for which the a , b , and c lattice parameters are 0.479, 0.725, and 0.978 nm, respectively. (a) If the atomic packing factor and atomic radius are 0.547 and 0.177 nm, respectively, determine the number of atoms in each unit cell. (b) The atomic weight of iodine is 126.91 g/mol; compute its theoretical density.	(10) CO1
Q2.	Discuss the fundamental principle behind the strengthening of materials. Also explain three methods of strengthening metals and alloys.	(10) CO2
Q3.	Differentiate between fracture and failure. Classify and discuss in detail the types of fracture in materials.	(10) CO3