



Department of Mechanical Engineering

CIE – I

Date	22nd July 2024	Maximum Marks	50
Course Code	ME242AT	Duration	120Min
Course Name	Material Science for Engineers	USN:	

Q. No.	Questions	M	BT	CO
1	How many electrons can occupy a P orbital?	1	1	1
2	The principal quantum number (n) refers to the _____ and _____ of the orbital.	1	1	1
3	In which type of bond do atoms share electrons?	1	1	1
4	A large energy gap between valence and conduction bands is the characteristic of which type of materials	1	1	1
5	What is the basic repeating unit in a crystal lattice?	1	1	1
6	Single atom or ion missing or occupying an irregular position is _____ type of defect in a crystal structure	1	1	1
7	The fractional increase in the length per unit rise in temperature in solids is known as _____	1	1	2
8	Identify the thermoelectric effect in which the temperature difference between two different materials or junctions in a circuit leads to the generation of an electric voltage	1	2	2
9	Define dielectric strength.	2	1	2

PART B

1	a) Describe Pauli Exclusion Principle and Aufbau principle.	05	2	1
	b) With the help of neat sketches explain the Secondary bonds with examples.	05		
2	Classify solid materials based on the band gaps. Explain them briefly giving examples	10	2	1
3	a) Calculate Atomic packing factor for HCP unit cell.	05	3	1
	b) Differentiate Edge dislocation and Screw dislocation	05	2	
4	Explain the properties and applications of metals and ceramics. Give two examples each.	10	3	1
5	a) Illustrate the temperature gradient along a conductor resulting in the absorption or release of heat in Thomson thermoelectric effect using appropriate sketches.	05	3	2
	b) Write a note on Insulating materials highlighting their applications	05	2	

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks	Particulars	CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
Distribution	TEST Marks	46	14	-	-	9	31	20	-	-	-
