UPES
End Semester Examination, December 2024

Course: Self-Healing Materials   Semester : VII
Program: Bachelor of Technology In Advance Materials & Nano Tech.   Time : 03 hrs.
Course Code: MECH4052   Max. Marks: 100

Instructions:

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	State any method utilized for damage identification in a composite panel.	4	CO1
Q 2	Differentiate between coherent and incoherent grain boundaries.	4	CO1
Q 3	Mention the major grain boundary migration mechanisms.	4	CO2
Q 4	How healing occurs in a metal matrix composite?	4	CO3
Q 5	Define self-healing in plants with an example?	4	CO3

SECTION B
(4Qx10M= 40 Marks)

Q 6	Compare intrinsic and extrinsic self-healing concepts.	10	CO4
Q 7	Describe in detail the term "Coincident Site Lattice (CSL)" grain boundary with example and proper diagram.	10	CO3
Q 8	Derive the equations involving extrinsic self-healing concept using a smart sensor.	10	CO4
Q 9	Write the self-healing mechanisms that operate in polymer composites domain using grain boundaries. OR Write the self-healing mechanisms that operate in polymer composites domain using nanomaterials.	10	CO4

SECTION-C
(2Qx20M=40 Marks)

Q 10	Explain the term "Grain Boundary diffusion" in detail through proper diagrams. Also, discuss the factors influencing the grain boundary diffusion with their effects. OR	20	CO5

	Explain the term "Grain Boundary motion" in detail through proper diagrams. Also, discuss the factors influencing the grain boundary diffusion with their effects.		
Q 11	Discuss the mentioned self-healing strategies in detail: (a) encapsulated healing material, (b) Activated Hydrogels, and (c) Passive technique.	**20**	**CO5**