School of Mechanical Engineering

Mechanical Engineering

ETE - Jun 2023

Time : 3 Minutes **Marks : 50**

Sem II - MCCR5027 - Smart Materials

Your answer should be specific to the question asked

Draw neat labeled diagrams wherever necessary

1.	What are the challenges and limitations of energy harvesting?	K2 CO3	(2)
2.	Compare MEMS devices with conventional macroscale counterparts.	K2 CO3	(2)
3.	How do composite materials differ from homogeneous materials?	K2 CO1	(2)
4.	How do temperature changes affect the performance of piezoelectric materials?	K2 CO2	(2)
5.	How are smart materials used in various industries and applications?	K2 CO1	(2)
6.	Evaluate the impact of various fabrication techniques on the performance and properties of composite materials.	K4 CO1	(5)
7.	Analyze the impact of external factors, such as temperature, stress, or strain rate, on the shape memory effect in alloys and propose strategies to optimize their performance.	K4 CO2	(6)
8.	Explore how the magnetostrictive materials change their shape in response to a magnetic field.	K3 CO1	(5)
9.	Assess the environmental sustainability and recycling considerations associated with polymer matrix composites. Analyze the challenges and potential solutions for the recycling and disposal of composite materials, considering their complex structure and combination of different materials	K4 CO1	(8)
10.	Explain the different types of smart actuators, such as piezoelectric, electrostrictive, shape memory alloy, or magnetostrictive actuators.	K5 CO3	(8)
11.	Analyze the underlying mechanisms and phase transformations involved in the shape memory effect exhibited by shape memory alloys. Discuss how changes in temperature or stress induce the reversible transformation between the martensitic and austenitic phases, enabling shape memory behavior.	K4 CO2	(8)