CBCS SCHEME

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BME306B

ACHARYA INSTITUTE OF TECHNOLOGY LIBRARY BANGALORE

Third Semester B.E./B.Tech. Degree Examination, June/July 2026

Smart Materials and Systems

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M: Marks, L: Bloom's level, C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Briefly explain the common Smart Materials and associated stimulus response with figure.	10	L2	CO1
	b.	Enumerate the Application Area of Smart Systems.	10	L1	CO3
		OR			
Q.2	a.	With figure, explain the classification of Smart Structure.	10	L2	CO1
	b.	What are System Intelligence and its components?	10	L1	CO1
		Module – 2			
Q.3	a.	What are Piezoelectric materials (PZT), explain the Piezoelectric effect.	10	L1	CO1
	b.	Discuss the broad applications of Carbon Nano Tubes (CNT).	10	L2	CO1
		OR			
Q.4	a.	Explain any two different Piezoelectric materials based sensors and actuators.	10	L2	CO1
	b.	What are Carbon Nano Tubes, mention its properties.	10	L1	CO3
		Module – 3			
Q.5	a.	What are Shape Memory Alloys (SMA), with Temp-Load figure explain the phase transformation in SMA.	10	L1	CO1
	b.	Write the application of SMA's.	10	L1	CO3

		OR			
Q.6	**a.**	What are Shape Memory Effect (SME). Explain about the One-Way and Two-Way effect with figure.	**10**	**L1**	**CO2**
	b.	Write the functional properties of SMA.	**10**	**L1**	**CO1**
		Module – 4			
Q.7	**a.**	Write a note on Drug Delivery using Smart Polymers. List its classification on open loop and closed loop systems.	**10**	**L1**	**CO1**
	b.	Explain briefly the Thermo-Responsive Polymers.	**10**	**L2**	**CO1**
		OR			
Q.8	**a.**	Explain about the PH-Responsive Polymers.	**10**	**L2**	**CO1**
	b.	Write the application of Smart Polymers.	**10**	**L1**	**CO3**
		Module – 5			
Q.9	**a.**	Write a note on Smart Corrosion Protection Coatings.	**10**	**L1**	**CO1**
	b.	With neat figure, explain the Surface Acoustic Wave (SAW) based Chemical Sensor.	**10**	**L1**	**CO2**
		OR			
Q.10	**a.**	Write a note on Self-Healing Materials.	**10**	**L1**	**CO2**
	b.	List out the Chemically Operated Sensors. Explain any one Sensor in brief.	**10**	**L1**	**CO3**

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