

**BME306B** 

Third Semester B.E./B.Tech Degree Supplementary Examination,
June/July 2024

## **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
a.	What is meant by system intelligence? Write it components and explain it.	10	L1	CO1
b.	Write the classification of smart structures and explain it.	10	L2	CO1
	OR			
a.	List any five common smart materials and write its associated stimulus-	10	L1	CO1
	Response.			
b.	List any five application areas of smart systems.	10	L1	CO1
a.				CO2
b.		10	L1	CO <sub>3</sub>
				,
a.		10	L1	CO <sub>2</sub>
b.	Write the characteristics of piezoceramics and its applications.	10	L2	CO <sub>3</sub>
Т				
a.				CO <sub>2</sub>
b.		10	L2	CO <sub>2</sub>
a.		10	L2	CO2
b.		10	L2	CO3
			1	
	Module – 4			
a.	Write the characteristics of thermally responsive polymers and its	10	L2	CO3
	applications.			
b.	Write the characteristics of electroactive polymer microgels and its	10	L2	CO3
	applications.			
	OR			
a.	Briefly explain pH-responsive and photo-responsive polymers.	10	L2	CO2
b.	Write a brief note on Drug delivery using smart polymers.	10	L2	CO2
				9
	Module – 5			. 🐷
a.	Write the properties of optically activated polymers and its applications.	10	L2	CO3
b.	Write a short note on Azobenzene liquid crystal.	10	L2	CO2
	OR			•
a.	Write the key features of smart corrosion protection coatings and its	10	L2	CO3
1				1
	a. b. a. b. a. b. a. b. a. b.	a. What is meant by system intelligence? Write it components and explain it.  b. Write the classification of smart structures and explain it.  OR  a. List any five common smart materials and write its associated stimulus-Response.  b. List any five application areas of smart systems.  Module – 2  a. Write the difference between piezoelectricity and piezoresistivity.  b. What is meant by Ferroelectireity? Write its properties and its applications.  OR  a. What is meant by Piezoelectric effect? Explain direct piezoelectric effect and inverse piezoelectric effect.  b. Write the characteristics of piezoceramics and its applications.  Module – 3  a. Writ a brief note on shape memory alloy and write its classification.  b. Briefly explain shape memory effect.  OR  a. Write the difference between one way shape memory effect and two way shape memory effect.  b. Write the applications of shape memory ceramics and shape memory polymers.  Module – 4  a. Write the characteristics of thermally responsive polymers and its applications.  b. Write the characteristics of electroactive polymer microgels and its applications.  OR  a. Briefly explain pH-responsive and photo-responsive polymers.  b. Write a brief note on Drug delivery using smart polymers.  Module – 5  a. Write the properties of optically activated polymers and its applications.  b. Write a short note on Azobenzene liquid crystal.	a. What is meant by system intelligence? Write it components and explain it.  DR  a. List any five common smart materials and write its associated stimulus-Response.  b. List any five application areas of smart systems.  10  Module – 2  a. Write the difference between piezoelectricity and piezoresistivity.  10  b. What is meant by Ferroelectricity? Write its properties and its applications.  OR  a. What is meant by Piezoelectric effect? Explain direct piezoelectric effect and inverse piezoelectric effect.  b. Write the characteristics of piezoceramics and its applications.  10  Module – 3  a. Write a brief note on shape memory alloy and write its classification.  b. Briefly explain shape memory effect.  OR  a. Write the difference between one way shape memory effect and two way 10 shape memory effect.  b. Write the applications of shape memory ceramics and shape memory 10 polymers.  Module – 4  a. Write the characteristics of thermally responsive polymers and its 10 applications.  DR  a. Write the characteristics of electroactive polymer microgels and its 10 applications.  DR  a. Briefly explain pH-responsive and photo-responsive polymers.  OR  a. Briefly explain pH-responsive and photo-responsive polymers.  10  Module – 5  a. Write the properties of optically activated polymers and its applications.  DR  a. Write the properties of optically activated polymers and its applications.  DR  Module – 5  a. Write a short note on Azobenzene liquid crystal.  OR	a. What is meant by system intelligence? Write it components and explain it.  b. Write the classification of smart structures and explain it.  OR  a. List any five common smart materials and write its associated stimulus-Response.  b. List any five application areas of smart systems.  10 L1  Module - 2  a. Write the difference between piezoelectricity and piezoresistivity.  DR  a. What is meant by Ferroelectircity? Write its properties and its applications.  OR  a. What is meant by Piezoelectric effect? Explain direct piezoelectric effect and inverse piezoelectric effect? Explain direct piezoelectric effect and inverse piezoelectric effect.  b. Write the characteristics of piezoecramics and its applications.  10 L2  Module - 3  a. Write a brief note on shape memory alloy and write its classification.  DR  a. Write the difference between one way shape memory effect and two way shape memory effect.  DR  a. Write the difference between one way shape memory effect and two way shape memory effect.  DR  a. Write the applications of shape memory ceramics and shape memory 10 L2 shape memory effect.  DR  a. Write the characteristics of thermally responsive polymers and its applications.  Module - 4  a. Write the characteristics of electroactive polymer microgels and its applications.  DR  A. Write the characteristics of electroactive polymer microgels and its applications.  OR  a. Briefly explain pH-responsive and photo-responsive polymers.  10 L2  Module - 5  a. Write the properties of optically activated polymers and its applications.  10 L2  DR  A. Write the properties of optically activated polymers and its applications.  10 L2  DR  A. Write a short note on Azobenzene liquid crystal.  OR