Model Question Paper- CBCS Scheme

USN | | | | | | | | | |

15ME745

Seventh Semester B.E. Degree Examination, December2018/January2019

Smart Materials & MEMS

Time: 3 hrs Max marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module

Module-1

1	a.	What are smart materials? Explain its applications in various fields.	**8 Marks**
	b.	Explain shape memory effect. List the applications of shape memory alloys.	**8 Marks**
		OR	
2	a.	Discuss the advantages of multiplexing embedded NiTiNOL actuators.	**8 Marks**
	b.	Explain the vibration control using a NiTiNOL wire suspended mass system at the free end of the beam.	**8 Marks**
		Module-2	
3	a.	Explain any one model predicting the Pre-yield behaviour in MR/ER fluids	**8 Marks**
	b.	Discuss the applications of MR/ER fluids in clutches.	**8 Marks**
		OR	
4	a.	Explain the principle of total internal reflection in optical fibers**.**	**8 Marks**
	b.	List the applications of optical fibers as sensors.	**8 Marks**
		Module-3	
5	a	Write a short note on active vibration absorbers	**6 Marks**
	b	Explain briefly the smart control of structures.	**10 Marks**
		OR	
6	a	Discuss briefly the challenges & opportunities of bio-mimetics**.**	**8 Marks**
	b	Discuss the micro structural design of toughness mechanism in mollusks.	**8 Marks**
		Module-4	
7	a	Explain briefly the intrinsic characteristics of MEMS.	**8 Marks**
	b	Explain with neat sketch, thermal oxidation fabrication of MEMS.	**8 Marks**
		OR	
8	a	List the properties of Piezo –electric materials.	**6 Marks**
	b	Explain in detail the working of Piezo-electric tactile sensors.	**10 Marks**
		Module-5	
9	a	List the applications where polymer MEMS are a success. Discuss any two.	**10 Marks**
	b	Explain the fabrication of MEMS pressure sensors in detail.	
		OR	
10	a	Discuss the design considerations of MEMS sensors in microphones.	**8 Marks**
	b	Explain briefly the top concerns for MEMS product development .	**8 Marks**