Register Number:……………..

KUMARAGURU
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B.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Seventh Semester

MECHATRONICS ENGINEERING

U18MCE0003**:** Micro Electro Mechanical Systems

COURSE OUTCOMES

CO1:	Explain the evolution of micro and smart system.
CO2:	Illustrate about various sensors and actuating system.
CO3:	Classify the Micro machining techniques in MEMS.
CO4:	Evaluate a proper scaling method.
CO5:	Determine packaging techniques in MEMS and smart system.
CO6:	Discuss various applications of MEMS.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	List out the components of a microsystem.	CO1	[K_2]
2.	What are the two types of scaling laws that are applicable to the design of microsystems?	CO4	[K_2]
3.	Why silicon is used as a substrate material for MEMS?	CO6	[K_2]
4.	What are the uses of micro accelerometers?	CO2	[K_2]
5.	Differentiate between positive resists and negative resists.	CO3	[K_2]
6.	Name some parameters that affect the rate of chemical vapor deposition.	CO3	[K_2]
7.	Give one advantage and one disadvantage of using surface micromachining.	CO5	[K_2]
8.	Write a note on "Plasma etching".	CO5	[K_2]
9.	What are the design constraints to be considered for micro systems?	CO1	[K_2]
10.	Define piezoelectric effect.	CO2	[K_1]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Summarize the steps involved in LIGA process with a neat sketch.	8	CO5	[K_2]
	b)	Explain any three applications of MEMS in automotive industry.	8	CO6	[K_2]
12.	a)	Compare Microsystems and Microelectronics with examples.	8	CO1	[K_2]

	b)	With the help of block diagram, describe the components needed to develop an intelligent microsystems.	8	CO1	[K_2]
13.		Discuss in detail about the steps involved in the photolithography process for fabrication of micro devices.		CO3	[K_2]
14.	a)	Describe the scaling laws in determining electrostatic forces and its impact in MEMS components.	8	CO4	[K_2]
	b)	Explain the working of micro grippers with a neat sketch.	8	CO2	[K_2]
15.		Discuss in detail about the different methods of actuating motions of micro devices.		CO2	[K_2]
16.		What are the general considerations in microsystem packaging design? Explain the three levels of microsystem packaging with a neat sketch.		CO5	[K_2]

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