KUMARAGURU
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B.E DEGREE EXAMINATIONS: APRIL /MAY 2024

(Regulation 2018)

Sixth Semester

MECHATRONICS ENGINEERING

U18MCE0003**:** Micro Electromechanical 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. How a mems act as a micro actuator?	CO1	[K$_2$]
2. Draw the block diagram of intelligent microsystems.	CO1	[K$_2$]
3. Discuss how actuation is done using thermal forces	CO2	[K$_2$]
4. List the technical issues involved in the application of MEMS in biomedicine	CO6	[K$_2$]
5. Differentiate positive resist and negative resist in photolithography process	CO2	[K$_2$]
6. Define epitaxy process	CO4	[K$_2$]
7. Discuss how scaling is done in geometry compare an surface to volume ratio of elephant and a dragonfly	CO3	[K$_2$]
8. Mention the process of thin film production for microsystems.	CO3	[K$_2$]
9. Write the mathematical modelling of capillary electrophoresis network systems	CO6	[K$_2$]
10. List the advantages of 3D packaging of MEMS and microsystems	CO5	[K$_2$]

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

11.	a)	Compare in brief Microelectronics and microsystems.	8	CO1	[K$_2$]
	b)	List the application in health care industry and brief the disposable blood pressure transducer and intrauterine pressure sensor.	8	CO1	[K$_2$]
12.		Brief about the working principle of Biosensor, Biomedical sensor and thermal sensor with neat sketch.	16	CO2	[K$_2$]
13.		Explain with neat sketch oxidation process in microfabrication process.	16	CO3	[K$_2$]
14.		Explain in detail the scaling in fluid mechanics and scaling in heat transfer	16	CO4	[K$_2$]
15.		Brief about the various interfaces problem associated with microsystems packaging.	16	CO5	[K$_2$]
16.		Describe the application of MEMS in automotive industry	16	CO6	[K$_2$]

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