

Reg.No.:



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN  
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]  
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

**Question Paper Code: 7018**

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – MAY / JUNE 2024

Sixth Semester

Electronics and Communication Engineering

U19ECV17 - INTRODUCTION TO MEMS

(Regulation 2019)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define MEMS.	2	K1	CO1
2.	What do you mean by inverse effect of piezo electricity?	2	K2	CO1
3.	Recall the principle of thermal couples.	2	K1	CO2
4.	What is the difference between sensors and actuators?	2	K2	CO2
5.	List the advantages of MOEMS technology.	2	K2	CO3
6.	Mention the uses of beam splitter in MOEMS technology.	2	K1	CO3
7.	Justify whether the magnetodiodes and magnetotransistors are MEMS devices.	2	K2	CO4
8.	Distinguish between unidirectional and bidirectional magnetic actuator.	2	K2	CO4
9.	What is the primary reason for designing solenoid type MEMS inductor?	2	K2	CO5
10.	Recall the relationship between the contact angle and the applied voltage for the case of electrowetting based fluid flow.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Explain in detail about different types of etching processes preferred during MEMS fabrications.	13	K2	CO1
	(OR)			
b) i.	Describe in detail about the principle of Inchworm Technology with suitable diagrams.	8	K3	CO1
ii.	Describe the role of Inchworm Technology in consumer product applications.	5	K3	CO1
12. a)	Describe in detail about the actuation using shape memory alloys.	13	K3	CO2
	(OR)			
b)	Explain in detail about U-shaped horizontal and vertical electro thermal actuator systems.	13	K3	CO2
13. a)	Explain the structure and principle of operation of a grating valve device.	13	K2	CO3
	(OR)			
b)	Explain the principle of measurement of shear stress by using MOEMS devices.	13	K3	CO3
14. a)	Comprehensively discuss the principle of operation of magnetic probe-based storage device.	13	K3	CO4
	(OR)			
b)	Explain the construction and operating principle of Magnetoresistive sensor with neat diagrams.	13	K2	CO4
15. a)	With the suitable diagrams, explain the principles of the following fluid flow phenomena.	7	K2	CO5
i.	Dielectrophoresis (DEP)	6	K2	CO5
ii.	Electroosmosis flow			
	(OR)			
b)	Explain the construction and working principle of diaphragm based micropumps with neat diagram.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Construct and explain the structure of MEMS gyroscope and comprehend its principle of operation.	15	K3	CO1
	(OR)			
b) i.	Summarize the process sequences with regard to the fabrication of RF MEMS switches.	7	K3	CO5
ii.	Explain the principle of operation of a switched-line phase shifter.	8	K3	CO5

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