21MT654

Model Question Paper-1/2 with effect from 2022-23 (CBCS Scheme)

USN

Fourth Semester B.E. Degree Examination Subject Title: MICRO ELECTRO MECHANICAL SYSTEMS Subject Code: 21MT654

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

	Module -1	Taxonomy Level		Marks
a	Define MEMS. Explain the applications of MEMS.	L1, L2	CO1	7M
b	With a Flow chart Explain Microsystem versus MEMS.	L2	CO1	7M
c	Discuss the need of Miniaturization Process	L2	CO1	6M
	OR			
a	Define Smart materials. Explain the Structure of Smart Materials.	L1,L2	CO1	7M
b	Explain the applications of Smart Materials.	L2	CO1	7M
c	Classify and Explain integrated micro systems.	L2	CO1	6M
	Module-2			
a	Explain the desirable features of Sensors.	L2	CO2	10M
b	Explain Piezo resistive pressure sensor with neat sketch	L2	CO2	10M
0	OK	1.2	CO2	10M
	With a neat sketch explain Portable blood analyzer			
b	Explain principle operation of micro mirror array for video projection and piezoelectric based inkjet print head.	L2	CO2	10M
	Module-3			
a	Briefly explain silicon wafer preparation.	L2	CO3	10M
b	With a neat sketch explain thin film deposition techniques.	L3	CO3	10M
	OR			
a		L3	CO3	10M
b	Sketch and Explain Bulk Micro machining	L3	CO3	10M
L	Module-4			
a	Explain the operation of Schottky Diode and Tunnel Diode with VI Characteristics.	L2	CO3	10M
b	Explain the three modes of Operations of a MOSFET with relevant equations.	L2	CO3	10M
	b c a b c a b b a b b a b b a a	b With a Flow chart Explain Microsystem versus MEMS. c Discuss the need of Miniaturization Process OR 0 a Define Smart materials. Explain the Structure of Smart Materials. b Explain the applications of Smart Materials. c Classify and Explain integrated micro systems. Classify and Explain integrated micro systems. Explain the desirable features of Sensors. b Explain Piezo resistive pressure sensor with neat sketch. OR a with a neat sketch explain Portable blood analyzer b Explain principle operation of micro mirror array for video projection and piezoelectric based inkjet print head. a Briefly explain silicon wafer preparation. b With a neat sketch explain thin film deposition techniques. a Mith a neat sketch explain Lithography. b Sketch and Explain Bulk Micro machining b Explain the operation of Schottky Diode and Tunnel Diode with VI Characteristics. b Explain the three modes of Operations of a MOSFET with relevant	b Vith a Flow chart Explain Microsystem versus MEMS. L2 c Discuss the need of Miniaturization Process L2 or OR L1,L2 befine Smart materials. Explain the Structure of Smart Materials. L1,L2 c Define Smart materials. Explain the Structure of Smart Materials. L2 c Classify and Explain integrated micro systems. L2 c Classify and Explain integrated micro systems. L2 a Explain the desirable features of Sensors. L2 b Explain Piezo resistive pressure sensor with neat sketch. L2 c OR Integrated micro system versus for video projection and piezoelectric based inkjet print head. L2 b Explain Piezo resistive pressure sensor with neat sketch. L2 c OR Integrate for thead. L2 b Explain principle operation of micro mirror array for video projection and piezoelectric based inkjet print head. L2 a Briefly explain silicon wafer preparation. L2 b With a neat sketch explain thin film deposition techniques. L3 a Module-3 L3 b Sketch and Explain Bulk Micro machining <td>b Vith a Flow chart Explain Microsystem versus MEMS. L2 C01 c Discuss the need of Miniaturization Process L2 C01 a Define Smart materials. Explain the Structure of Smart Materials. L1,L2 C01 b Explain the applications of Smart Materials. L2 C01 c Classify and Explain integrated micro systems. L2 C01 c Classify and Explain integrated micro systems. L2 C02 v Module-2 V V C02 a Explain the desirable features of Sensors. L2 C02 b Explain Piezo resistive pressure sensor with neat sketch. C02 C02 b Explain Piezo resistive pressure sensor with neat sketch. L2 C02 b Explain principle operation of micro mirror array for video projection and piezoelectric based inkjet print head. L2 C03 b With a neat sketch explain thin film deposition techniques. L3 C03 c OR L3 C03 b With a neat sketch explain Lithography. L3 C03 b With a neat sketch explain Lithography. L3</td>	b Vith a Flow chart Explain Microsystem versus MEMS. L2 C01 c Discuss the need of Miniaturization Process L2 C01 a Define Smart materials. Explain the Structure of Smart Materials. L1,L2 C01 b Explain the applications of Smart Materials. L2 C01 c Classify and Explain integrated micro systems. L2 C01 c Classify and Explain integrated micro systems. L2 C02 v Module-2 V V C02 a Explain the desirable features of Sensors. L2 C02 b Explain Piezo resistive pressure sensor with neat sketch. C02 C02 b Explain Piezo resistive pressure sensor with neat sketch. L2 C02 b Explain principle operation of micro mirror array for video projection and piezoelectric based inkjet print head. L2 C03 b With a neat sketch explain thin film deposition techniques. L3 C03 c OR L3 C03 b With a neat sketch explain Lithography. L3 C03 b With a neat sketch explain Lithography. L3

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	OR			
а	Implement Inverter NAND gate using CMOS Logic Circuits and outline the Operations using truth table of operations.	L2	CO4	10M
b	with a standard symbol for an Operational Amplifier, discuss the input- output relation of ideal Op-amp.	L3	CO4	10M
	Module-5			
а		L2	CO4	10M
	Explain the design methodology of PID controller.			
b		L3	CO4	10M
	Sketch and Explain Digital Controller			
	OR			
а		L2	CO4	10M
	Explain the advantages of PID Controllers and its applications			
b	Briefly Explain integration of Pressure sensor and smart structure in vibration control.	L2	CO4	10M
	b a b	a Implement Inverter NAND gate using CMOS Logic Circuits and outline the Operations using truth table of operations. b with a standard symbol for an Operational Amplifier, discuss the input-output relation of ideal Op-amp. Module-5 a Explain the design methodology of PID controller. b Sketch and Explain Digital Controller OR a Explain the advantages of PID Controllers and its applications b Briefly Explain integration of Pressure sensor and smart structure in	a Implement Inverter NAND gate using CMOS Logic Circuits and outline the Operations using truth table of operations. L2 b with a standard symbol for an Operational Amplifier, discuss the inputout put relation of ideal Op-amp. L3 current control of ideal Op-amp. L2 Module-5 a Explain the design methodology of PID controller. b Sketch and Explain Digital Controller OR a Explain the advantages of PID Controllers and its applications b Briefly Explain integration of Pressure sensor and smart structure in	a Implement Inverter NAND gate using CMOS Logic Circuits and outline the Operations using truth table of operations. L2 CO4 b with a standard symbol for an Operational Amplifier, discuss the input-output relation of ideal Op-amp. L3 CO4 a Module-5 L2 CO4 a Explain the design methodology of PID controller. L3 CO4 b Sketch and Explain Digital Controller L3 CO4 a CO4 L2 CO4 b Sketch and Explain Digital Controller L3 CO4 a L2 CO4 CO4 b Briefly Explain integration of Pressure sensor and smart structure in L2 CO4

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.