KUMARAGURU college of technology
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Register Number:……..…

M.E DEGREE EXAMINATIONS: DEC 2015

(Regulation 2014)

Third Semester

CAD/CAM

P14CCTE25 : Micro Electro Mechanical Systems Design

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. MEMS components ranges in size from CO3 [K_1]

   a) 1mm to 1cm b) 1µm to 500µm

   c) 1µm to 1mm d) 1nm to 1µm

2. The deflection of thin diaphragm in micro pressure sensor is measured by CO3 [K_1]

   a) Mechanical means b) Optical means

   c) Electrical means d) Both a and c

3. Silicon conducts heat _____times faster than silicon oxide. CO3 [K_1]

   a) 50 b) 100

   c) 150 d) 200

4. CO2 [K_2]

List I	List II
A. 100 plane silicon crystal	i. 6 atoms
B. GaAs	ii. very good physical stability
C. Silicon	iii. High cost
D. 111 plane silicon crystal	iv. 5 atoms

   a) A-1,B-2,C-3,D-4 b) A-4,B-3,C-2,D-1

   c) A-1,B-3,C-2,D-4 d) A-4,B-2,C-3,D-1

5. The movement of the beam mass in force-balanced micro accelerometer is CO1 [K_1]

usually measured by

a) Voltage change
b) Piezoresistor
c) Piezoelectric
d) Capacitance change

6. The dashpot in a mass-spring vibration system serves the purpose of CO1 [K_1]

a) Damping
b) Deceleration
c) Make system vibrate
d) Acceleration

7. _____is the most used in silicon micromachining: CO3 [K_2]

a) Laser micromachining
b) Micro Electro-Discharge machining
c) Bulk micro machining.
d) Powder Blasting

8. The resonant vibration has the advantage of CO1 [K_2]

a) Simplicity
b) Reliability
c) High sensitivity and precision
d) Repeatability

9. Packaging of optical MEMS requires CO2 [K_2]

a) Sensitive to light
b) Adequate access to light beams
c) Reflection of light beams
d) Absorption of light beam

10. Silicon di-oxide with KOH etchant is_____ slower than silicon. CO2 [K_2]

a) 1000
b) 200
c) 20000
d) 100

PART B (10 x 2 = 20 Marks)

11. List the types of Micro Sensors. CO1 [K_1]
12. Define scaling in geometry. CO1 [K_1]
13. Define the substrates and wafer. CO2 [K_2]
14. Give any four application of polymer in MEMS and its advantages. CO1 [K_2]
15. Define creep deformation. CO1 [K_2]
16. Explain LEFM. CO1 [K_2]
17. List the types of interfaces in Microsystem Packaging. CO1 [K_1]
18. List the types of techniques used in Etch Stop. CO1 [K_1]

19.	What are the major tasks involves in microsystems design?	CO3	[K_3]
20.	Give the application of MEMS in Telecommunications.	CO1	[K_3]

PART C (6 x 5 = 30 Marks)

21.	Define the process behind actuation using piezoelectric crystal.	CO1	[K_2]
22.	Explain CVD process.	CO3	[K_2]
23.	Explain bending of circular plates with edge fixed.	CO3	[K_2]
24.	Explain Bulk micro manufacturing and list the type of etching process.	CO3	[K_2]
25.	Explain about 3-D packaging.	CO1	[K_2]
26.	MEMS application in aerospace industry explain briefly.	CO1	[K_3]

PART D (4 x 10 = 40 Marks)

27.	Define Micro Actuation. Explain any two micro actuators,	CO1	[K_2]
28.	Briefly explain the Photolithography microsystem fabrication process.	CO3	[K_2]
29.	Explain briefly about LIGA process.	CO3	[K_2]
30.	Explain the three levels of Microsystem Packaging.	CO1	[K_2]

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