Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: AE364
Course Name: MEMS/NEMS

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.

Marks

1   a)   Write down the advantages of miniaturization of MEMS devices.   (4)

    b)   Explain scaling in rigid body dynamics using Trimmer Force scaling vector.   (6)

    c)   Write short notes on the different materials used in MEMS industry .   (5)

2   a)   What is the main advantage of DRIE process and how it is achieved?   (6)

    b)   List any four applications of MEMS devices.   (4)

    c)   Differentiate between positive and negative resists.   (5)

3   a)   Write short notes on wet etchants.   (5)

    b)   Explain the working of a typical CVD reactor with neat diagram.   (6)

    c)   Compare microelectronics and microsystems.   (4)

PART B
Answer any two full questions, each carries 15 marks.

4   a)   Explain the different types of mechanical sensors.   (6)

    b)   Explain the need for signal processing in MEMS industry.   (4)

    c)   Explain the working of a microaccelerometer.   (5)

5   a)   Explain the concept of energy conversion and force generation in electromagnetic actuators.   (5)

    b)   What are the different types of reluctance motors?   (4)

    c)   Distinguish between sensors, actuators and transducers.   (6)

6   a)   Explain the working of a capacitive type pressure sensor.   (5)

    b)   Explain the working of an acceleration sensor.   (5)

    c)   Write short notes on piezoelectric actuators.   (5)

PART C
Answer any two full questions, each carries 20 marks.

7   a)   Enlist any four applications of microfluidics.   (4)

    b)   Explain the various types of mechanical micropumps.   (16)

8   a)   Write down the design constraints in MEMS industry.   (8)

    b)   Explain the critical consideration factors in the selection of manufacturing process.   (12)

9 a) Explain three levels of microsystem packaging .   (10)

   b) Explain modeling and simulation of a typical micropump.   (10)

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