CBCS SCHEME

USN

15NT73

Seventh Semester B.E. Degree Examination, July/August 2021

MEMS and NEMS

Time: 3 hrs. Max. Marks: 80

Note: *Answer any FIVE full questions.*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

1 a. Enumerate the concept of miniaturization and list the benefits. **(08 Marks)**
b. Discuss the various steps involved in fabrication of IC's. **(08 Marks)**

2 a. Write a note on micro-sensors and micro actuators. **(08 Marks)**
b. Explain briefly about MEMS packages. **(08 Marks)**

3 a. Define transducer and explain the working of
i) Capacitive transducer ii) Optical waveguide transducer. **(09 Marks)**
b. Explain the working of schottky diode based transducer **(07 Marks)**

4 a. Briefly about :
i) Quartz crystal imbalance ii) Film bulk acoustic wave resonator. **(10 Marks)**
b. Explain importance of cantilever based transducer. **(06 Marks)**

5 a. With a sketch, explain surface and Bulk micro machining. **(10 Marks)**
b. List and explain various etching methods. **(06 Marks)**

6 a. With a sketch, explain the concept of photolithography. **(10 Marks)**
b. Define piezoelectric effect, and explain the various mechanisms involved in it. **(06 Marks)**

7 a. Explain the concept of Reliability and stability. **(06 Marks)**
b. Discuss briefly about the various MEMS failure mechanism. **(10 Marks)**

8 a. Enumerate the concept of CMOS and transmitters. **(06 Marks)**
b. Write a note on : i) Traceability ii) Calibration. **(06 Marks)**
c. Discus the working of signal amplifier. **(04 Marks)**

9 a. Define NEMS, Explain Nano machining of NEMS. **(06 Marks)**
b. List and explain the steps involved in fabrication of NEMS. **(10 Marks)**

10 a. Write a short note on : i) Stencil lithography ii) Sacrificial etching **(08 Marks)**
b. Explain briefly about future challenges and applications of NEMS. **(08 Marks)**

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