

# CBCS SCHEME

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17NT73

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 MEMS and NEMS

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain the four types of MEMS packaging. (10 Marks)  
b. Differentiate between MEMS and IC's. (10 Marks)

OR

- 2 a. Explain the working principle of piezo resistive sensors and piezo ink jet printer. (10 Marks)  
b. Write notes on: (i) Micro-fluids (ii) RF-MEMS (10 Marks)

### Module-2

- 3 a. Define transducer. Explain the working of capacitive transducers. (10 Marks)  
b. Explain the importance of cantilever based transducer. (10 Marks)

OR

- 4 a. Explain the working principle of:  
(i) Electrochemical Transducer (10 Marks)  
(ii) Bipolar Junction Transducer (10 Marks)  
b. Write a note on Acoustic Wave Transducers. (10 Marks)

### Module-3

- 5 a. List and explain the various etching methods. (10 Marks)  
b. Differentiate between Surface and Bulk Micro Machining. (10 Marks)

OR

- 6 a. With a neat sketch, explain the concept of photolithography. (10 Marks)  
b. Describe the thin film techniques and give the applications. (10 Marks)

### Module-4

- 7 a. Define packaging and explain the various packaging technologies. (10 Marks)  
b. Discuss the working of signal amplifiers and signal conditioning. (10 Marks)

OR

- 8 a. Explain the concept of reliability and stability. (10 Marks)  
b. Enumerate the concept of: (i) CMOS (ii) Transmitters (10 Marks)

### Module-5

- 9 a. Define NEMS. Explain Nano Machining of NEMS. (10 Marks)  
b. Explain large scale integration of NEMS devices. (10 Marks)

OR

- 10 a. Explain electron beam lithography with neat sketch. (10 Marks)  
b. Explain briefly the future challenges and applications of NEMS. (10 Marks)

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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.