Code No: 118CY

R13

[3]

(50 Marks)

#### JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B. Tech IV Year II Semester Examinations, May - 2019 MIEMS DESIGN

#### (Mechanical Engineering (Mechatronics))

Firme: Schours

1)

Max. Marks: 75

Note: This question paper contains two parts A and B.

Pan A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of SUries. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

#### PART - A

(25 Marks)

1.30Explain the role of nametechnology in MEMS fabrication. [2] Differentiate between structural and sacrificial materials. [31]b) List out the basic modeling elements in electrical system. 0) [2]What are the features of passive election by systems? d) [3] Explain the working principle of peltiereffect heat pump. 121e). Give the characteristics of shape memory allows 0 [3] What are the uses of beam splitter? (S) [2] hi Explain the principle of optical switch. [3] What are the applications of MEMS inductors > 1) [2] Explain the working of MEMS based phase shiften

#### PART-B

- 2.aDescribe bio and chemo devises.
  - Explain various stages at which impurity doping is done in MEMS fabrication. (6) [5+5]

#### 3.20 Explain the steps involved in photolithography.

Differentiate between bulk and surface micromachining. (b)

#### Explain the features of passive mechanical systems. 4.a)

Describe the basic modeling elements of fluid systems. 60

#### OR

- 5. Explain the steps involved in the modeling of pure mechanical system with spring damper and mass.
- With the help of suitable diagrams explain how flow measurement can be done using 6. integrated paddle-cantilever structure.

#### OR

7. Explain the steps involved in the fabrication of micro-machined thermocouple probe and explain its working.

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