Code No: **RT41035** **R13** **Set No. 1**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

MICRO ELECTRO MECHANICAL SYSTEMS

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) Define MEMS. [3]
   b) Write about peltier effect. [4]
   c) What are the applications of MOEMS? [3]
   d) Write the functions of magneto transistor. [4]
   e) Write the considerations on micro scale fluid. [4]
   f) Write the limitations of chemical micro systems. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain about structural and sacrificial materials. [8]
   b) Describe the MEMS gyroscopes. [8]

3. a) Explain about thermal flow sensors and micro hot plate gas sensors. [8]
   b) Describe U-shaped horizontal and vertical electro thermal actuator. [8]

4. a) Explain about light modulators and beam splitter. [8]
   b) Describe about wave guide and tuning. [8]

5. a) Describe about magneto resistive sensor. [8]
   b) Explain about large force reluctance actuator. [8]

6. a) Explain about dielectro phoresis (DEP). [8]
   b) Describe about RF MEMS and MEMS inductors. [8]

7. a) Explain about chemo capacitors in detail. [8]
   b) Write about electronic nose (E-nose). [8]

Code No: **RT41035** **R13** **Set No. 2**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

MICRO ELECTRO MECHANICAL SYSTEMS

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) Write the history of MEMS. [3]
   b) What is the importance of pyro electricity? [4]
   c) Write the properties of light. [3]
   d) What are the applications of magnetic sensors? [4]
   e) Write the applications of micro fluidic systems. [4]
   f) Write the advantages of bio medical micro systems. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain about thin film deposition, impurity doping and etching. [8]
   b) Describe about shear mode piezo actuator and gripping piezo actuator. [8]

3. a) Explain about thermo couple and micro machined thermo couple probe. [8]
   b) Describe about MEMS thermo vessels. [8]

4. a) Explain the principle of MOEMS technology in detail. [8]
   b) Explain about shear stress measurement. [8]

5. a) Write about mag MEMS actuators and by directional micro actuator. [8]
   b) Describe about magneto diodes and magneto transistor. [8]

6. a) Explain about fluid actuation methods. [8]
   b) Describe the RF – based communication systems. [8]

7. a) Explain about membrane-transducer materials. [8]
   b) Describe about calorimetric spectroscopy. [8]

Code No: **RT41035** **R13** **Set No. 3**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

MICRO ELECTRO MECHANICAL SYSTEMS

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) Write the development of MEMS. [4]
   b) What are the applications of thermal sensors? [4]
   c) Write the functions of optical switch. [3]
   d) What are the applications of magnetic actuators? [4]
   e) Write about electro thermal flow. [3]
   f) What are the applications of chemo resistors. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain about surface micro machining and wafer bonding. [8]
   b) Describe about capacitive measurement and inchworm technology. [8]

3. a) Write about thermistors and thermo devices in detail. [8]
   b) Explain about micro spring thermal actuator. [8]

4. a) Describe about micro lens and micro mirrors. [8]
   b) Explain about grating light valve (GLV). [8]

5. a) Explain magnetic materials for MEMS and properties. [8]
   b) Describe about magnetic probe based storage device. [8]

6. a) Explain about electro wetting and electro osmosis flow. [8]
   b) Explain about tuner/filter, resonator and clarification of tuner. [8]

7. a) Describe about chem.-lab-on-a-chip (CLOC) in detail. [8]
   b) Write about mass sensitive chemo sensors. [8]

Code No: **RT41035** **R13** **Set No. 4**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

MICRO ELECTRO MECHANICAL SYSTEMS

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) Define micro machining. [3]
   b) What are the applications of thermal actuators? [4]
   c) What are the functions of light modulators? [3]
   d) Write about hall effect. [4]
   e) Write about thermo capillary effect. [4]
   f) What are the applications of chemo transistors? [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain principles and methods of lithography. [8]
   b) Describe pressure measurement by micro phone. [8]

3. a) Explain about heat transfer processes. [8]
   b) Illustrate shape memory alloys (SMA) and data storage cantilever in detail. [8]

4. a) Describe about light detectors. [8]
   b) Explain about digital micro mirror device (DMD). [8]

5. a) Explain about magnetic sensing and detection. [8]
   b) Describe about feedback circuit integrated magnetic actuator. [8]

6. a) Describe micro fluid dispenser and micro pumps. [8]
   b) Explain about MEMS switches and phase shifter. [8]

7. a) Write about sensing mechanism and its principle. [8]
   b) Describe about fluroscence detection. [8]