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**Total No. of Pages : 02**

**Total No. of Questions : 08**

**M.Tech. (VLSI D) (2016 & Onwards) EL-IV (Sem.-3)**

**SENSOR TECHNOLOGY AND MEMS**

**Subject Code : MTVL-308**

**M.Code : 74817**

**Time : 3 Hrs.**

**Max. Marks : 100**

**INSTRUCTIONS TO CANDIDATES :**

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

- Q1 (a) How a mask pattern is transferred using lithography? With neat and labeled diagram, illustrate the steps involved in UV Lithography. 15
- (b) What do you mean by stiction phenomena in surface micromachining? Discuss briefly. 5
- Q2. (a) Explain the working of integrated hall sensor with the help of diagram. 10
- (b) What do you understand by photodiode? Explain the working principle of high energy photodiodes with diagram. 10
- Q3. (a) Compare the surface and bulk micromachining processing used for silicon fabrication Technology. 10
- (b) Enlist five advantages of Integrated smart sensors. 5
- (c) Briefly explain buried oxide process in semiconductor technology. 5
- Q4. (a) Explain Surface Acoustic wave and flexural plate wave with the help of diagram. 10
- (b) Discuss briefly any two devices which are using electrostatic actuation. 10
- Q5. (a) Describe the fabrication process for (i) cantilever anchored to silicon substrate by means of oxide layer (ii) directly on the silicon substrate. Which one is better? 10
- (b) What are the merits of combining anisotropic etching to IC technology? Describe the Front-side process flow for the resonant actuator using this technology. 10

- Q6. (a) Enlist the applications of Micro-nozzles. With the help of diagrams explain, how the micromachining in the micro- nozzle can be performed? 10
- (b) Describe the processing steps required to fabricate a resistive gas micro sensor. 10
- Q7. Describe the detailed mass spring model of electrostatically actuated MEMS devices. 20
- Q8. (a) Write a short note on : (i) Membrane Pump (ii) Nano Jets 10
- (b) What conditions should be satisfied to make a micro sensor the smart one? Describe the mass spring model of electrostatically actuated MEMS devices in brief. 10

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**