Roll No. | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 08

M.Tech. (Emb Sys) (Sem.–3)

SENSOR TECHNOLOGY AND MEMS

Subject Code : MTES-PE5B-18

M.Code : 76853

Date of Examination : 12-12-22

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1.Attempt any FIVE questions out of EIGHT questions.

2.Each question carries TWELVE marks.

1. a) Draw the Primary and Secondary flats for n type {100} and p type {100} silicon wafer. 2

   b) With suitable diagram, differentiate between sputtering and e-beam evaporation. 6

   c) What do you mean by Etch Selectivity? Explain with example. 4

2. a) Explain the process of RF magnetron sputtering with the help of diagram. 6

   b) Write the steps of silicon fusion bonding. 6

3. a) What are the three principal Silicon compound materials used in MEMS and Microsystems? Explain briefly about each of them. 1.5+4.5

   b) Enlist all the basic steps in UV photolithography for pattern transfer (with the help of diagrams). 6

4. a) Enlist all methods by which dopants can be introduced into silicon. Explain two of them (with diagrams) which are used for locally varying the dopant concentration. 6

   b) Draw the schematic of MEMS accelerometer and describe its working and application. 6

5. a) What do you mean by pull-in phenomenon? Explain with the help of diagram. Also, derive the expression for pull-in. 6

   b) Write the brief process (in steps) of modeling of MEMS device. 6

6. a) Describe various sensing and actuating mechanism (with one example for each) in MEMS. 6

   b) Write a short note on piezoresistors with one example 6

7. a) What are the applications of polymers in MEMS and explain methods to make polymers electrical conductive. 6

   b) Differentiate between bulk and surface micro machining. Explain the role of sacrificial layer in fabrication of MEMS devices. 6

8. State various deposition techniques. Explain in brief the technique of PVD for MEMS device Fabrication. Also define step coverage and shadowing. 12

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.