Registration no: | | | | | | | | | | |

Total Number of Pages: 01 **B.Tech**

PEEI5405

8th Semester Regular / Back Examination 2016-17

MICRO ELECTRO MECHANICAL SYSTEMS

BRANCH(S):BIOMED, CSE, IT, ITE
Time: 3 Hours
Max Marks: 70
Q.CODE: Z275

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) What is the reason for miniaturization?
b) What is microfabrication? Name two 3D microfabrication techniques.
c) Draw the schematic of a capacitive sensing accelerometer.
d) A plane intercepts the x-, y- and z- axes at 3, 4,2 respectively. Obtain an equation for the plane and write its Miller indices.
e) Name two techniques for Silicon Wafer preparation.
f) Mention some microfluidic techniques
g) Differentiate between wet and dry etching.
h) Enlist one application of BIO MEMS and MOEMS
i) What do you mean by thermal oxidation?
j) Write the expression for calculating the deflectionJ of a cantilever beam when a point load is applied at its free end.

Q2 a) What do you mean by homo and hetero-epitaxy? **(2)**
b) Discuss the CVD process for deposition of Silicon dioxide, silicon nitride, poly-silicon films. **(8)**

Q3 a) Why are polymers used for the design of Microsystem device? Give some examples **(3)**
b) Discuss the Surface Micromachining technique in details with suitable examples and illustrations. **(7)**

Q4 a) Differentiate between LPCVD and PECVD with suitable illustrations. **(5)**
b) Discuss the Electron beam lithography process with suitable schematics. **(5)**

Q5 a) Discuss the steps involved in Ion Implantation of pentavalent impurity in a silicon substrate. **(5)**
b) What is a μ-TAS system? Where does it find its use in MEMS? **(5)**

Q6 a) What is the underlying principle behind MEMS Gyroscope? **(5)**
b) Discuss the Objective and issues of MEMS packaging. **(5)**

Q7 Detail the steps involved in LIGA with suitable illustrations. **(10)**

Q8 **Write short answer on any TWO:** **(5 x 2)**

a) Wafer bonding techniques
b) MEMS Varactor
c) Microlens
d) Etching