Registration No : | | | | | | | | | | |

Total Number of Pages : 01 **M.Tech**
P2AECC14

2nd Semester Back Examination 2018-19
BIO-MEMS & NANOTECHNOLOGY
BRANCH : VLSI & EMBEDDED SYSTEMS DESIGN
Time : 3 Hours
Max Marks : 100
Q.CODE : F557

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) What is use of piezoelectric material in nano-technology?
b) Give an example of wet etched structure of silicon with neat diagram.
c) Give a brief idea about self-aligned vertical mirrors.
d) What are the advantages of mems and microsystems?
e) What is micro fluid dispenser?
f) Discuss FEM.
g) Give a brief idea about 1d, 2d, 3d photonic crystal.
h) Explain abd crystal fibre.
i) Between sensing and communication which one is better and why?
j) What are the essence of nanotech?

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Write down the technologies involved in MEMS.
b) What do you mean by ion implantation wafer bonding? Discuss in detail.
c) Give a brief idea about bulk micro machining.
d) Describe the working principle of micro-actuators.
e) What are the types of pressure sensors in microsensors?
f) Write a short note on micro fluid dispenser.
g) Explain carbon molecules and carbon clusters.
h) Write down the applications of photonic crystal in optical logic gates.
i) Differentiate between micro needle and micro pump.
j) What are the properties of nanomaterials? Also write down the formation of metal nano -clusters.
k) Write a short node on fibre bragg grating.
l) Explain the application drug synthesis and delivery in nanotechnology.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What do you mean by CVD-LIGA process? Explain in detail. Why coating technology used in microsystem? **(16)**

Q4 Discuss piezoelectric crystals and magnetic materials used for MEMS. **(16)**

Q5 Write down the application of bio MEMS in detail. **(16)**

Q6 What are the nano-fabrication methods? Explain nano-materials in human body in detail. **(16)**