SEM- VIII ETRX (CBSGS) 24/5/16

MEMS Technology.

Q. P. Code : 731501

3 Hours Max Marks: 80

N.B.

1) Q. No. 1 is compulsory.
2) Attempt any three out of remaining questions.
3) Assume any suitable data wherever required but justify the same.

1	a	Give few examples of MEMS device which are characterized by sensors and actuators.	20
	b	Explain the sacrificial layer and its role in fabrication of MEMS devices	
	c	What are the characteristics of Micro-heater?	
	d	In case of photolithography, Compare the two types of photo-resist used	
2	a	Discuss the process of photolithography. Mention the types of photolithography suitable for at least two MEMS devices with justification.	10
	b	Discuss selection of material based on applications. Support your answer by considering suitable example.	10
3	a	A 30 μm thick membrane is needed for a pressure sensor application. Calculate the size of the mask opening W needed for the V groove if the full wafer thickness is 600 μm using an-isotropic (Tan 54.74^0) etching below the silicon <100> surface.	10
	b	Explain Dry etching & Wet etching in fabrication process of MEMS devices.	10
4	a	Describe the representative process flow for fabricating the ink jet printer head by Hewlett-Packard. Also explain the operating principle of this MEMS device in detail.	10
	b	Differentiate between bulk and surface micromachining for fabrication of MEMS devices with suitable example	10
5	a	State various Chemical Vapor Deposition Techniques. Explain in brief the techniques of Chemical Vapor Deposition for MEMS device fabrication.	10
	b	Explain transduction pertaining to microfilm strain gauge. State the factors that lead to thin film stress	10
6		Write a short note on (any three)	20
	a	Photolithography(Compare major types of exposure system)	
	b	Anodic bonding	
	c	Reliability of MEMs devices.	
	d	Applications of MEMS in Biomedical Instrumentation	