Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

SIXTH SEMESTER B.TECH (E & C) DEGREE END SEMESTER EXAMINATION - APRIL / MAY 2017

SUBJECT: ELECTRONIC SYSTEM DESIGN (ECE - 4023)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. With neat typical signal flow chain of electronic system design explain different stages of system development.

1B. A 30um thick membrane is needed for a pressure sensor application. Calculate the size of the mask openings needed for the V-groove microstructure if the full wafer thickness is 600um.

1C. IT projects are usually geographically dispersed. The strides in communication technology have enabled this to happen and better results are achieved and passed on to the customers. Miscommunication is a key problem in globally dispersed projects and lead to significant problem. Draw neat Ishikawa diagram to resolve the issue and suggest possible solutions.

(5+3+2)

2A. Draw the noise models for the following circuit elements with relevant equations:

i) Diode ii) BJT.

2B. An amplifier has a voltage gain of 20, an infinite input resistance and zero output resistance. The amplifier is connected to a sensor that produces a voltage of 3V and has a source resistance of 100Ω and to a load resistance of 60 Ω, what will be the output voltage of amplifier. Draw an equivalent circuit of the amplifier, sensor and load.

2C. Realize low pass filter using Operational trans conductance amplifier.

(5+3+2)

3A. What is Heat sink? Explain any two commonly used heat transfer mechanisms in electronic design with mode equations.

3B. Draw thermal circuit for a device with and without a heat sink and give device thermal resistance equations.

3C. A square silicon chip (k=150W/m.k) is of width W=7mm on a side and of thickness t=2mm. the chip is mounted in a substrate such that its side and back surfaces are insulated, while the front surface is exposed to a coolant. If 5W are being dissipated in circuits mounted to the back surface of the chip, what is the steady-state temperature difference between back and front surfaces?

(5+3+2)

4A. Draw and explain the melting point diagram of Tin and Lead alloys in the soldering techniques. Why does the electronic industry employ 63/37 solder?

4B. Explain the working of the typical circuit of switched mode power supply and give its merits and demerits.

4C. Discuss the different technologies used to implement touch screen. State the advantages and disadvantages of each of them.

(5+3+2)

5A. Draw the flow chart of double sided plated through hole printed circuit board and explain. Why cleanliness important in the manufacture of PCBs?

5B. State exponential law of reliability. A multivibrator circuit uses 2 transistors, 8 resistors, 2 capacitors and 2 diodes. It is followed by a buffer circuit consisting of one transistor and three resistors. If the failure rates of resistor, capacitors, diode and transistors are 0.6, 0.6, 0.2 and 0.65 respectively, find MTBF of the circuit in hours. Assume failure rate for 10^6 hours.

5C. Identify the customer needs and write the detailed specifications and suggest suitable environmental tests for any of the following products.

i) Five volts DC supply for laboratory use.

ii) Emergency light for military use in Kashmir.

(5+3+2)