Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

FIFTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION
MARCH 2021
SUBJECT: ELECTRONIC PRODUCT DESIGN AND PACKAGING (ECE - 4303)

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

Instructions to candidates

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

1A. Discuss the Kolb's model of learning. Explain with necessary block diagram the characterization of the design edge product development process with example.

1B. Explain Product Reliability with respect to Manufacturer point of view quantifying MTBF and MTTF.

1C. Draw the circuit diagram for regulated power supply operating on 230V, 50Hz AC signal giving an output voltage of ± 6V and output current of 1A. The supply voltage variation can be taken as $\pm 15\%$ .The load regulation should be more than 0.5% and the output ripple is less than 0.2%. Calculate the value of filter capacitor, RMS current on the secondary side of the transformer, and turns ratio of the transformer.

(4+3+3)

2A. Explain the concept of heat flux for different modes of heat transfer. Discuss any one type of heat sink used in electronic devices with necessary diagram.

2B. Draw the block diagram of the 4-channel data acquisition system and explain the selection parameters of the components in each block.

2C. A square silicon chip of width W=5mm and thickness t=1mm has a thermal conductivity of k=150W/mK. The chip is mounted on the substrate such that its side and back surfaces are insulated while the front surface is exposed to a coolant. If 4W has being dissipated by the circuit mounted on the back surface of the chip calculate the steady state temperature difference between front and back surfaces of the chip.

(4+3+3)

3A. Discuss design considerations for electronic packaging technics. Explain chip scale packages with necessary diagrams and give its merits and demerits comparing to ball grid array.

3B. Discuss double layer PCB manufacturing with flow chart using CAM technique. Explain the need of laminate and plating in printed circuit boards.

3C. In a multilayer PCB signal and ground plane is separated by 0.25inch, common area of two planes is 6.25inch^2. Find the parasitic capacitance for relative permittivity of substrate $\varepsilon_r = 1.5$.

(4+3+3)

4A. Discuss various types of noises in the electronic circuits. Draw the circuit diagram of the low noise amplifier and explain its function.

4B. Discuss the reliability, prediction and measurement issues in the integrated circuits with its consequences.

4C. For a Printed Circuit Board, calculate the width of the track of a micro strip geometry having 50Ω characteristic impedance, relative permittivity 4.2, PCB laminate thickness is of 1.6mm and track thickness of 50 micron.

(4+3+3)

5A. What are the various types of electromagnetic interference in the electronic circuits? Give its effects and explain how to neutralize them.

5B. With neat diagram, explain the cross-talk effects in the electronic circuits. Give the remedies to minimize the cross talks.

5C. Explain the working of switch mode power supply with its block diagram and input output wave forms.

(4+3+3)