MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal)

## FIFTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION JANUARY-FEBRAURY 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. With flow chart discuss the concept of product development with objectives and methodology for developing an app for conducting online exam with the concern of avoiding malpractice. Give the conclusions and comment the same.
- 1B. Discuss Aesthetics and Ergonomics with a case study for a three wheeler smart vehicle to be developed in MIT Manipal as a student project. Give its features.

(6+4)

- 2A. Develop a two phase flow model for a 3D integrated microchannel cooling system for a Processor IC and discuss its function. Compare its merits and demerits with normal cooling system.
- 2B. Discuss the heat transfer path for the microchip with its thermal architecture. Calculate the characteristic impedance for a strip line geometry when the thickness of PCB laminates is 1.5mm and its relative permittivity is 3.0. The width of the track is0.8mm and the thickness is 30microns.

(6+4)

- 3A. Discuss hybrid circuit technology for wafer level packaging. Which type of packaging technics do you prefer for flexible Electronics? Give the comparative graphical curve.
- 3B. The Desktop computer is to be cooled by a fan. The Electronics of the computer consume 75W of power under full load conditions. The computer is to operate in environment at a temperature up to 40°C and elevations upto 2000m, where the atmospheric pressure is 79.50kPa. The exit temperature of the air is not to exceed 75m\min at the exit of the computer case where the fan is installed to keep the noise level down. Calculate the flow rate of the fan that needs to be installed.

(6+4)

- 4A. Realize a MEMS sensor for identifying E-coli bacteria in the drinking water filter. Discuss the methodology with the expected results and comment the same.
- 4B. A power transistor has a thermal resistance of 100° C/W. Calculate the maximum permissible power dissipation, when the  $T_{Jmax}$ =80°C and  $T_A$ =35°C. If the heat sink is used and thermal resistance is reduced to 50°C/W, calculate the maximum permissible power dissipation. Draw the heat flow structure with the heat flow path.

- 5A. Discuss multilayer PCB manufacturing technics with the aid of EDA tool for a mother board having transmitter and receiver sections.
- 5B. Discuss effect of EMI over medical instruments. Explain the technics used for the reduction of Electromagnetic interference.

(5+5)