



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VII SEMESTER B.TECH. (PRINT & MEDIA TECHNOLOGY)

END SEMESTER MAKE-UP EXAMINATIONS, DECEMBER 2019

SUBJECT: SMART PACKAGING [PMT 4004]

REVISED CREDIT SYSTEM

(31/12/2019)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

❖ Answer **ALL** the questions.

- 1A. Differentiate between the working of an Active and Passive RFID Tags.
 - 1B. Explain in detail about the Active Polymer Packages utilized for Non-Meat Food Products.
 - 1C. Write the procedure for application, evaluation and authorization of active and intelligent components in smart packaging.
- [04 + 03 + 03]
- 2A. List the merits and demerits of Direct Thermal and Thermal Transfer for printing Barcodes.
 - 2B. Briefly explain any six motivations to adopt Smart Packaging.
 - 2C. Explain the working of any two type of oxygen absorbers utilized in smart packaging.
- [04 + 03 + 03]
- 3A. What is the importance of Humidity Absorbers utilized in food packaging? Explain.
 - 3B. Explain in detail the general safety considerations to be made for smart packaged materials.
 - 3C. Explain how the extrinsic factor "Temperature" effect the shelf life of a product.
- [04 + 03 + 03]
- 4A. Explain the working of any two types of Barcode Scanners.
 - 4B. Explain in detail the CO₂ Controllers utilized in smart packaging.
 - 4C. Write the principle, merits, demerits and applications of Package integrity test methods:
 - a. Acoustic Imaging
 - b. Gas Tracer detection
- [04 + 03 + 03]
- 5A. Name any four food products and the causes for their spoilage, also mention the appropriate smart packaging system suitable to increase the shelf life of it.
 - 5B. Explain the three important features involved in the smart cards to provide security.
 - 5C. Explain in detail about the non-invasive quality indicators:
 - a. Time-temperature integrators (TTIs)
 - b. Food Quality Indicators.
- [04 + 03 + 03]