Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

VII SEMESTER B.TECH (PRINTING TECHNOLOGY)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: PACKAGING TECHNOLOGY [PME 401]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitable assumed.

1A. A retailer needs a corrugated box of length **500** mm to carry **23** Kg of washing powder. The boxes are expected to stack up to **15** high. The length, width and height of the corrugated box are respectively to be in the ratio **2:1:1**. The fluting medium is of **130** GSM with RCT of **1.6** KN/m and all the liners are made from same paper with equal GSM. Which of the following corrugated box is cheaper for the above specifications? **04**

Three ply box with C flute.

Five ply box with B & C combination flutes.

*(**Note:** Use two decimal place correction for ECT & RCT and Factor of safety = 3)*

1B. With the help of block diagram explain the interlinked organizational responsibility of a package? **03**

1C. Name and explain the method of manufacturing narrow necked bottles with a neat diagram. **03**

2A. Explain the steps involved in designing a cushion package. **04**

2B. What is the significance of performing ply bond strength test on packaging boards? Explain the procedure for calculating delaminating energy with a neat sketch. **03**

2C. What are the three types of fillers used in vertical form fill seal machines? Explain these with suitable examples. **03**

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3A. With a neat sketch explain the working of two types of antimicrobial films used in smart packaging. **04**

3B. What are the different packaging criteria groups? Explain. **03**

3C. Draw and explain the various stages in stretch blow molding process. **03**

4A. Which kind of die would you prefer for large scale precision carton making? Explain the steps involved in making such dies with neat sketch. **04**

4B. List three categories of product that requires special glass design features? Explain its special design considerations. **03**

4C. Explain the procedure involved in conducting following package test. **03**

i. Fungus resistance test **ii.** Salt spray test

5A. Explain the structure and working of RFID and Electronic Product Code in smart packaging. **04**

5B. A glass bottle manufactured for the use of storing certain chemical is required to be tested in the laboratory. The bottle measures **450** mm long. The diameter and wall thickness is **150** mm and **12** mm respectively. The product to be filled has the temperature of **85** ^{o}C and expected pressure inside the bottle will be **95** kg/m^2 during its use. Assuming the material constant and atmosphere temperature as **0.45 & 30** ^{0} C respectively, calculate the thermal stress and limiting hoop stress in the glass bottle. **03**

5C. What is dynamic cushion curve? Explain five important cushion characteristics for packaging with examples. **03**

6A. Explain various methods of corrosion prevention in packaging with suitable examples. **04**

6B. Some crisps, sealed in a bag made from 25 μm low density polythene, gained 1.4 g in nine days, and 8.6 altogether when the bag was cut open and re-exposed. What type of wrapping would be required to give a shelf life of 98 days under the same conditions, assuming that a total gain of 3.95 g could be tolerated without loss of texture? **03**

6C. Explain the working of carbon dioxide emitters in smart packaging. Give example. **03**