Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

VI SEMESTER B.TECH (PRINT AND MEDIA TECHNOLOGY)

END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: PACKAGING TECHNOLOGY - I [PME 312]

REVISED CREDIT SYSTEM

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:

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

1A. With a neat sketch explain the procedure involved in calculating ply bond strength of packaging board. **04**

1B. Explain the types of flexible packaging with suitable examples. **03**

1C. Illustrate six types of metal tube finish shapes and give one application for each. **03**

2A. With a neat diagram explain the manufacturing process of a necked Draw-and-Iron metal can. **04**

2B. The glass bottle manufactured for storing industrial chemicals is required to resist a limiting hoop stress of 325 Kg/mm^2. The fill height of glass bottle measures 425 mm. The diameter of glass bottle is 0.15 meters. The product is expected to be filled at the temperature of 82 °C. The expected internal pressure inside the glass bottle is 98 Kg/mm^2. Assuming the glass material constant and temperature of atmosphere as 0.45 & 36 °C respectively, Calculate the thermal stress in the glass bottle. **03**

2C. Which type of plastic film is called backbone of food and confection industry? Name and list the five applications of such plastic films in packaging. **03**

3A. An industrial bearing manufacturer requires a square shaped corrugated box of width 370 mm to carry a gross weight of 22 kg for military applications. The height of one full stack of boxes are 525 cm. All the flutes are made from 140 GSM kraft paper with 1.8 KN/m. All the liners are made from same paper with **04**

equal GSM. Which of the following box will be cheaper for given specifications? Take Factor of Safety = 3.

    i. 3 ply, B flute box.

    ii. 5 ply, B&C combination flute box.

Note: Use two decimal place correction for ECT and RCT values.

3B. Explain polymer chain branching in Polyethylene. What are the effect of branching on the properties of polyethylene for packaging applications? **03**

3C. Explain the process of can welding in three piece can making with neat diagram. **03**

4A. Which type of bottle manufacturing process is used to produce wide mouth bottles? Explain such process with neat sketch. **04**

4B. Explain the influence of polarity on the plastic packaging materials with suitable examples. **03**

4C. With a neat diagram explain the operation of aerosol valve used in metal cans. **03**

5A. Explain four methods of laminating aluminum foil. List one advantage for each method. **04**

5B. With a neat diagram explain the interlinked organizational responsibility of a package. **03**

5C. Explain the procedure involved in measuring the following properties of plastic packaging materials. **03**

    i.   Impact strength   ii. Grease and oil barrier   iii. Haze

6A. Explain three types of adhesives used in the construction of adhesive tapes. What are their advantages? **04**

6B. With a neat sketch explain the product life curve. **03**

6C. Some biscuits, sealed in a bag made from 30 μm low density polythene, gained 1.4 g in seven days, and 8.6 altogether when the bag was cut open and re-exposed. At what time would it have gained exactly 6.8 g of moisture, if the packaging material is changed to 120 μm low density polythene? **03**