Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

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

END SEMESTER EXAMINATIONS, NOV 2017

SUBJECT: PACKAGING DESIGN AND TESTING [PMT 4101]

REVISED CREDIT SYSTEM
(16/11/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A. With a neat sketch explain the test conducted on transport package to evaluate its resistance against shunting shocks.

1B. Offset press blankets comes in a batches of 150 in a corrugated carton box weighing 62 Kg per carton. The maximum permissible load on the carton is 750 Kg. One full truck load containing 300 cartons has just arrived to the company stores. Calculate the maximum number of boxes that can be stacked for safe storage. Also calculate the load exerted on fifth carton from bottom of a full stack. The height of single carton box is 30 cm.

1C. Explain the process of manufacturing of two-piece drawn and wall ironed (DWI) metal cans with a neat sketch.

[04 + 03 + 03]

2A. A logistic company needs a corrugated box of width 280 mm to carry 22 Kg of tea powder. The boxes are required to be stacked up to 14 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 1.8 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?

a. Three ply box with C flute.

b. Five ply box with B & C combination flutes.

*(**Note:** Use two decimal place correction for ECT and RCT)*

2B. Explain the steps in designing optimized cushion system for packaging.

2C. With a neat diagram explain the process of metal can welding.

[04 + 03 + 03]

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3A. With a neat sketch explain the working of screw type injection molding machine.

3B. Explain the working of aerosol packaging system with a neat sketch.

3C. With a neat sketch explain the test conducted to evaluate the compression strength of transport package.

[04 + 03 + 03]

4A. With a neat sketch explain the stages in pressure bubble vacuum forming.

4B. A glass bottle manufactured for the use of storing certain chemical is required to be tested in the laboratory. The bottle measures 415 mm long. The radius and wall thickness of the bottle are 82 mm and 12 mm respectively. The product to be filled has the temperature of 82 ^{o} C and expected pressure inside the bottle will be 96 kg/m^2 during its usage. The material constant and atmosphere temperature are 0.45 & 31 ^{0} C respectively. Calculate the thermal stress and limiting hoop stress due to pressure in the glass bottle.

4C. Explain various types of flexible packaging with suitable examples.

[04 + 03 + 03]

5A. Explain the steps in stretch blow molding with a neat sketch. What are its advantages?

5B. With a neat diagram explain the stages in the manufacturing of narrow mouthed glass bottles.

5C. What are the three types of fillers used in vertical form-fill-seal machines? Explain.

[04 + 03 + 03]

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