Ref. No.: Ex/PRN/T/315/2019

BACHELOR OF ENGINEERING IN PRINTING ENGINEERING
3RD YEAR FIRST SEMESTER EXAMINATION 2019
PACKAGING TECHNIQUES-II

Full Marks: 100 **Time: 03 Hrs.**

Answer any five questions

1. (a) Why assessment of journey hazards is necessary?
   (b) How the best packaging material for fragility protection be selected?
   (c) How can you prevent the package with a content from mechanical shock and strength?
   (d)Why hermetically sealed container creates problem during air transportation?

   4x5=20

2. (a)How the nature of the packaged products changes by the influence of moisture?
   (b)How can a packaged article be subjected to forced vibration? Illustrate with examples.
   (c)How can you compare the efficiencies of two or more packages of the same product?

   6+6+8=20

3. (a)Explain the working principle of accelerometer. How can you measure 'G' reading of packaged article during drop test with the help of an accelerometer?
   (b)How can you determine the amount and number of units of desiccant required to maintain a specific relative humidity within a container?

   10+10=20

4. (a) Draw the arrangement of roller conveyor for carrying rectangular shaped packages and round shaped packages and also mention the design parameters of the conveyor by showing in the diagram.
   (c)What will be the arrangement of rollers for conveying very small packaged items?

   15+5=20

5. (a)Derive the exponential decay relation of moisture sensitive packaged item.
   (b)From this relation how can you determine the half-value period of the moisture sensitive packaged item?
   (c)From the half value period how can you determine the shelf life?

   10+4+6=20

6. (a) Draw the theoretical curves of transmissibility against frequency ratio for damped and undamped conditions. From these curves explain the main design considerations of the shipping container for the effective isolation of vibratory forces emanating from a freight car to which the container is rigidly attached.

(b)For investigational testing of a package of size 40 inch x 30 inch x 24 inch weighing 10 kg gross and holding 80 cartons in two layers arranged in 8x5. Each carton having glass bottles, stoppers of which are pointed towards 40 inch x 30 inch face.

i)Show the above arrangement with a neat sketch.
ii)How many positions of falls can be made during drop test? Mention the positions.

12+8=20

7. (a)Distinguish between horizontal impact and vertical impact on the packaged items during distribution.
(b)Distinguish between impact load factor and cushion factor
(c)If a package weighing 100 lb. supported by cushion is dropped from 30 inch and has a maximum cushion deformation of 2 inch, what force will be exerted on the package? What will be the load factors for both crushing type and elastic type cushioning material?
(d)What deformation of an elastic type cushioning material will be required to limit the load factor of a packaged item to 30 if a boxcar is stopped from a speed of 20 miles per hour in a distance of 2.0 inch?

4+4+6+6=20