

BACHELOR OF ENGINEERING IN PRINTING ENGINEERING
2nd YEAR 2nd SEMESTER EXAMINATION 2025
PACKAGING TECHNIQUE-II

Full Marks: 100

Time: 03 Hrs.

Answer Q.1 and any six questions from rest

1. A) Which of the following is not a key factor in efficient package distribution?
- i) Effective transportation planning
 - ii) Optimized warehouse management
 - iii) Accurate customer data
 - iv) Minimal focus on packaging material cost
- B) What type of hazard can occur when a box is dropped during handling?
- i) Chemical hazard
 - ii) Biological hazard
 - iii) Physical hazard
 - iv) Environmental hazard
- C) What type of hazard can be caused by improper warehouse stacking?
- i) Chemical hazard
 - ii) Biological hazard
 - iii) Physical hazard
 - iv) Environmental hazard
- D) Which of the following is not a factor that can impact shelf life?
- i) Temperature during storage
 - ii) Humidity during storage
 - iii) Type of packaging material
 - iv) The color of packaging
- E) What is the main function of a barrier material in food packaging?
- i) To make the packaging waterproof
 - ii) To protect the food from oxygen and moisture
 - iii) To improve the aesthetics of the packaging
 - iv) To make the packaging recyclable
- F) What is the purpose of a drop test in package testing?
- i) To simulate the impact of vibration on the package
 - ii) To determine the structural integrity of the package after a fall
 - iii) To measure the moisture permeability of the packaging material
 - iv) To evaluate the heat resistance of the package

[Turn over

- G) Which test simulates the conditions of prolonged storage and transportation, such as temperature and humidity fluctuations?
- i) Drop test
 - ii) Vibration test
 - iii) Climatic testing
 - iv) Compression testing
- H) Which of the following material is used as a primary package in bread?
- i) HDPE
 - ii) LDPE
 - iii) PS (polystyrene)
 - iv) PVC
- I) The sequence of a typical manufacturing supply chain is
- i) Storage-Supplier-manufacturing-storage-distributor-retailer-customer
 - iii) Supplier-Storage-manufacturing-storage-distributor-retailer-customer
 - iv) Supplier-Storage-manufacturing-distributor-storage-retailer-customer
 - v) Supplier-Storage-manufacturing-storage-retailer-distributor-customer
- J) The term.....refers to any idle resources that can be put to some future use.
- i) Inventory
 - ii) Warehousing
 - iii) Logistics
 - iv) Procurement

10x1 = 10

2. (a) Discuss about the possible hazards during distribution of packaged items. Why assessment of journey hazards is necessary?
 (b) How the best packaging material for fragility protection be selected?

10+5

3. (a) How can you find the thickness of a particular cushion being used more efficiently for good cushioning design in a package? Is it at all necessary and why?
 (b) How can you prevent the package with a content from mechanical shock and strength?
 (c) Distinguish between impact load factor and cushion factor.

6+5+4

4. (a) What is the relation between the packaging cost and loss through damage during transport and handling system? Describe the effect of technological development in an improved packaging material on it.
 (b) Describe the principle of the method for determining the amount (weight and number of units) of desiccant required to maintain a specific relative humidity within a container.

8+7

5. (a) 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?
 (b) An item to be packaged weighs 30 pounds, and the supporting suspension system has a spring constant of 100 pounds per inch. The package is to be shipped by rail freight in train that will be a forcing frequency of 4.0 cycles per second at near about 60 miles per hour. Find the transmissibility of the suspension system used in the package if (i) no damping is provided, (ii) the system has a damping ratio of 0.375, and (iii) if the spring constant is increased to 320 pounds per inch. [a) no damping b) damping ratio of 0.375]. Comment on your answers from the design point of view.

5+10

6. (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?

5+5+5

7. How can you determine the half-value period of a moisture sensitive package? Is it the shelf life of the package at service conditions? If not, how can you determine this life?

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8. Five packets of cigarettes overwrapped in moisture proof cellulose film are initially weighed in grams and given 33.145, 32.796, 32.771, 32.175 and 32.203 respectively. They are exposed to a storage atmosphere of 25°C and 75% R.H. and re-weighed at intervals upto 16 days. Due to moisture gain the following gains in weights of the packets are given below.

Packet No.	Gains after x days' storage (in grams)		
	x=2	x=7	x=16
1	0.079	0.0198	0.412
2	0.088	0.233	0.480
3	0.079	0.197	0.420
4	0.074	0.190	0.406
5	0.046	0.227	0.489

The packets are then completely opened to expose the whole of the contents to the storage atmosphere and allowed to come to equilibrium. The final weights are 36.409, 35.950, 35.887, 35.188 and 35.216 grams respectively.
 Determine the half-value period of the cigarette packet.

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9. (a) Draw the arrangement of roller conveyor for carrying rectangular shaped box packages and round shaped packages. Also mention the design parameters of the conveyor by showing in the diagram.
- (b) Draw the theoretical curves of transmissibility with the variation of frequency ratio of a package for different damping including no damping.
From these curves mention the design considerations of a package to isolate vibratory forces.

7.5+7.5