



The present work, produced by the [ECOSIGN Consortium](#), is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](#).

# Ecodesign in food packaging

## UNIT 9: Paper and cardboard Packaging

### Quiz and Assignment

Gabriel Laslu, Dipl. Eng. (IDT1), [gabriel.laslu@gmail.com](mailto:gabriel.laslu@gmail.com)

Quiz .....2

Assignment .....5



## Quiz

1) The most popular cellulosic materials for paper making are:

- A. Conifers.
- B. Cotton and rice
- C. Flax and hemp

Answer A.

2) Types of paper used in the field of packaging:

- A. Untreated paper and paper containing synthetic fibers.
- B. Chemically treated paper (waxed paper) and paper coated with aluminum, cellophane, polyethylene
- C. Untreated paper for non-resilient inferior packaging;  
Paper containing synthetic fibers;  
Chemically treated paper for packaging (waxed paper);  
Paper coated with aluminum, cellophane, polyethylene.

Answer C

3) Cardboard types used for packaging:

- A. Wax-laminated carton, LDPE or compounding compounds in the composition which increase the barrier properties; duplex (custom) carton for offset printed packages; carton triplex for transport packaging, high resistance to cracking;
- B. Corrugated cardboard, with mechanical strength and good elasticity, mechanical protection;
- C. Wax-laminated cardboard, LDPE or compounding compounds in the composition which increase the barrier properties;
  - Duplex (custom) carton for offset printed packages (Cellulose material with a gray face and a white face with good machining capacity. After laser cutting the edge remains carbonized, dark brown);
  - Triplex carton for transport packaging, high resistance to cracking;



- Corrugated cardboard, with mechanical strength and good elasticity, mechanical protection especially used for secondary and tertiary packaging.

Answer C

4) Paper and cardboard can acquire barrier properties for grease, moisture, light, O<sub>2</sub>, temperature resistance, the possibility of hot welding, for packaging of liquids by:

A. Coating and lamination with plastics such as polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET / PETE) and ethylene vinyl alcohol (EVOH).

B. Coating and lamination with plastics, such as polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET / PETE) and ethylene vinyl alcohol (EVOH) and with aluminum foil, wax and other treatments.

C. Coating and lamination with aluminum foil, wax and other treatments.

Answer B

5) The usual carton used for packaging the liquids is made up of several layers as follows:

A. The outer layer of polyethylene (LDPE) protects the print (ink layer) and allows welding of the flaps of the packaging; Bleached paper is the print media; uncoated paper (kraft) provides the necessary mechanical rigidity to the packaging; the inner polyethylene layer provides barrier properties to liquids and allows the edges to be joined by thermal insulation.

B. Bleached paper for print media; uncoated paper (kraft) provides the necessary mechanical rigidity to the packaging; the inner polyethylene layer provides barrier properties to liquids and allows the edges to be joined by thermal insulation.

C. The outer layer of polyethylene (LDPE) protects the print (ink layer), allows welding of the flaps of the packaging and makes the seal against the outside environment; Bleached paper is the print media; uncoated paper (kraft) provides the necessary mechanical stiffness to the packaging.

Answer A.

6) The aseptic carton used for packaging the liquids consists of several layers, as follows:

A. Polyamide - protects against external moisture, Cardboard - for stability, Polyethylene - adhesive layer, Aluminum foil - O<sub>2</sub> and light barrier, Polyethylene - adhesive layer, Polyethylene in contact with food.

B. Cardboard - for stability, Polyethylene - adhesive layer, Aluminum foil - O<sub>2</sub> barrier and light.



C. Cardboard - for stability, Polyethylene - adhesive layer, Aluminum foil - O2 and light barrier, Polyethylene - adhesive layer, Polyethylene in contact with food.

Answer A.

- 7) THE EUROPEAN DECLARATION OF PAPER RECYCLING 2016-2020 covers all paper and cardboard products, it includes the 28 EU Member States plus Switzerland and Norway. Regarding Eco-design, among the objectives and objectives of the Declaration are:

A. By 2020, there should be a ban on landfill storage of recyclable paper.

B. Exclusion of materials known to be carcinogenic, mutagenic or toxic to reproduction as well as hazardous adhesives and inks, reduction of product mass, re-use of packaging or extension of life, reduction of environmental impact of generated waste, reduction of harmful and dangerous substances in materials and products.

C. The European Commission must take action against countries where selective waste collection is not carried out.

The waste hierarchy must be implemented, including energy from waste and renewable energy.

Answer B.

- 8) Plant cells are made up of cellulosic fibers connected. During the pulp pulp extraction process for paper and cardboard manufacture, these microscopic fibers are separated from one another by chemical or mechanical processes. Which procedure is most used in paper making:

A. Both processes are equally used, the quality of the paper being the same.

B. The chemical process by which lignin is eliminated, the process yield being 45-50%.

C. The mechanical process that does not eliminate lignin, the yield of the process being  $\leq 95\%$ .

Answer B.

- 9) When manufacturing paper and cardboard, pastes consisting of:



- A. Cellulose pulp dispersed in water in 50% fiber, 50% water.
- B. Cellulose pulp dispersed in water in a proportion of 10% fiber, 90% water.
- C. Cellulose pulp dispersed in water at 2% fiber, 98% water.

Answer C.

10) The operations performed by the paper machine are:

- A. Casting the paper pulp onto an endless sieve; partially removing water from the paper pulp, by special absorption devices, and by continuously shaking the web; the formation of the paper web due to the fusing of the paper materials as a result of the loss of water; dehydration of the paper tape by pressing and heating; smoothing, cutting and possibly winding the paper on the roll.
- B. Formation of the paper web due to the fusing of the paper materials as a result of the loss of water; dehydration of the paper tape by pressing and heating; smoothing, cutting and possibly winding the paper on the roll.
- C. Casting the paper pulp onto an endless sieve; dehydration of the paper tape by pressing and heating; smoothing, cutting and possibly winding the paper on the roll.

Answer A

## Assignment

Develop at least one of the following tasks:

1. Comment EU prescriptions on eco-design for paper and cardboard recovery and recycling. (See also Video Presentation Chapter 9 Part 1)
2. Briefly describe the methods for improving the barrier properties of paper and cardboard packaging. (See also Video Presentation Chapter 9 Part 2)
3. Indicate the main methods for obtaining paper and cardboard. Comment on the advantages and disadvantages of each. (See also Video Presentation Chapter 9 Part 3)

