

# System Design for Sustainability

## Week 1: Practice Questions

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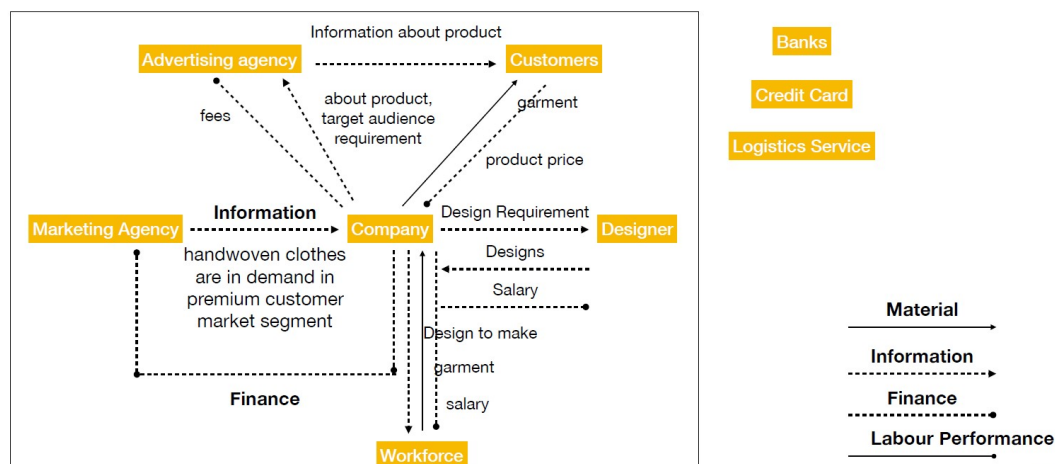
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1. Which of the following would you consider to be the most sustainable?

Use case: A toothbrush for daily use.

- (a) An electric toothbrush with plastic body and replaceable AA batteries. The toothbrush head needs replacement every 6 months. Priced at ₹899.
  - (b) A bamboo toothbrush with Nylon bristles. Priced at ₹125.
  - (c) A regular toothbrush with plastic handle and plastic bristles. Priced at ₹110.
  - (d) Neem stick. Priced between ₹2 to ₹4.
2. In what ways does Cradle to Cradle design imitate nature's ways? Check all correct answers.
- (a) Infinite circulation of nutrients in products.
  - (b) Making products that look more like nature.
  - (c) Upcycling of materials into other products.
  - (d) Minimization of waste generated during production processes.
  - (e) Follows a "butterfly diagram" for inputs and outputs of products.
3. Which of the following is **not** a part of the Cradle to Cradle certification standard?
- (a) Clean Air and Climate Protection
  - (b) Water and Soil Stewardship
  - (c) Low Energy Usage
  - (d) Product Circularity
  - (e) Social Fairness
4. Which of the following is/are **not** examples of a system?
- (a) A bowl of fruit
  - (b) A football team

- (c) A vending machine
- (d) Earphones
- (e) A watch
5. What are the key differences between an open and closed system? Check all correct answers.
- (a) A closed system does not interact with its environment. An open system does interact with its environment.
- (b) A closed system does not receive feedback, whereas an open system does.
- (c) An open system transforms over a period of time, whereas a closed system does not.
- (d) An open system is always a natural system, and closed system man-made.
6. Consider a thermally insulated coffee mug as a system. Which of the following statements about its system hierarchy are correct? Check all correct answers.
- (a) The cap of the mug is a sub-system.
- (b) The steel straw (if it comes with one) is a sub-system.
- (c) The handle (with which it is carried) is a sub-system.
- (d) The insulation material is an element of a sub-system.
- (e) The sipper is a sub-system.
7. Please study the given diagram of a conceptual sketch of a product-service system. In the list of statements that follow, check all options that apply and are correct.



- (a) There are multiple stakeholders to be considered in a PSS design.
  - (b) Not every stakeholder matters for design.
  - (c) The design process is not always optimized for product lifecycle.
  - (d) Different flows of materials and information are shown by different types of arrows, as per the legend.
8. In what ways can a PSS design be more sustainable than a product design? Check all correct answers.
- (a) It encourages the businesses to increase the longevity of products.
  - (b) Since the revenue stream is not dependent only on the product, it encourages lower consumption of products by users.
  - (c) Services can add value to the product lifecycle.
  - (d) Services are more profitable than products.
  - (e) Services reduce lack of social equity