**Unit 1 Test Study Guide**

**Universal Systems Model**

Feedback

Output

Process

Input

|  |  |  |
| --- | --- | --- |
| Input Types   * People * Materials * Tools/Machines * Energy * Information * Finances * Time | Process Types   * Problem solving * Production * management | Outputs   * Desired vs undesired * Intentional vs unintentional * Instantaneous vs delayed |

Engineering Design Process

1. Define the Problem
2. Do background research
3. Specify requirements
4. Brainstorm a solution
5. Choose a solution
6. Do development work
7. Build a prototype
8. Test and redesign

Vocab to know

* Criteria: A standard or aspect of a design that can be measured
* Constraint: Limitation or condition that must be satisfied by a design
* Prototype: A first working model or product from which other forms are developed

**Exhaustive list of engineering career titles which you might encounter in this course:**

|  |  |
| --- | --- |
| * Aeronautical Engineer * Aerospace Engineer * Agricultural Engineer * Agricultural Technician * Application Engineer * Architectural Engineer * Automotive Engineer * Biomedical Engineer * Biotechnology Engineer * Chemical Engineer * Civil Engineer * Communications Engineer * Computer Engineer * Computer Hardware Engineer * Computer Programmer * Computer Science Technician * Computer Software Engineer * Construction Engineer * Consultant * Development Engineer * Drafter * Electrical Engineer * Electrician * Electronics Technician * Energy Transmission Engineer * Environmental Engineer * Facilities Technician * Fire Protection Engineer * Geothermal Engineer * Hazardous Waste Engineer * Hazardous Waste Technician * Human Factors Engineer * Industrial Engineer * Industrial Engineering Technician * Licensing Engineer * Manufacturing Engineer * Manufacturing Processes Engineer * Manufacturing Technician | * Marine Engineer * Materials Engineer * Materials Lab & Supply Technician * Mechanical Engineer * Metallurgic Engineer * Mining Engineer * Naval Engineer * Network Technician * Nuclear Engineer * Ocean Engineer * Operations Research Engineer * Packaging Engineer * Packaging Technician * Petroleum Engineer * Pharmaceutical Engineer * Plastics Engineer * Power Systems Engineer * Product Design Engineer * Project Engineer * Project manager * Prototype Engineer * Quality Engineer * Quality Technician * Radio/TV Broadcast Technician * Radiology Engineer * Researcher * Safety Engineer * Software Engineer * Sound Technician * Structural Engineer * Survey Technician * Systems Design Engineer * Technical Sales Manager * Technical Writer * Telecommunications Engineer * Textile Engineer * Transportation Engineer |

**Unit 1 Practice Test**

1. What are the five components of a technology system?
   1. **Goals, Inputs, Processes, Outputs, Feedback**
   2. Computers, Electricity, People, Printers, Time
   3. Time, Energy, Finances, Information, Materials
   4. People, Materials, Machines, Products, By-Products
2. Which of the following is consumed or processed by a technological system?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Goals. | c. | **Inputs.** |
| b. | Feedback. | d. | Outputs. |

1. Technology Systems aim to accomplish what?

|  |  |  |  |
| --- | --- | --- | --- |
| **a.** | **Goals** | c. | Standards |
| b. | Guidelines | d. | Win the MVP Award |

1. What is the term for the finished product and other by-products of a system?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Goals | c. | Inputs |
| **b.** | **Outputs** | d. | Feedback |

1. Which of the following is **NOT** one of the three main types of processes of a technology system?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Production | c. | **Transformation** |
| b. | Management | d. | Problem Solving |

1. What is the goal of the problem solving process?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | **To select the best solution** | c. | To find problems without a solution |
| b. | To find as many problems as possible | d. | To explain why natural processes occur |

1. Which of the following is **NOT** a type of input?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Time | c. | **Ideas** |
| b. | Money | d. | People |

1. What is Feedback?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Food in the back of the refrigerator | c. | **Information used to regulate a system** |
| b. | Scrap materials used for production | d. | Information processed more than once |

9) This field of engineering is interested in the safety of people, animals and ecosystems. a) Sanitary

b) Environmental c) Agricultural

d) Biological

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10) This type of engineer is involved in the discovery, extraction, and processing of raw materials.

a) Mineral and Mining b) Rock

c) Geological d) Materials

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11) Areas in the agricultural field of engineering include:

a) food production, detergents, and plastics b) hardware, antique tools, and houseplants c) cows, ponies, and pigs

d) food processing, soil and water, and aquaculture

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12) This type of engineer may design pharmaceuticals, food products, detergents, plastics, paints, petroleum products, and other substances.

a) Medical

b) Mechanical c) Chemical

d) Genetic

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13) A structural engineer might a) design a skyscraper

b) design a storefront layout c) design house interiors

d) design cityscapes

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14) These engineers are responsible for the design development and operation of ships, boats, and submarines.

a) Sea

b) Marine and Ocean

c) Vessel

d) Nautical

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15) An electrical engineer might design:

a) a computer circuit board

b) a tunnel

c) an ore extracting device

d) a space exploration probe

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16) An acoustical engineer might work with which type of person

a) A sports announcer

b) A preacher

c) A symphony organizer

d) All of the Above

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Complete each statement (17-21) using the terms provided in the Word Bank below.

|  |  |  |
| --- | --- | --- |
| **Word Bank** | | |
| Industrial | Aerospace | Food process |
| Robotics | Marine and Ocean | Petroleum |

17) A Aerospace engineer might be responsible for the design of a Boeing 747.

18) Sally Mason is involved in the entire process of mass-producing a product. She is currently working on quality control from Yummy Toothpaste. Sally is probably a industrial engineer.

19) A Food Process engineer is responsible for the processing, handling, packaging and   
equipment for the food industry.

20) A Petroleum engineer might work in conjunction with a Marine & Ocean engineer to

remove an oil spill from the ocean.

21) A Robotics engineer is responsible for the design of products such as space

exploration probes, automated devices used in manufacturing and other autonomous devices.

Other questions to expect:

* Given an Engineering problem, how would you apply the engineering design process to solve this problem (break it down step by step)

Example: Given the engineering problem of constructing an apartment building to house 500 people, how might you apply the engineering design process?

* Given a system, identify the inputs, process, output and feedback. (Think back to the Universal Systems Model, “size up the systems” assignment.