## Question Bank

# SYSTEM ENGINEERING

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Short answer type questions.

# UNIT I

1. **Discuss the use of different systems engineering process models in terms of their optimal use for various system developments.**

While the term *systems engineering* can be traced back at least to the 1940s, to this day no single, universal definition of the term exists. Frequently, *systems engineering* is defined by the context in which it is embedded.

2. **System engineering bridges the traditional engineering discipline "justifies this sentence.**

   Prior to World War (WW) II, architects and civil engineers were, in effect, the Systems Engineersof their time, on large, primarily civil engineering projects such as: the Egyptian pyramids, Roman aqueducts, Hoover Dam, the Golden Gate Bridge, and the Empire State Building. Other architects covered trains and large ships. Nevertheless, these early Systems Engineers operated without any theory or science of Systems Engineering or any defined and consistently-applied processes or practices.

   During WW II a project manager and chief engineer could oversee the development of an aircraft program if assisted by leaders for key subsystems, such as propulsion, controls, structure, support systems, etc. Some additional elements of Systems Engineering, such as operations research and decision analysis, gained prominence during and after WW II. Today, with more complex requirements and systems, the chief engineer uses a Systems Engineering team to help him with requirements development and to work with all the project teams.

3. **What is systems engineering, give examples?**

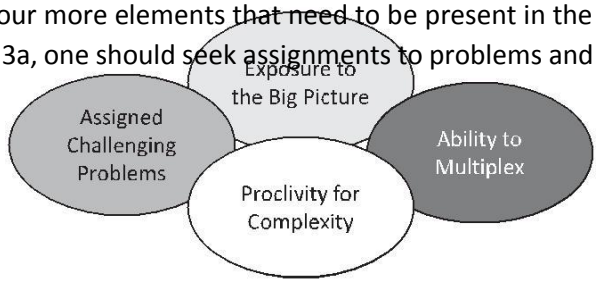
   According to one definition of the classical practice, systems engineering is "an interdisciplinary approach to translating users' needs into the definition of a system, its architecture and design through an iterative process that results in an effective operational system. Systems engineering applies over the entire life cycle, from concept development to final disposal

## 4. Give any five examples of systems requiring systems engineering

As noted at the beginning of this chapter, the generic definition of a system as a set of interrelated components working together as an integrated whole to achieve some common objective would fit most familiar home appliances. A washing machine con-sists of a main clothes tub, an electric motor, an agitator, a pump, a timer, an inner spinning tub, and various valves, sensors, and controls.

## 5. What is systems engineer career development model, give phases of it?

When one has the characteristics noted above and is attracted to become a systems engineer, there are four more elements that need to be present in the work environment. As shown in Figure 1.3a, one should seek assignments to problems and tasks that are




## 6. Describe perspectives of systems engineering.

While the field of systems engineering has matured rapidly in the past few decades, there will continue to exist a variety of differing perspectives as more is learned about the potential and the utility of systems approaches to solve the increasing complex problems around the world. The growth of systems engineering is evidenced in the number of academic programs and graduates in the area. Some surveys note that systems engineering is a favored and potentially excellent career path. Employers in all sectors, private and government, seek experienced systems engineering candidates.

## 7. Give ten systems domains & also explain it?

With a broad view of system development, it can be seen that the traditional approach to systems now encompasses a growing domain breadth. And much like a Rubik's Cube, the domain faces are now completely integrated into the systems engineer's perspective of the "big (but complex) picture." The systems domain faces shown in Figure 2.4 include not only the engineering, technical, and management domains.

## 8. Explain systems engineering fields,give their names?

Systems engineering grew out of a need for specialized engineering disciplines to be able to work together. They focus on making different components, produced by specialty engineers, work as a cohesive and efficient system. Systems engineers also repair and improve upon existing systems as new technologies emerge.

A college degree in systems engineering provides the necessary skills needed to interact with professionals engaged in a broad field of disciplines. Systems engineers must think holistically, taking into account every aspect of a project, including the costs, environmental concerns, timeframes, and life expectancy of equipment.

## 9. What is systems engineerng approaches?give example?

Systems engineering can also be viewed in terms of the depictions of the sequence of processes and methodologies used in the execution of the design, development, integration, and testing of a system (see Figure 2.6 for examples). Early graphics were linear

## 10. Write origin and evolution of systems engineering ?

Systems are entities composed of well-defined components. When integrated the components act together as to form a functioning whole with dynamical beha viors and responses to the environment. Systems can be embedded into other functional enti ties as components. dentifying a system or a hierarchy of systems requires a certa in level of abstraction and implification. One de I s lineates simple from complex systems . Simple Systems have few components and their behavior is in all respects fully understandable and predictable. An example would be a solid bal l falling under the action of gravity through air. This Simple System consists of the ball, t he air, and the gravitational force. Here we usually assume a single ball, constant acceleration of gravity, a viscous drag on the ball, and Newton's laws. When making these assumptions, we arrive at very useful answers. We did, however, neglect many aspects. If, for example, we would ask how the behavior changes when we go from one ball, to two, to three, or even more balls that fall close to each other, our "Simple System" assumption fails. It is not sufficient to generalize fr om one ball's behavior to many. instead we need to consider the interaction of the balls throug h their self-generated vortices.