Sheet # 2
Module 01: Systems Foundation

1. Difference between open and closed systems.

- An open system is always dependent upon an environment with which it can exchange matter, energy and information.

OR

- Open systems refer to that interact with other systems or the outside environment.
- The closed system is open for input of energy only.

OR

- The closed system systems having relatively little interaction with other systems or the outside environment
- The differences between open and closed systems are relative, for example
- **Humans**, inhale oxygen out of the environment and exhale carbon dioxide into the environment. Similarly, some organizations consume raw materials in the production of products and emit finished goods and pollution as a result. In contrast, **a watch** is an example of a closed system in that it is a relatively self-contained, self-maintaining unit that has little interacts or exchange with its environment.

2. Explain the meaning of stability.

- Normally systems show stability, that is, constancy of structure and function under fluctuation, which maintains the same internal state under various pressures.

3. Show the difference between

- static and dynamic system
  - —A static system: is a structure which is not in itself performing any kind of activity.

    A system is said to be static if its output depends only on the input at the present time.

  - —A dynamic system: has both structural components and activity. Examples of such systems are respectively a radio tower and a military squad (فرقة) with its men, equipment and orders.

- deterministic and stochastic systems
  - —A deterministic system has inputs and outputs capable of being interpreted and measured on a single-event basis. The output will be the same for each identical input; repeated trials will always give the same results.
  - —A stochastic system works instead with identical inputs and its elements cannot be returned to their original state. The factors influencing the system obey uncertainty and statistical variation.

Indicate whether the following statements are true or false …

1. Parts of a system are dynamically interrelated or interdependent
2. Groups of components within the system may by themselves have properties
3. A collection of parts that don't interact with each other can constitute a system
4. The objective of the engineers for a system is to provide a system that accomplishes the primary objectives set by the stakeholders
5. About 80% of the actual cost for the system has been spent by the end of design and integration
6. A good decision is the same as a good outcome
7. Every system has a set of boundaries
8. The length of development life cycle is a key factor behind accepting/rejecting systems and software Implementations
9. Effective identification of user requirements minimizes problems associated with cost, schedule, and performance
10. A system is a set of separated units each of its function
11. A closed system is open for the inputs

Chose the correct answer:-

1. A system that is always dependent upon its environment is called

A. Open system
B. Closed system
C. Regulated system

2. "Systems are synthesized into more complex systems" refers to the concept of

A. hierarchy of systems
B. The Universe
C. Order of systems

3. Which of the followings is NOT a system characteristic?

A. parts (components)
B. an environment
C. the universe

4. The amount of disorder or randomness present in the system is known as

A. entropy
B. chaos
C. Equifinality

5. In complex systems, specialized units perform specialized functions. This characteristic is known as

A. Multifinality
B. Equifinality
C. Differentiation

6. The reason for a system existence is referred to as

A. System's equilibrium
B. System's purpose
C. System's entropy

7. A collection of hardware, software, people, facilities, and procedures organized to accomplish some common objectives"" refers to

A. A system
B. An organized collection
C. An aggregate

8. The configuration items reenter the systems engineering process during system integration for integration

A. testing and verification
B. Validation
C. All of the above

9. A(an) ……. system is always dependent upon an environment

A. Open
B. Closed
C. Isolated

10. A(an) ……. system is a structure which is not in itself performing any kind of activity

A. deterministic
B. static
C. decomposable

11. In a(an) ……. system repeated trials will always give the same results

A. deterministic
B. stochastic
C. Open