

Sheet # 3

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. A major problem with the waterfall process is that iteration between phases that are widely separated is all too common **T**
2. The spiral model addressed the need to shorten the time period between the users' statement of requirements and the production of a useful product. **T (State the objective of spiral model?)**
3. The processes of the spiral model cannot be repeated **F**
4. Effective identification of user requirements minimizes problems associated with cost, schedule, and performance **T**
5. Subsystems of non-decomposable system can be regarded as independent of one another **F**
6. Decisions have to be made with the best information available at the time **T**
7. The spiral model addressed the need to shorten the time period between the users' statement of requirements and the production of a useful product **T**

Choose the correct answer:-

1. The spiral model has _____ major processes
 - A. Three
 - B. Four**
 - C. Five
2. A system model that is characterized by the sequential evolution of typical life-cycle phases is called
 - A. TTDSE model
 - B. Waterfall model**
 - C. Spiral model
3. Inheritance is a key concept in _____ methodology
 - A. OO**
 - B. TTDSE
 - C. Spiral

4. A(an) system is always dependent upon an environment
- A. Open**
 - B. Closed
 - C. Isolated
5. A(an).....system is a structure which is not in itself performing any kind of activity
- A. deterministic
 - B. static**
 - C. decomposable
6. In a(an) system repeated trials will always give the same results
- A. deterministic**
 - B. stochastic
 - C. Open
7. The amount of disorder or randomness present in the system is known as
- A. entropy**
 - B. chaos
 - C. Equifinality
8. In complex systems, specialized units perform specialized functions. This characteristic is known as
- A. Multifinality
 - B. Equifinality
 - C. Differentiation**
9. The reason for a system existence is referred to as
- A. System' s equilibrium
 - B. System's purpose**
 - C. System' s entropy
10. The configuration items reenter the systems engineering process during system integration for integration
- A. testing and verification
 - B. Validation
 - C. All of the above**

Cybernetics

- The science of control and communication, in the animal and the machine.
- Art of steering - Concerns with errors in systems of control and communication.
- It has the aim of achieving a condition of equilibrium which is the maintenance of order.
- Concerned with the restoring of stability within all kinds of systems.