1. (4 Points) How does software differ from the artifacts produced by other engineering disciplines?

2. (10 Points) The waterfall model is appropriate for projects with what Characteristics?
3. (13 Points) List the four design models required for a complete specification of a software design and the role of each.

4. (7 Points) Link each Diagram to its appropriate description

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use-case diagram</td>
<td>is created to establish the boundary between the system and the environment.</td>
</tr>
<tr>
<td>Class diagram</td>
<td>is created to define the major subsystems and to show the lines of information (data and control) flow</td>
</tr>
<tr>
<td>A system context diagram - SCD</td>
<td>Describes how the external entities (people, devices) can interact with the system</td>
</tr>
<tr>
<td>A system flow diagram – SFD</td>
<td>provides an indication of how data are transformed as they move through the system and the functions that transform the data flow</td>
</tr>
<tr>
<td>ERD</td>
<td>Used to describe the behavior of objects and could also be used to describe the entire system behavior</td>
</tr>
<tr>
<td>State diagram</td>
<td>depicts data object relationships</td>
</tr>
<tr>
<td>Data flow diagram (DFD) -</td>
<td>Used to describe the static structure of the system</td>
</tr>
</tbody>
</table>
Part 2 – Circle the correct answer in questions 1 through 22 below (66 Points)

1. Which of these are the 5 generic software engineering framework activities?
   A) communication, planning, modeling, construction, deployment
   B) communication, risk management, measurement, production, reviewing
   C) analysis, designing, programming, debugging, maintenance
   D) analysis, planning, designing, programming, testing

2. The prototyping model of software development is
   A) A reasonable approach when requirements are well defined.
   B) A useful approach when a customer cannot define requirements clearly.
   C) The best approach to use for projects with large development teams.
   D) A risky model that rarely produces a meaningful product.

3. Which of these is not one of the phase names defined by the Unified Process model for software development?
   A) Inception phase
   B) Elaboration phase
   C) Construction phase
   D) Validation phase

4. In the Unified Process model requirements are determined iteratively and may span more than one phase of the process.
   A) True
   B) False

5. The spiral model of software development
   A) Ends with the delivery of the software product
   B) Is more chaotic than the incremental model
   C) Includes project risks evaluation during each iteration
   D) All of the above

6. The incremental model of software development is
   A) A reasonable approach when requirements are well defined.
   B) A good approach when a working core product is required quickly.
   C) The best approach to use for projects with large development teams.
   D) A revolutionary model that is not used for commercial products
7. What are the four framework activities found in the Extreme Programming (XP) process model?
   A) analysis, design, coding, testing
   B) planning, analysis, design, coding
   C) planning, analysis, coding, testing
   D) planning, design, coding, testing

8. What role(s) do user stories play in agile planning?
   A) Define useful software features and functions delivered to end-users
   B) Determine a schedule used to deliver each software increment
   C) Provide a substitute to performing detailed scheduling of activities
   D) Used to estimate the effort required build the current increment
   E) both a and d

9. Analysis models depict software in which three representations?
   A) architecture, interface, component
   B) cost, risk, schedule
   C) information, function, behavior
   D) None of the above

10. Which of the following can be elements of computer-based systems?
    A) documentation
    B) software
    C) people
    D) hardware
    E) all of the above

11. Which UML diagrams are useful for analysis modeling?
    A) Use-case diagram
    B) Activity diagram
    C) Class diagram
    D) State diagram
    E) All of the above

12. During project inception the intent of the tasks are to determine
    A) basic problem understanding
    B) nature of the solution needed
    C) people who want a solution
    D) none of the above
    E) a, b and c
13. Which of the following is not a UML diagram used for creating a system analysis model?
   A) activity diagram
   B) class diagram
   C) dataflow diagram
   D) state diagram

14. Which of the following items does not appear on a CRC card?
   A) class collaborators
   B) class name
   C) class reliability
   D) class responsibilities

15. The state diagram
   A) depicts relationships between data objects
   B) depicts functions that transform the data flow
   C) indicates how data are transformed by the system
   D) indicates system reactions to external events

16. Which of the following are areas of concern in the design model?
   A) architecture
   B) data
   C) interfaces
   D) project scope
   E) a, b and c

17. Which of these are characteristics of a good design?
   A) exhibits strong coupling between its modules
   B) implements all requirements in the analysis model
   C) includes test cases for all components
   D) provides a complete picture of the software
   E) both b and d

18. Inheritance provides a mechanism by which changes to lower level classes can be propagated to all super classes quickly.
   A) True
   B) False

19. Polymorphism reduces the effort required to extend an object system by
   A) coupling objects together more tightly.
   B) enabling a number of different operations to share the same name.
   C) making objects more dependent on one another.
   D) removing the barriers imposed by encapsulation.
20. Which of the following is not one of the five design class types
   A) Business domain classes
   B) Entity classes
   C) Process classes
   D) User interface classes

21. Which design model is analogous to the detailed drawings of the access points and external utilities for a house?
   A) Architectural design
   B) Component-level design
   C) Data design
   D) Interface design

22. Which design model is analogous to a set of detailed drawings for each room in a house?
   A) Architectural design
   B) Component-level design
   C) Data design
   D) Interface design