Part 1 (THEORY):

1. **Which of the following are characteristics of the Waterfall model?**
   - ☐ Requirements have to be completed before performing analysis and design
   - ☐ Tasks are done iteratively
   - ☐ Tasks are done sequentially
   - ☐ Analysis/design and programming tasks are usually performed at the same time
2. **Project management involves the following activities.**
   - ☐ Write use-case specifications
   - ☐ Estimate effort, time, and staff to develop
   - ☐ Write the project development plan
   - ☐ Form software architecture
3. **Software architecture affects the following of software**
   - ☐ Maintainability
   - ☐ Readability of requirements
   - ☐ Performance
   - ☐ Ease of use
4. **We can perform static review or inspection on the following**
   - ☐ Use cases
   - ☐ Working software
   - ☐ Source code
   - ☐ None of the above
5. **Who are mainly responsible for unit testing?**
   - ☐ Business analyst
   - ☐ Developer
   - ☐ Tester
   - ☐ Customer
6. Explain why, in the waterfall model, it is more effective to discover and fix defects in the early phases than in the later phases of the project.
7. List all responsibilities of a business analyst in a software project. What are the main artifacts produced by this role?
8. Why do we need to have a test plan? What information does it include?
9. Describe one of the following concepts in less than 100 words: software development plan, software effort, software size, software architecture, agile method, pair programming, Scrum, software testing, non-functional requirements, and software lifecycle.

Part 2 (PRACTICE):

SHARE-A-RIDE SYSTEM

Share-A-Ride is a system that helps students to get around easily by taking rides shared by other students. Two students going on the same direction to the same school, one having a bike and the other does not, but he/she can share the cost of the ride. The system is composed of three sub-systems: Driver, Passenger, and Admin.

The Driver sub-system provides services for students who have vehicles and willing to pick up other students. When Bob, who is a student and has a bike, needs to go from one place to another, he uses this sub-system on his mobile phone to share his ride information, including route, departure time, and vehicle type ("Share a ride").

Alice, a student who does not have a bike, requests a ride by using the Passenger sub-system. He enters his route and departure time to search for rides. The sub-system displays rides that match the route request along with fees, departure times, and directions. Alice chooses the ride from Bob ("Take a shared ride").

Bob will then be notified to contact Alice to arrange the pick-up. When the ride ends, Alice can choose to pay the ride fare by cash or by online payment. Bob will also be charged 20% of the ride fare by the system. Both students can rate along with comments about the ride. They can also view their ride history.

To ensure safety, students using the system need to register and have valid student identifications.

The Admin sub-system provides administration services such as: validate student registrations, resolve ride issues, configure system settings, and view usage information.

a) Draw a use-case diagram for the "Share-A-Ride" system. The diagram needs to capture all possible use-cases from the description above.

b) Write the use-case specification for the use-case named "Share a ride" (used by Bob).

c) Write necessary test cases to test the use-case named "Take a shared ride" (used by Alice).

-THE END-