Q.1. Medical Refunds Ltd. is a medical insurance company that reimburses the cost of drugs to its customers. On presentation of drug receipts by the customer, the company inputs the Drug Receipts into the computer-based Drug Refund Program. For each customer, the Drug Refund Program

- Classifies each receipted drug as either a Class A Drug or a Class B Drug. The cost of a Class A Drug is in the range of € 0.00 to € 100.00. The company refunds 90% of the cost of each Class A Drug after a minimum payment of € 5.00 by the customer. For example, a € 10.00 drug is reimbursed by € 4.50. The cost of a Class B Drug is greater than €100.00. 50% of the cost of a Class B Drug is refunded.
- Prepares a cheque to be sent to the customer. The refund agreement states that the customer will be refunded within 45 days of the submission of the drug receipts.

(a) Identify and describe **two** test techniques that you would employ to test the Drug Refund Program. Justify your answer.

(b) Using the test techniques identified in (a) above, identify and prepare a list of test cases that would test the Drug Refund Program. For each test technique employed, ensure that 100% test coverage is achieved.

Q.3. **(a) Identify and describe the main activities in Test Driven Development.**

1. Write User Story
2. Develop Product Skeleton
3. Create Test Class
4. Design Test Cases – EP,BVA (Test Design Template)
5. Write JUnits
6. Run JUnits
7. Write Product Code

(b) What is regression testing? Explain how the use of automated tests and a testing framework such as JUnit simplifies regression testing.

Regression testing is the process of running tests for functionality that has already been implemented when new functionality is developed or the system is changed. Regression tests check that the system changes have not introduced problems into the previously implemented code.
Automated tests and a testing framework, such as JUnit, radically simplify regression testing as the entire test set can be run automatically each time a change is made. The automated tests include their own checks that the test has been successful or otherwise so the costs of checking the success or otherwise of regression tests is low.

Q.6 (**a) Pair programming has become a popular XP tool because code is regularly reviewed by more than one person, resulting in higher quality code. Identify and describe the roles and responsibilities in the Pair Programming process?**

Pair programming is a method of programming in which two people work together at one keyboard.
• One person, "the driver", types at the keyboard.
• The other person, "the observer" (or "navigator") reviews each line of code as it is typed, checking for errors and thinking about the overall design.
Driver:

-Write the code according to the navigator's specification
-Listen intently to the navigators instructions
-Ask questions wherever there is a lack of clarity
-Offer alternative solutions if you disagree with the navigator
-Where there is disagreement, defer to the navigator. If their idea fails, get to failure quickly and move on
-Make sure code is clean
-Own the computer / keyboard
-Ignore larger issues and focus on the task at hand
-Trust the navigator - ultimately the navigator has the final say in what is written
-You are writing the code

Navigator:

-Dictates the code that is to be written - the 'what'
-Clearly communicates what code to write
-Explains 'why' they have chosen the particular solution to this problem
-Check for syntax / type errors as the Driver drives
-Be the safety net for the driver
-Make sure that the driver sticks to the small task at hand
-Outline and note down high level tasks / issues
-Ongoing code review
-Pay attention
-Wait until the task is complete to bring up design / refactoring issues

Both:

-Actively take part in programming
-Aim for optimal flow - avoid trying to be 'right'
-Embrace your role
-Intervene if your pair is quiet
-Know when to give up / steal keyboard
-Communicate, communicate, COMMUNICATE!
-Sync up frequently to make sure you are on the same page
-Don't hog the keyboard
-High-five every time a test passes
-Follow best practices for TDD
-Swap roles frequently

(a) Discuss the benefits of Pair Programming that contribute to the development and quality of the product.

• Some benefits you can expect:
– better code (simpler design, fewer bugs, more maintainable),
– higher morale (more fun!),
– shared knowledge throughout your team (both specific knowledge of your codebase

and general programming knowledge),
– better time management,
– higher productivity.
• Pair programming offers several important benefits that contribute to the quality of the product.
• The first is that both programmers are learning from each other and becoming more familiar with different aspects of the product. This is important for continual improvement
and cross-training, but also helps expedite code defects as they arise during the build.
• The second benefit is that pair programming allows each developer to focus on his or her
specific role; there is a lot less cognitive overload when a developer can concentrate on getting the code working while letting the pairing partner focus on things such as performance optimization or possible bugs.
• Finally, pairing can also build trust and encourage more regular communication between
team members.

(c) In Scrum, differentiate between the different roles and responsibilities of the Product Owner, the Scrum Master, and the Team.

Product Owner
• The product owner selects work requirements for each sprint.
• The product owner maintains a prioritized list of requirements for the product called a product backlog.
• The requirements are written in the form of user stories or stories about the problem that needs to be solved by the requirement.

Duties of the Product Owner:
 PO has to attend the daily sprint planning meetings.
 PO prioritizes the product features, so the development team can clearly understand them.
 PO decides the deadlines for the project.
 PO determines the release date and contents.
 PO manages and creates the product backlog for implementation, which is nothing but the prioritized backlog of user stories.
 PO defines user stories to the development team.
 Spending some time to prioritize the user stories with few team members

Scrum Master
• Tracking (progress) is also an important part of the Scrum approach.
• Scrum teams meet daily in what is commonly referred to as a daily stand-up or daily Scrum meeting.
• A Scrum master is assigned to lead these meetings to ensure that they remain brief and focused and that all team members have a chance to contribute.

Duties of Scrum Master:

 SM facilitates team for better vision and always tries to improve the efficiency of the teams.
 SM manages Scrum processes in Agile methodology.
 SM removes impediments for the Scrum team.
 SM arranges daily quick stand-up meetings to ensure proper use of processes.
 SM helps product owner to prepare good product backlog and sets it for the next sprint.
 Conducting retrospective meetings.
 SM organizes and facilitates the sprint planning meeting.

Team

• These daily scrum meetings are designed to be short (usually around 15 minutes), and each team member answers the following questions:
– What have I done since yesterday?
– What am I doing today?
– Any roadblocks?
– The team also uses burn down or burn up charts to track progress through the sprint.

Duties of Team

 Create and deliver the products or services;
 Be self-organized and self-managed. The Teams must be able to determine its own tasks and how they will perform it;
 Cross-functional. Teams are not combined with a single skill, but multiple different skills;
 Are dedicated for a product or a service.
 Recommended to work in the same work space.

(d) In Scrum, what is the purpose of the Working Agreement? What issues or topics are addressed by the Working Agreement?

One way that trust and teamwork are established and enforced is through the creation of a working agreement.

- This is a document or set of expectations that define how the Scrum team is going to work together.
- The working agreement is the first point of collaboration for a new Scrum team as they define their relationships.
- It is more than just rules of engagement for team behavior; the working agreement ultimately reflects the values and commitment of the team.

The Team –Working Agreement Topics

- Time and location of Daily Scrum
- Testing strategy (unit, functional, integration, performance, stress, etc...)
- Build and infrastructure plans (shared responsibilities)
- Team norms (be on time, respect estimates, help when needed, etc...)
- How to address bugs/fires during Sprint
- Product Owner availability (phone, office hours, attendance in Daily Scrum)
- Capacity plan for initial Sprint(s)