Candidates are admitted to the examination room ten minutes before the start of the examination. On admission to the examination room, you are permitted to acquaint yourself with the instructions below and to read the question paper.

Do not write anything until the invigilator informs you that you may start the examination. You will be given five minutes at the end of the examination to complete the front of any answer books used.

May/June 2012   SE3SQ11 2011/12 A 001

1 Answer Book
Only CASIO fx-83ES or -83MS calculators permitted

UNIVERSITY OF READING

SOFTWARE QUALITY AND TESTING (SE3SQ11)

Two hours

Answer **FOUR** questions.

1.   (a)   What are the challenges facing a tester when, in a long term Scrum approach to software product development, the Sprints are run consecutively? Credit will be given for the quality of THREE distinct and pertinent points expressed.   (10 marks)

      (b)   Your company is developing a medical decision support component (DESC) in the manner described in part (a) above. Figure 1 is a component diagram showing it in its normal operation linked to a medical system of the kind used by a doctor when consulting with a patient. There are five different manufacturers of such medical systems (MS) and each offers a different MS API (application programming interface). Currently, regression-testing is performed manually by trained testers. However they cannot keep up with the consecutive sprints and are missing faults that turn out to be significant. Analyse the problem and propose a prescription for its remedy. Credit will be given for the quality of EACH of THREE distinct analysis points and TWO prescription points made.
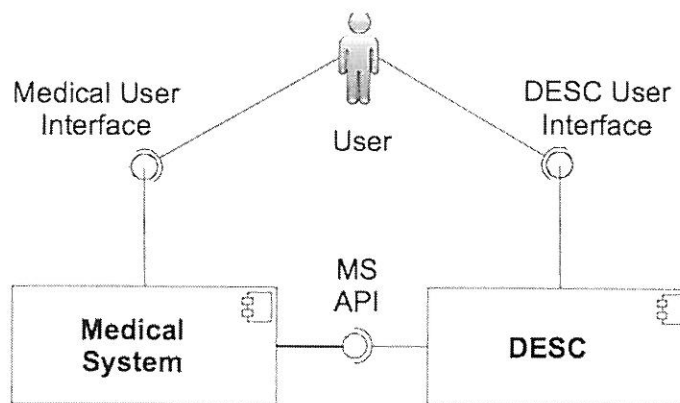

Figure 1   (15 marks)

2.   (a)   List the elements of a well-formed test case suitable for dynamic testing and explain why they are necessary.   (12 marks)

     (b)   Suppose you are responsible for testing a software component that executes the business rules governing book loans in a library management system. Assuming that this component is situated in a three-tier architecture, between a database component and a user interface component, describe how you would go about designing a set of black box tests. You will need to make pertinent assumptions and these should be recorded in your answer. Credit will be given for including a test-case example that uses all the fields of a well-formed test case.   (13 marks)

3.   (a)   Describe the Fagan Inspection process paying attention to its critical success factors.   (12 marks)

     (b)   You are a member of a plan-driven test team in a company who develop software components on fixed price contracts to meet customer supplied specifications. Your boss has asked for a brief on how static testing in the form of *inspections* will help the company to be more profitable. Write a suitable memorandum to your boss. Credit will be given for including your reasonable assumptions along with the memorandum.   (13 marks)

4. (a) Explain and discuss the difference between black and white box dynamic testing. Credit will be given for FOUR distinct pertinent points and an illustration supporting your points. (9 marks)

(b) By creating a control flow graph determine the number of branches and decisions that the following program code fragment contains. Credit will be given for showing your working relating source code lines through executable statements to code blocks, and for the final control graph.

```
17  Public Function StockAvailable(Q) As Boolean
18     Const NOSTOCKLEFT = -1  'Constant used to indicate
19                            'out of stock condition
20     'Calculate a new residual stock assuming Q are removed
21     ResidualStock = ResidualStock - Q
22     'Apply stock availability rules
23     If ResidualStock < 0 Then 'Not enough stock
24        ResidualStock = NOSTOCKLEFT
25        StockAvailable = False
26     Else                 'Enough Stock
27        StockAvailable = True
28     End If
29
30     'Test to see if Restocking will be needed
31     If ResidualStock < Minstock Then
32        RestockFlag = True
33     Else
34        RestockFlag = False
35     End If
36  End Function
```

(16 marks)

5. (a) Explain how the architectural perspective expressed in figure 2 helps us to formulate component level quality plans. Credit will be given for indicating how physical, logical, development and process views point us to test concerns.
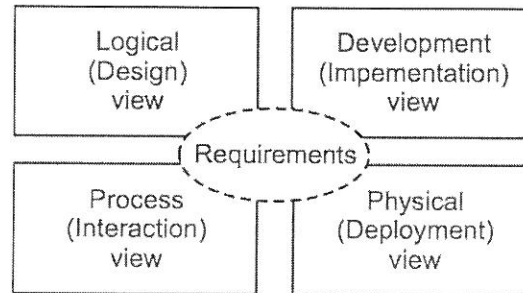

Figure 2 (12 marks)

(b) Consider figure 2. Discuss what software development artefacts can be tested and how much quality management of them you would expect to find in a company operating at Capability Maturity Model (CMM) level 1. (13 marks)

(End of Question Paper)