



**UNIVERSITY OF COLOMBO, SRI LANKA**

**UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING**

**DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)**

**Academic Year 2007/2008 – 2<sup>nd</sup> Year Examination – Semester 3**

***IT3203 Software Engineering 1***

**PART 2 – Structured Question Paper**

**15<sup>th</sup> March, 2008**

**(ONE HOUR)**

**To be completed by the candidate**

BIT Examination Index No: .....

**Important Instructions:**

- The duration of the paper is **1 (One) hour**.
- The medium of instruction and questions is English.
- This paper has **3 questions** and **9 pages**.
- **Answer any 2 of the questions (50 marks each) only.**
- **All questions carry equal marks**
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.  
If a page is not printed, please inform the supervisor immediately.

**Questions Answered**

Indicate by a cross (x), (e.g. 

X
---

) the numbers of the questions answered.

To be completed by the candidate by marking a cross (x).	1	2	3	
To be completed by the examiners:				

- 1) (a) Discuss the importance of the maintenance phase in the software life cycle.

(16 marks)

**ANSWER IN THIS BOX**

Any 4 of the following points:

Corrections to software may need to be done.

Software may need to be adapted to new contexts.

New requirements may need to be catered for.

Software maintenance absorbs about 60% of the total software lifecycle costs according to studies which have been done.

Many organizations face a maintenance burden showing a difficulty to cope with legacy software.

- (b) Briefly explain the steps in software quality management?

(12 marks)

**ANSWER IN THIS BOX**

**Quality assurance**

Establish organisational procedures and standards for quality.

**Quality planning**

Select applicable procedures and standards for a particular project and modify these as required.

**Quality control**

Ensure that procedures and standards are followed by the software development team.

- (c) Consider the following programming languages: SQL, FORTRAN, Java script, Visual Basic and PROLOG.

What is the most suitable language to develop each of the following applications?

(10 marks)

**ANSWER IN THIS BOX**

Application	Language
Expert systems	<b>PROLOG</b>
Rapid application development	<b>Visual Basic</b>
Web programming	<b>Java Script</b>
Scientific computing	<b>FORTRAN</b>
Database Construction	<b>SQL</b>

- (d) Consider the following code fragment.

```
while a
{
  while b
  {
    c
    d
  }
}
```

If you were to test this code, what would be the test technique to adopt?

(04 marks)

**ANSWER IN THIS BOX**

**white box testing**

- (e) Use a 'black box' approach to generate test cases for the Java method that calculates the perimeter of a rectangle whose sides are a and b. The sides a and b are represented by integer parameters in this method.

(08 marks)

**ANSWER IN THIS BOX****sample equivalence classes****C1:  $a > 0$  (valid)****C2:  $b > 0$  (valid)****C3:  $a \leq 0$  (invalid)****C3:  $b \leq 0$  (invalid)****sample values for each class****From C1,  $a = 1, 5, \text{maxint}$** **From C2,  $b = 1, 6, \text{maxint}$** **From C3,  $a = 0, -1$** **From C4,  $b = 0, -1$** **test cases****any inter-class combination of values**

- 2) (a) Suppose you are working as a software engineer involved in the development of an e-commerce website.

(i) What type of software would you think you are developing?

(04 marks)

**ANSWER IN THIS BOX**

**Business software/ web-based software/real-time software/application software/  
bespoke software/client-server software**

(ii) What are the 2 most important characteristics your software must have?

(04 marks)

**ANSWER IN THIS BOX**

**Security**

**Accuracy**

(iii) Justify your answer in part (ii) above.

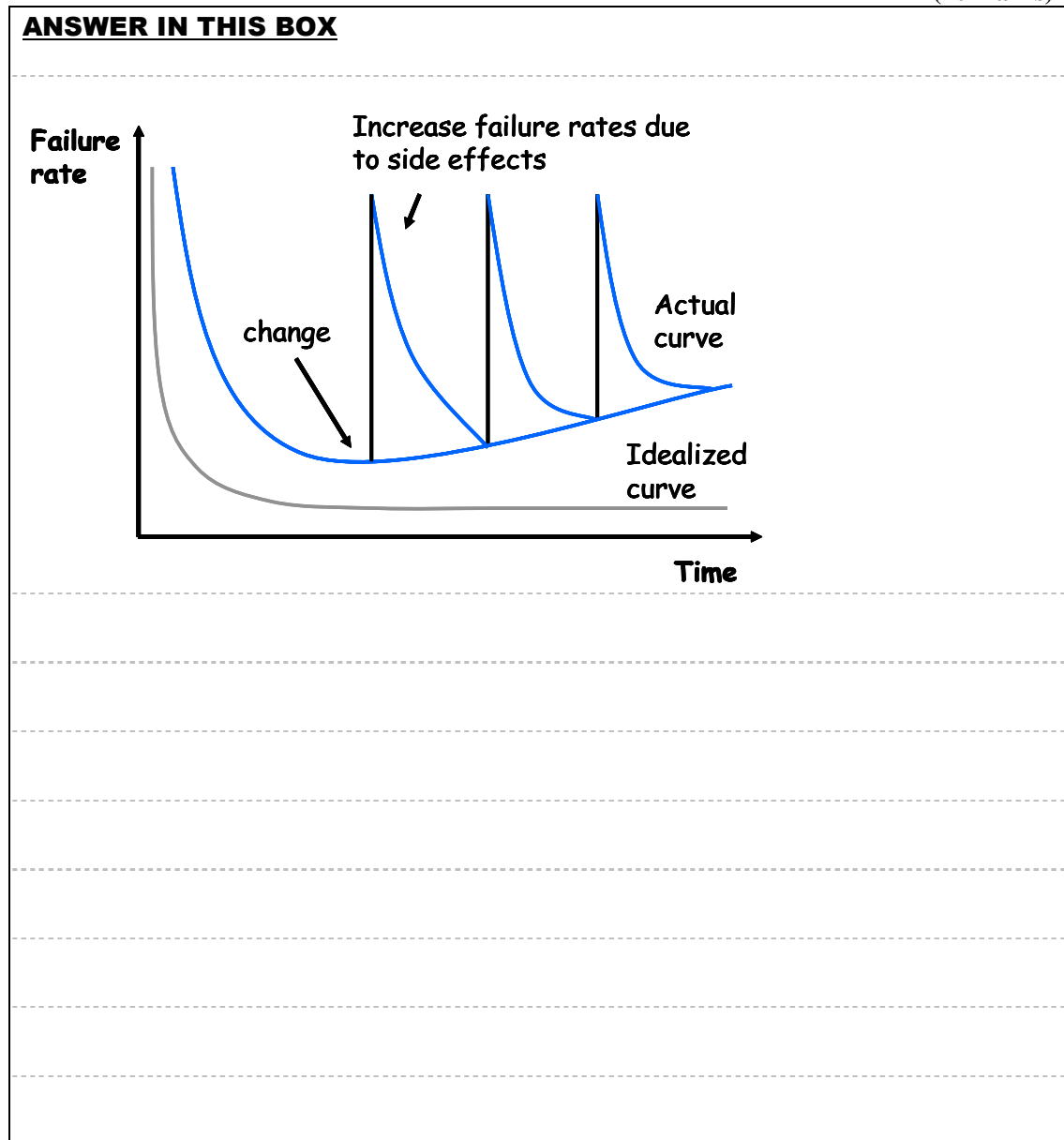
(04 marks)

**ANSWER IN THIS BOX**

**Transactions must be secured and accurate.**

- (b) Draw the ideal failure curve for software. Show how it approximates the failure curve for hardware in the practical case.

(10 marks)



- (c) Briefly describe what is meant by the term software process.

(04 marks)

**ANSWER IN THIS BOX**

Software process is the set of activities followed to develop software.

(d) Compare and contrast between the waterfall model and evolutionary prototyping.

(16 marks)

**ANSWER IN THIS BOX**

**Waterfall model**

- (1) Is a linear model with clear milestones and deliverables
- (2) Can be used when requirements are clear and stable
- (3) Product visible only at the end
- (4) Easier to enforce design discipline

**Evolutionary prototyping**

- (1) Is a non-linear model
- (2) Can be used when requirements are unclear and unstable
- (3) Product visible at an earlier stage
- (4) Difficult to enforce design discipline

(e) Giving reasons, explain what you think the best process model is to adopt for the development of the system in part (a)?

(08 marks)

**ANSWER IN THIS BOX**

**evolutionary prototyping**

**because requirements can be unclear and unstable**

- 3) (a) Why is it important to consider the non-functional requirements of software?

(08 marks)

**ANSWER IN THIS BOX**

Non-functional requirements ensure the smooth delivery of the functional requirements to the user.

- (b) Compare and contrast between the suitability of a natural language and a notation like DFD for the capturing of requirements for a project.

(08 marks)

**ANSWER IN THIS BOX**

any 2 points for each of natural language and DFD from among the following:

natural language – high in expressive power, customer will be familiar, ambiguous

DFD – less expressive, customer might not be familiar, unambiguous

- (c) What do you think your responsibilities are as a team member who engineers requirements?

(06 marks)

**ANSWER IN THIS BOX**

any 3 of the following points:

perform feasibility study  
choose techniques to collect requirements  
gather requirements  
analyze requirements  
validate requirements  
create requirement specification



- (d) What architecture best suits the development of a computer aided design system that facilitates a group of architects to work simultaneously on a shared design?

(08 marks)

**ANSWER IN THIS BOX**

Repository model, because architects can share a common data repository and each can co-author the design with the other.

- (e) List and briefly describe the main activities of software design.

(16 marks)

**ANSWER IN THIS BOX**

architectural design – main parts of the system and their integration is thought of

data design – issues like what data is to be stored and how it is to be stored are considered

procedural design – algorithms are designed to carry out the data processing activities

user interface design – user interface is designed giving consideration to who the users are and what are the tasks they perform at the interface.

- (f) What are design patterns?

(04 marks)

**ANSWER IN THIS BOX**

Reusable design elements which are encountered frequently in designs.

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