



**NAMIBIA UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY  
**FACULTY OF COMPUTING AND INFORMATICS**  
DEPARTMENT OF COMPUTER SCIENCE

<b>QUALIFICATION:</b> BACHELOR OF COMPUTER SCIENCE, BACHELOR OF INFORMATICS	
<b>QUALIFICATION CODE:</b> 07BACS,07BAIF	<b>LEVEL:</b> 7
<b>COURSE:</b> SOFTWARE ENGINEERING 2	<b>COURSE CODE:</b> SEN721S
<b>DATE:</b> JANUARY 2019	<b>PAPER:</b> THEORY
<b>DURATION:</b> 3 HRS	<b>MARKS:</b> 100

<b>SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION PAPER</b>	
<b>EXAMINER(S)</b>	<b>Mr. JEREMIAH LUMBASI</b>
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**THIS QUESTION PAPER CONSISTS OF 3 PRINTED PAGES**  
(Excluding this front page)

**INSTRUCTIONS**

1. Answer ALL the questions in the provided examinations answer booklet.
2. Write clearly & neatly and number the answers clearly.
3. When answering questions you should be guided by the allocation of marks in square brackets[ ].
4. Use of any electronic devices (e.g. cell-phones) is prohibited.
5. NUST examination rules and regulations apply.

**PERMISSIBLE MATERIALS**

Non programmable Scientific Calculator.

### Question 1 [10 marks]

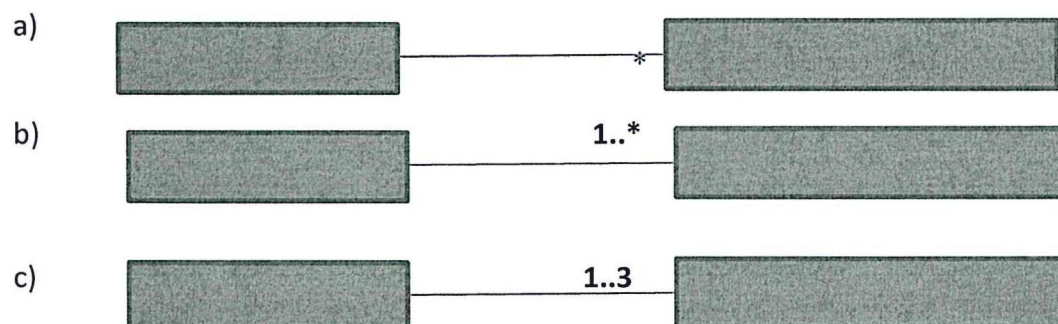
- 1.1 Define the following in the context of software engineering. [4 marks]
- a) *Polymorphism* [2 marks]
  - b) Inheritance [2 marks]
- 1.2 One of the difficulties and risks in software engineering as a whole **Uncertainty about technology.**, explain two ways in which this occurs and a resolution to this approach. [6 marks]

### Question 2 [17 marks]

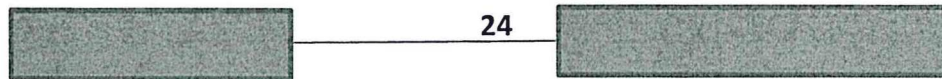
- 2.2 What is the importance of basing your development on solid proven principles and re-usable technology. [3 marks]
- 2.2 Developers are often willing to reuse packages of code delivered with a programming language, but are reluctant to develop new ones, and are especially reluctant to develop entirely new frameworks. Explain the reasons for this reluctance, and how can these vicious cycles be broken. [6 marks]
- 2.3 Importance of re-usable components [4 marks]
- 2.4 Explain one advantage and disadvantage of having many slots on a framework [4 marks]

### Question 3 [15 marks]

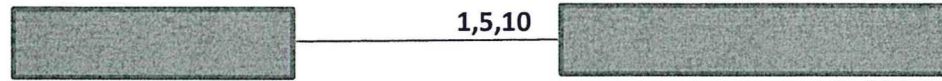
- 3.1 Why do developers apply different techniques of modeling to a system being developed. [6 marks]
- 3.2 Employing UML, a well-defined *standard* modelling language, adds additional Advantages as compared to other modelling technique, briefly explain the advantages [4 marks]
- 3.3 In each diagram below what does each of the multiplicities mean [5 marks]



d)



e)



#### Question 4 [17 marks]

- 4.1 Explain some essentials of *Component-Based Software Engineering(CBSE)* [6 marks]
- 4.2 What is component validation? Briefly describe one major problem that is likely to be encountered during this process. [4marks]
- 4.3 Explain the purpose of middleware and why is it different from regular software components [2 marks]
- 4.4 When you create a system by composing components, you may find that there are potential conflicts between functional and non-functional requirements, the need to deliver a system as quickly as possible and the need to create a system that can evolve as requirements change. Taking these into account what are some of the decisions you are likely to make trade -offs [3 marks]
- 4.6 The principle of component independence means that it ought to be possible to replace one component with another that is implemented in a completely different way. Using an example , explain how such component replacement could have undesired consequences and may lead to system failure. [ 2 marks]

#### Question 5 [ 19 marks]

- 5.1 List 3 characteristics of a pattern [3 marks]
- 5.2 In documenting a pattern, one should provide it with a name as well as other information such as context, problem, forces, solution etc. Explain these different parts of documenting a pattern. [6 marks]
- 5.3 With an example describe the *General Hierarchy pattern* . [10 marks]

#### Question 6[22 marks]

- 6.1 Describe the terms Quality Assurance and Quality Control and explain what does quality assurance mean to the software industry [6 marks]

- 6.2 You are in charge of a Quality Assurance team, suggest and describe the different components of an outline structure for a quality plan [10 marks]
- 6.3 Software standards play a very important role in software quality management. Explain any three of these reasons. [ 6 marks]

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