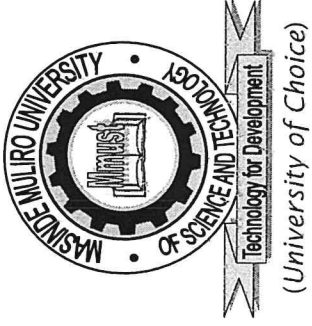


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**MASINDE MULIRO UNIVERSITY OF SCIENCE AND
TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2021 / 2022 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER EXAMINATIONS
FOR THE DEGREE OF
BACHELOR OF SCIENCE IN COMPUTER SCIENCE**

COURSE CODE: BCS 367

COURSE TITLE: SOFTWARE DEVELOPMENT

DATE: Thursday 21st April, 2022 **TIME:** 12.00p.m. – 2.00p.m.

INSTRUCTIONS TO CANDIDATES

Question ONE (1) is compulsory
Answer any other TWO (2) questions
TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

*This Paper Consists of 3 Printed Pages. Please Turn Over.
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Question One (30 Marks)-compulsory

- (a) Define the following software development terms (3 marks)
- (i) Software Requirements Specifications
 - (ii) Software functional specifications
 - (iii) System specifications
- (b) Identify and explain what SRS constitutes and what it does not constitute (4 marks)
- (c) In software development, It is useful to classify operations as being either **constructors** or **observers**. Briefly describe (i) Constructors (6 marks)
- (ii) Observers
- (d) Differentiate between a software process and software process model (4 marks)
- (e) There are many different software processes, but all involve some common aspects, what aspects are these? (4 marks)
- (f) A time comes when exploratory programming is the only option left for most programmers, suggest conditions under which this is so, (3 marks)
- (g) Many computer scientists agree that “**smalltalk**” is one of the best exploratory programming languages. Suggest three possible reasons for this language. (3 marks)
- (h) Apart from **smalltalk**, identify any six other programming languages that can be used in exploratory programming (3 marks)

Question Two (20 Marks)

- (a) (i) The idea behind algebraic specifications is that an abstract data type (ADT) should be characterized only by the behaviors of its members. What do you understand by this statement? (2 marks)
- (ii) In algebraic specifications, abstract data types are defined by signatures and axioms. Briefly explain what each term means (4 marks)
- (b) (i) Briefly describe Stacks as used in software development (4 marks)
- (ii) Give a one sentence interpretation of the following algebraic specifications in relation to stacks and abstract data types. (7 marks)

Stack <Elem>:
Signature:

```
isEmpty :
topOf  :
empty  :
pop    : Stack<Elem> → Stack<Elem>
push   : Stack<Elem> × Elem → Stack<Elem>
```

- (c) It's argued that it's better to model a range of *pop* as *stack * elem* than *jsut stack*. Why should this be the case and in which programming language would this more applicable? (3 marks)

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Question Three (20 Marks)

- (a) There are several notations for displaying data-flow diagrams, including Edward Yourdon, Larry Constantine, Tom DeMarco, Chris Gane, and Trish Sarson. Use a suitably labelled diagram to illustrate the three most widely used DFD notations: (12 marks)
- (b) Starting with a simple context diagram of two entities, break down the context diagram to level 1 using SSADM DFD Templates and Examples. (8 marks)

Question Four (20 Marks)

- (a) (i) Is software requirements specification necessary? If so what do you opine to be its goals? (7 marks)
- (b) It's Unfortunate that much of the time, systems architects and programmers write software requirements specifications with little (if any) help from the technical communications organization. And when that assistance is provided, it's often limited to an edit of the final draft just prior to going out the door. Suggest possible benefits a software development organization can derive by involving technical writers in the entire duration of developing software requirements specification document. (7 marks)
- (c) Several standards organizations (including the IEEE) have identified nine topics that must be addressed when designing and writing an SRS. Identify and explain any four such topics. (6 marks)

Question five (20 Marks)

- (a) There are several software processes models, among them are the waterfall model, Incremental development and Reuse-oriented software engineering, Create a six column table to show item number, process model, definition, advantages, disadvantages and application (16 marks)

No.	Process model	Definition	Advantages	disadvantages	application
1	Waterfall				
2	Incremental				
3	Re-use oriented				

- (b) Use a well labelled diagram to illustrate the components of software requirements engineering process activities (4 marks)