

**FACULTY OF SCIENCES**  
**DEPARTMENT OF COMPUTER SCIENCE**

**2023\_2 EXAMINATIONS**

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**COURSE CODE: CIT308**

**COURSE TITLE: FORMAL METHODS AND SOFTWARE DEVELOPMENT**

**COURSE CREDIT: 3 UNITS**

**TIME ALLOWED: 2 HOURS**

**INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER THREE QUESTIONS**

**Q1**

- (a) Highlight 8 requirements of user interface **4 marks**
- (b) Draw a level 0 data flow diagram for hotel reservation system? **5 marks**
- (c) Construct a truth table for the formula  $((a \rightarrow b) \wedge (b \rightarrow c)) \leftrightarrow \neg a$  **12 marks**
- (d) Enumerate 8 advantages of using formal methods? **4 marks**

**Q2**

- (a) Show that the inverse and the converse of a conditional are logically equivalent **8 marks**
- (b) Explain Universal and Existential statements? **7marks**

**Q3**

- (a) Complete the table comparing the three testing models under the highlighted areas?

Areas	Unit Testing	System Testing	Integration Testing
Objective			
Scope			
Test Environment			
Dependencies			

**12 marks**

- (b) Explain model checking as a formal methods technique?

**3 marks**