

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF APPLIED SCIENCE**  
**COMPUTER SCIENCE DEPARTMENT**  
**DECEMBER EXAMINATIONS 2001**

**SUBJECT:** SOFTWARE METHODOLOGY AND ENGINEERING I  
**CODE:** SCS 2103 (FOR CARRY OVER STUDENTS)

**INSTRUCTION TO CANDIDATES**

Answer any three (3) questions from SECTION A and the question in SECTION B.

**Time: 3 hours**

**QUESTION ONE**

Formal methods are required in software development. Discuss. [25]

**QUESTION TWO**

Outline the stages of a specified software development model. [25]

**QUESTION THREE**

A library System is to be specified. The following are the operations that are expected.

- (i) issue a copy of a book to a registered reader.
- (ii) A reader returns a book to the library
- (iii) Remove a copy of a book from the stock
- (iv) Inquire which books are on loan to a given reader
- (v) Register a new reader
- (vi) Cancel a reader's register

By using Z notation, write a precise specification for each operation. [25]

**QUESTION FOUR**

- a) Why is design phase important in any software development. [15]
- b) Illustrate one design tool that can be applied in software development. [10]

**QUESTION FIVE**

- a) Outline the steps that are followed in JSP.
- b) State the characteristics of JSP. [25]

**SECTION B**

**QUESTION SIX**

A hospital file contains records of staff and patients sorted into ascending order of surname within ward. It is required to print all the names of staff in ward order, with a heading at the start of each ward.

Follow the following steps in your answer:

- (i) Sketch 'sample data for both input and output files and annotate the sketches to indicate groups, repetitions and selection.
- (ii) Produce logical data structures for both input and output files
- (iii) Indicate correspondences between components of data structures
- (iv) Derive the program structure
- (v) Produce the schematic logic. [25]

**END OF QUESTION PAPER**

**GOOD LUCK!**