UNIVERSITY OF GHANA
COLLEGE OF BASIC AND APPLIED SCIENCES
SCHOOL OF ENGINEERING SCIENCES
FIRST SEMESTER EXAMINATION 2014/2015
LEVEL 200: BACHELOR OF SCIENCE IN ENGINEERING
CPEN 207: INTRODUCTION TO SOFTWARE ENGINEERING (3 Credits)

TIME ALLOWED: TWO HOURS (2 HRS)

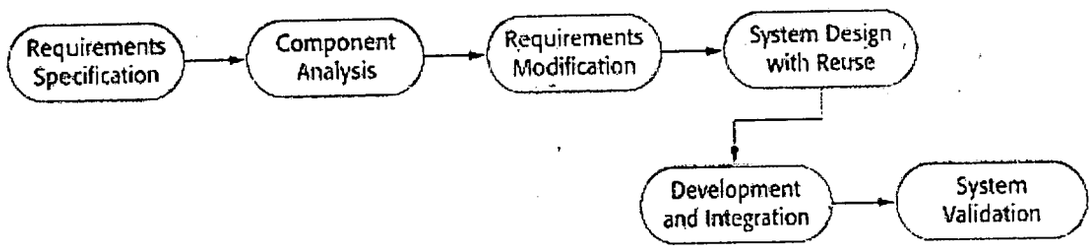
INSTRUCTION: Attempt ALL questions. Provide your solutions in the answer booklets provided.

SECTION A [50 Marks]

Question 1

i. Explain why incremental development is the most effective approach for developing business software systems. Why is this model less appropriate for real-time systems engineering? **[5 marks]**

ii. Consider the reuse-based process model shown in the figure below. Explain why it is essential to have two separate requirements engineering activities in the process. **[5 marks]**



iii. Why is it important to make a distinction between developing the user requirements and developing system requirements in the requirements engineering process? **[2 marks]**

Question 2

i. Explain how the principles underlying agile methods lead to the accelerated development and deployment of software. **[5 marks]**

ii. When would you recommend *against* the use of an agile method for developing a software system? **[2 marks]**

iii. Explain why testing can only detect the presence of errors, not their absence. **[3 marks]**

iv. Some people argue that developers should not be involved in testing their own code but that all testing should be the responsibility of a separate team. Give arguments for and against testing by the developers themselves. **[4 marks]**

v. Give at least two (2) reasons why a software system that is used in a real-world environment must change or become progressively less useful. **[4 marks]**

Question 3

i. A small company has developed a specialized product that it configures specially for each customer. New customers usually have specific requirements to be incorporated into their system, and they pay for these to be developed. The company has an opportunity to bid for a new contract, which would more than double its customer base. The new customer also wishes to have some involvement in the configuration of the system. Explain why, in these circumstances, it might be a good idea for the company owning the software to make it open source. **[10 marks]**

ii. Discover ambiguities or omissions in the following statement of requirements for part of a ticket-issuing system:
An automated ticket-issuing system sells rail tickets. Users select their destination and input a credit card and a personal identification number. The rail ticket is issued and their credit card account charged. When the user presses the start button, a menu display of potential destinations is activated, along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input a personal identifier. When the credit transaction has been validated, the ticket is issued.
[5 marks]

iii. Write a set of non-functional requirements for the ticket-issuing system, setting out its expected reliability and response time. **[5 marks]**