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COLLEGE

*Bastion of Knowledge...*

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**OFFICE OF THE DEPUTY PRINCIPAL  
ACADEMICS, STUDENT AFFAIRS AND RESEARCH**

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# **UNIVERSITY EXAMINATIONS**

## **2019 /2020 ACADEMIC YEAR**

### **THIRD YEAR FIRST SEMESTER REGULAR EXAMINATION**

## **FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE**

**COURSE CODE: COM 312**

**COURSE TITLE: Software Engineering II**

**DATE: 9<sup>th</sup> December, 2019**

**TIME: 9.00 am -12 noon**

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### **INSTRUCTION TO CANDIDATES**

- SEE INSIDE

**THIS PAPER CONSISTS OF PRINTED PAGES**

**PLEASE TURN OVER**

**COM 312: SOFTWARE ENGINEERING II**

**STREAM: BSc (Computer Science)**

**DURATION: 3 Hours**

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**INSTRUCTIONS TO CANDIDATES**

- i. Answer **ALL** questions from section A and any **THREE** from section B.
- ii. Maps and diagrams should be used whenever they serve to illustrate the answer.
- iii. Do not write on the question paper.

**SECTION A (24 MARKS) COMPULSORY**

**QUESTION ONE (12 Marks)**

- a) (Khetia's supermarket, a leading fast moving consumer goods retail chain organisation is looking to provide its clients with an online solution to making purchases. The idea is to have an online store where the clients can order and pay for goods online with the goods being delivered at the clients doorstep thereafter.
- (i) Describe how the system engineers for Khetia's may incorporate software reuse in the design of such a system. (4 Marks)
  - (ii) Assuming that all visitors accessing Khetia's online store are not required to log in for them to start shopping. Identify a potential functional issue that may arise if the system is not carefully designed. (2 Marks)
- b) Discuss the 6 factors that a software engineer needs to put into consideration when planning for software reuse (6 Marks)

**QUESTION TWO (12 Marks)**

- a) Expound on the six most important design issues that have to be considered in distributed systems engineering (6 Marks)
- b) The goal of service candidate identification should be to identify services that are logically coherent, independent, and reusable. However, identifying service candidates is sometimes difficult because you have to envisage how the services will be used. You have to think of possible candidates then ask a series of questions about them to see if they are likely to be useful services. Highlight the possible questions that you might ask to identify potentially reusable services (6 marks)

**SECTION B (36 Marks)****QUESTION THREE (12 Marks)**

Component composition is the process of integrating components with each other, and with specially written 'glue code' to create a system or another component. Assuming that you are composing two components (A and B) to create a new component. With the aid of a well labelled diagram discuss the three approaches to component composition. (12 Marks)

**QUESTION FOUR (12 Marks)**

- a) Given that embedded systems are reactive systems that react to events in their environment, the most general approach to embedded, real-time software design is based on a stimulus-response model. Describe the two classes in which stimuli fall into (4 Marks)
- b) Embedded systems' patterns are process-oriented rather than object- or component-oriented. Expound on the three real-time architectural patterns that are commonly used (6 Mark)
- c) Provide a brief explanation of your understanding of COTS products reuse (2 Marks)

**QUESTION FIVE (12 Marks)**

- a) Discuss the key stages in the process of service construction by composition (6 Marks)
- b) Detail six features that clearly distinguish COTS solution systems from COTS integrated systems (6 Marks)

**QUESTION SIX (12 Marks)**

- a) Provide a brief description of the seven main activities that need to be included in a real-time software design process: (7 Marks)
- b) The engineering of distributed systems has a great deal in common with the engineering of any other software. However, there are specific issues that have to be taken into account when designing this type of system. These arise because the system components may be running on independently managed computers and they communicate across a network. Therefore a distributed approach to system engineering has to be adopted. Describe the advantages of using a distributed approach to systems development (5 Marks)

**QUESTION SEVEN (12 Marks)**

- a) Identify the four most important goals of project management (4 marks)
- b) Describe five responsibilities associated with the position of a software project manager (5 Marks)
- (c) Risk may be viewed as something that you'd prefer not to have happen. Risks may threaten the project, the software that is being developed, or the organization. Illustrate three related categories of risk that may affect a software engineering project. (3 Marks)

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