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CICT PART III SECTION 5

SOFTWARE ENGINEERING

THURSDAY: 26 November 2020.   **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question.

QUESTION ONE

(a)   (i)   You have been tasked to carry out a requirements analysis of a proposed software system.

                Appraise four steps you would follow in order to effectively execute the above task.   (8 marks)

         (ii)   Part of your tasks in (a) (i) above will include a "gap analysis".

                Describe the gap analysis process.   (4 marks)

(b)   A team appointed to undertake software testing intends to undertake various component tests on a newly developed system.

         Discuss the four types of interfaces that might need to be tested during this process.   (8 marks)
                                                                                                (Total: 20 marks)

QUESTION TWO

(a)   Interpret the following information system audit processes:

         (i)   Auditing around the computer.   (2 marks)

         (ii)   Auditing with the computer.   (2 marks)

         (iii)   Auditing through the computer.   (2 marks)

(b)   Describe each of the following techniques of verification and validation as used in software development:

         (i)   Symbolic execution.   (2 marks)

         (ii)   Statistical analysis.   (2 marks)

         (iii)   Walkthrough.   (2 marks)

(c)   In a bank, an account is a relationship between a customer and the bank. A customer has a name. A bank has a branch. A customer may have several accounts of different types and balances.

         Required:
         Draw an entity relationship (ER) diagram for the scenario described above.   (8 marks)
                                                                                                (Total: 20 marks)

QUESTION THREE

(a)   (i)   Distinguish between "software re usability" and "software re-use".   (2 marks)

         (ii)   Discuss three benefits and three problems associated with software re-use.   (6 marks)

(b)   (i)   Describe the term "commissioning documents" as used in software engineering.   (2 marks)

         (ii)   Explain why it is necessary to keep properly maintained commissioning documents.   (4 marks)

(c)   Agile methods of systems development are said to lack maturity and have some problems as well as opportunities for improving the process of software construction.

Citing three supporting reasons, explain the above view.   (6 marks)
(Total: 20 marks)

QUESTION FOUR
(a)   Explain the difference between the following terms as used in software engineering:

      (i)   Fault avoidance and fault tolerance.   (2 marks)

      (ii)   Usability and availability.   (2 marks)

(b)   Citing four reasons, support the proposition that it is necessary to measure software processes, products and resources.   (8 marks)

(c)   McCabe's complexity measures are based on a control flow representation of a program.

      Required:
      (i)   Highlight the two items used in the above software measure.   (2 marks)

      (ii)   Illustrate three notations used in the above software measure.   (6 marks)
(Total: 20 marks)

QUESTION FIVE
(a)   Justify why efficient data conversion is an important step in software change management.   (4 marks)

(b)   The Board of Directors of a financial company intend to acquire a software system for their banking sector. The Board has invited you to make a presentation to them on the process needed to acquire either an off-the-shelf or a custom-made-system. During the presentation, you will be required to explain methods necessary to ensure quality control and quality assurance in the whole process.

      Required:
      (i)   Outline the steps required to acquire either an off-the-shelf or a custom-made system.   (12 marks)

      (ii)   Differentiate between "quality assurance" and "quality control" as used in software engineering.
                                                               (4 marks)
(Total: 20 marks)

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