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**University Examinations 2016/2017**

SECOND YEAR FIRST SEMESTER EXAMINATION

FOR THE DEGREE OF

BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND FORENSICS

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

&

(YEAR FOUR SEMESTER ONE)BACHELOR OF MATHEMATICS AND COMPUTER SCIENCE

**CCS 3201/CCS 3325/ICS 2302: SOFTWARE ENGINEERING**

**DATE: DECEMBER 2016 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two***questions.

**QUESTION ONE (30 MARKS)**

1. When would you advice a developer to use ad hoc method for a software development project and when would you advice for the software engineering method? Justify your answers (6 marks)
2. Explain the differences between the following two phases from a computing practitioner’s perspective
3. Software engineering (2 marks)
4. Computer science (2 marks)
5. Software inspections are very important and must be undertaken for any non-trivial software development project. What are software inspections and at what phase of software development do we need them? (5 marks)
6. Distinguish between “software processes” and “software process models”. Give suitable examples in each case. (5 marks)
7. What management strategies would you use to address the following risks?
8. Lack of qualified staff (4 marks)
9. Some parts of the software not working correctly as per expectation despite the fact that the programmers have completed them. (3 marks)
10. Database is inefficient due to the fact that it has a very large number of records than recommended. (3 marks)

**QUESTION TWO (20 MARKS)**

A car manufacturer wishes to save weight and improve reliability by replacing most of the vehicle’s wiring harness with a local area network. Systems such as engine management, anti-lock braking, traction control and stability control will thus share common platform components. Your task is to ensure that the safety of these systems, and of the vehicle electronics overall, is not impaired by this upgrade.

1. Describe the methodology you would adopt for the project, and justify your choice. (5 marks)
2. How would you then ensure that subsequent development of these subsystems {which you should assume are supplied by different sub-contractors {does not compromise vehicle safety? (5 marks)
3. How might the completion times and costs be estimated for a new software engineering contract? (5 marks)

**QUESTION THREE (20 MARKS)**

1. After a progress assessment exercise one day, you discover that you are falling behind schedule with a software development project that you are currently working on.
2. What are some of the factors that could have led you to violate your original schedule? (3 marks)
3. Assuming that your client has refused to extend the schedule deadline, what other options do you have to correct this problem? (3 marks)
4. What challenges are you likely to face for each of the options you take in (ii) above. (4 marks)
5. You are require to design a software system for a student elections voting systems on which voters can see the list of candidates and select one to vote for. The system should check that each voter is eligible to vote. The returning officer should be able to print the total votes obtained by candidate and a list of the voters who have voted. To take care of any dispute that may possibly occur, the Dean of Students acting as an arbiter should be able to print the complete record of who voted for whom.
6. Identify the actors in this scenario (3 marks)
7. Draw a Use Case Diagram for the scenario (3 marks)
8. With suitable examples, differentiate the following concepts
9. System architecture (2 marks)
10. System design (2 marks)

**QUESTION FOUR (20 MARKS)**

1. Why is the analysis stage of software engineering considered so important? (5 marks)
2. What approaches can be taken to ensure it is successful? (5 marks)
3. If you were managing the evolution of a safety-critical product, what special steps would you take for risk reduction or due diligence reasons? (5 marks)
4. What is the main criterion for deciding whether or not to use the waterfall model in a software development project? (5 marks)

**QUESTION FIVE (20 MARKS)**

1. Describe the spiral model of software development (5 marks)
2. Give two examples of software engineering tasks where it is likely to be useful, and two where it is less likely to be (5 marks)
3. If you were developing a security-critical system, how would you integrate the security requirements engineering and assurance processes into the model? (5 marks)
4. Explain whether there would be any difference for a hardware development project. (5 marks)