Faculty of Engineering sciences

UNIVERSITY OF GHANA

FACULTY OF ENGINEERING SCIENCES
FIRST SEMESTER EXAMINATIONS: 2012/2013
LEVEL 200: BACHELOR OF SCIENCE IN ENGINEERING

CPEN 207: INTRODUCTION TO SOFTWARE ENGINEERING [*3 Credits*]
TIME: 3 HOURS

Instructions: Answer ***ALL*** questions. Circle the correct answer on the question paper in section A and answer section B in the answer booklet provided.

ID_NUMBER:_____ **SIGNATURE:**_____

SECTION A: [50 MARKS]

A1. Software engineers use the following to enhance the quality of their products:

I. Tools II. Techniques III. Procedures IV. Paradigm

A. I and II
B. I, II and III
C. I, II and IV
D. I, II, III and IV

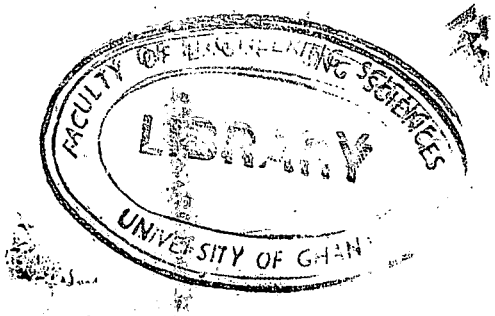
A2. A software process has the following characteristics:

I. The activities are organized in a sequence, so that it is clear when one activity is performed relative to the other activities techniques.
II. The process prescribes all of the major process activities.
III. Each process activity has entry exit criteria, so that we know when the activity begins and ends.
IV. Constraints or controls may apply to an activity only.

A. I and II
B. I, II and III
C. I, II and IV
D. I, II, III and IV

A3. Modelling a process offers the following merits

I. It forms a common understanding of the activities, resources, and constraints involved in software development.
II. Every process should be the same for all solutions.
III. It helps the development team find inconsistencies, redundancies and omissions in the process and in its constituent parts.



A. I and II
B. I and III
C. II and III
D. I, II and III

A4. The software process model which transforms specification to design is known as _____.

A. Waterfall B. data-flow model C. role/action model D. process model

A5. _____ approach of software development is customer centered

A. Waterfall B. Evolutionary development C. Formal transformation D. reusable components

A6. All paradigms of software development will have the _____ as one of its constituent part.

A. Workflow model B. data-flow model C. role/action model D. process model

A7. The following paradigms of software development is/are more likely found in other engineering disciplines.

I. The waterfall approach
II. Evolutionary development
III. Formal transformation
IV. Reusable components

A. I and II
B. II and IV
C. I and IV
D. I, II, III and IV

A8. Software systems that are old and yet to perform critical business functions faces _____.

A. The legacy challenge
B. The heterogeneity challenge
C. Delivery challenge
D. Maintenance challenge

A9. When software Engineers don't disclose information about their clients and employers to other people, what responsibility are they adhering to?

A. Confidentiality
B. Competence
C. Intellectual property right
D. Computer misuse

A10. The delivery challenge is the challenge of _____.

A. Delivering software on time
B. Shortening software delivery time
C. Delivering complex software on time
D. Delivering software late

A11. Each loop in the spiral model is divided into _____ sectors.

A. Two
B. Three
C. Four
D. Six

A12. The major distinguishing feature of the spiral model is _____.

A. The setting of objectives in each phase
B. Specification, design and validation can be done concurrently
C. Consideration of risk
D. Conducting of a feasibility study

A13. Reuse-oriented development has the following merits:

I. amount of software to be developed is reduced
II. Cost of development is reduced
III. It is high risk approach to software development

A. I and II
B. I, II and III
C. I and III
D. II and III

A14. A detailed, mathematical formal definition of a system function is a _____.

A. User requirement
B. Formal transformation
C. Functional requirements
D. Requirement

A15. Non-functional requirement are mostly derived from the needs of the _____.

A. User
B. Software engineers
C. Project manager
D. Project team

A16. Non-functional requirements could be classified into _____ main categories.

A. Two
B. Three
C. Four
D. Five

A17. Requirement that specify how a software system behaves are known as _____.

A. Reliability requirements
B. Usability requirements
C. Product requirements
D. Performance requirements

A18. Robustness of a software system can be measured by _____.

A. Mean time to failure
B. Processed transactions per second
C. Availability
D. Percentage of events causing failure

A19. To develop a satisfactory system, the software engineers must have an understanding of the _____.

A. Functional requirement
B. Non-functional requirement
C. Application domain
D. System requirements

A20. User requirements are best written using _____.

A. Natural language
B. System models
C. Technical terms
D. English language

A21. The following are consumers of the software requirements specification.

I. Customers
II. Managers
III. Software engineers

A. I only
B. I and II
C. II and III
D. I, II and III

A22. Requirements engineering is concerned with _____.

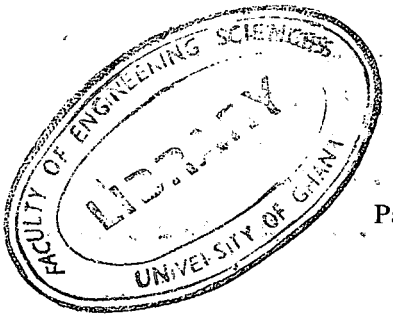
A. Testing of the system
B. System analysis process
C. Software maintenance
D. Activities needed to create and maintain a system requirement document

A23. Which of the following is the preferred standard method of communication for software practitioners?

A. Structural natural language
B. Design description language
C. Graphical notations
D. Mathematical specifications

A24. What is the most difficult and critical stage of the requirement engineering process?

A. Feasibility study
B. Requirements elicitation and analysis
C. Requirements specification
D. Requirements validation



A25. Repairing coding errors is _____ repairing requirement errors.

A. More expensive than
B. More cheaper than
C. The same as
D. 50 percent more than

A26. The process of converting a system specification into an executable system is known as _____.

A. programming
B. design
C. implementation
D. testing

A27. Software designers create _____ design version(s) for a every software system they produce.

A.One B. Two C. Four D. Several

A28. Interface design can be associated with _____.

A.GUI
B.The system
C.Subsystems
D.Architecture

A29. The essence of debugging is _____.

A.Location of errors
B.Repairing errors
C.Testing the system
D.Locating and correction of errors.

A30. Context models are used to define the _____ of the system.

A.Behavior
B.Environment
C.Architecture
D.State

A31. Which of the following is/are used in modeling the behavior of a system?

I. State machine model
II.Data-flow model
III. Architectural model

A.I only
B.II only
C.I and II
D.I, II and III

A32. Which model is characterized by system states and events which cause transitions from one state to another?

A. Data-flow model
B. State machine model
C. Architectural model
D. Process model

A33. Different types of users, using the system refers to the principle of _____.

A. User familiarity
B. User diversity
C. Consistency
D. User guidance

A34. The process of ensuring that the software meets the customer's expectation is.....

A. Testing
B. Verification
C. Validation
D. User requirements.

A35. The process of checking that the software conforms to its specification is referred to as _____.

A. Testing B. Verification C. Validation D. Software requirements specification

A36. What activity is needed to find inconsistencies between a program and its specification?

A. Defect testing
B. Debugging
C. Statistical testing
D. None of the above

A37. What name is given to the testing done by the customer?

A. Unit testing
B. Module testing
C. Sub-system testing
D. Acceptance testing

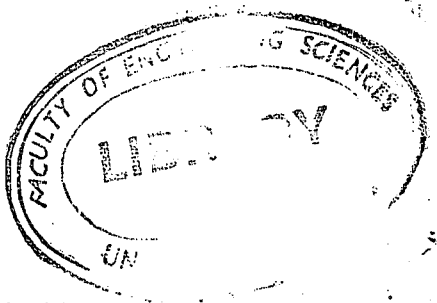
A38. Which of the following is usually the responsibility of programmers?

I. Unit testing
II. Module testing
III. Sub-system testing

A. I only B. II only C. I and II D. I, II and III

A39. Software that is used to support software process activities is referred to as.....

A. CASE
B. CAD
C. CADE
D. CAES



A40. Which risk can be identified in the following statement "The underlying technology on which the system is built is superseded by new technology".

A. Hardware unavailability
B. Requirement change
C. Technology change
D. Business risk

A41. The _____ nature of software causes problems for management.

A. tangible
B. intangible
C. complex
D. testing

A42. What risk type can be identified in the following statement "There will be a large number of changes to the requirements than anticipated".

A. Requirement change
B. product and project
C. Product
D. Business

A43. The process of identifying activities, milestones and deliverables produced by a project is referred to as _____.

A. Proposal writing
B. Project planning
C. Project monitoring and review
D. Personnel selection and reviews

A44. _____ relationship is between a client and a supplier.

A. an association
B. an aggregation
C. a dependency
D. a schedule algorithms

A45. In principle, the functional requirements specification of a system should be both.....

A. complete and efficient
B. consistent
C. complete and consistent
D. efficient

A46. In an activity network diagram, the longest path is referred to as _____.

A. critical length
B. critical deadline
C. critical path
D. critical milestone.

A47. It is general knowledge that inspections and reviews are more effective in discovering defects than testing.

A. True B. False

A48. There is a regular progress report in evolutionary development.

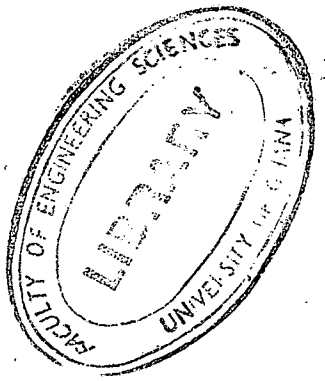
A. True B. False

A49. When using color in user interface design it is important to use color change to illustrate a significant event.

A. True B. False

A50. Program testing is the most widely used verification and validation technique.

A. True B. False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SECTION B: [50 MARKS]

Answer ***ALL*** questions in this section.

B1. [10 marks]

What will be the values of the array '**a**' after the function executes? You must trace the algorithm carefully outlining all your steps

```
void Mystery()
{
    int hold;
    int[] a = {62,4,10,33,1,6,2};
    for(int i = 0; i < a.length-1; i++)
    {
        for(int j = 0 ; j < a.length-1; j++)
        {
            if( a[j] <a [j+1])
            {
                hold = a[j];
                a[j] = a[j+1];
                a[j+1] = hold;
            }
        }
    }
}
```

B2. [10 marks]

What would be the value of '**mystery_num**' after the following block of code executes if **number=53468**. Trace the algorithm carefully outlining all your steps also showing how **each variable** changes.

```
int number, mystery_num = 0, digit;
while(number > 0)
{
    mystery_num = mystery_num * 10;
    digit = number % 10;
    digit = (digit + 7) % 10;
    mystery_num = mystery_num + digit;
    number = number / 10;
}
```

B3. [8 marks]

a) You are a software engineering consultant and have been called in by the vice-president for finance of Level200 Desserts, a corporation that manufactures and sells a variety of

desserts to restaurants. She wants your organization to build a stock control product that will monitor the company's product, starting with the purchasing of the various ingredients and keeping track of the desserts as they are manufactured and distributed to the various restaurants. What criteria would you use in selecting a life-cycle model for the project? **[5 marks]**

b) Briefly explain why non-functional requirement is critical to the system usability as compared to functional requirement. **[3 marks]**

B4. [10 marks]

Management of a car washing bay has decided to automate its car washing business. The customer chooses the type of wash and notes the type of car. The system computes the fee and displays the amount due on a control panel. The customer can then pay for the car wash. After payment, if the wash is currently busy, the system indicates that the customer must wait. Otherwise, the system indicates that the customer should drive the car into the car wash bay.

a) Develop a set of use cases (Use Case Diagram) for the operation of the washing bay. **[3 marks]**

b) Draw a sequence diagram for the above description. **[7 marks]**

B5.[12 marks]

a) You are asked by your manager to deliver software based on a schedule that you know can only be met by asking your project team to work unpaid overtime. All team members have young children. Discuss whether you should accept this demand from your manager or whether you should persuade your team to give their time to the organization rather than to their families. What factors might be significant in your decision? **[6 marks]**

b) Suggest ways in which the user interface to an e-commerce system such as an online bookstore or music retailer might be adapted for users who have a visual impairment or problems with muscular control. **[6 marks]**