

(Set-Q<sub>1</sub>)

**MCA-3rd**

**Software Engineering & OOAD**

Full Marks : 70

Time : 3 hours

Answer any **six** questions including Q. No. 1

*The figures in the right-hand margin indicate marks*

1. Give brief answers to the following questions :  

$2 \times 10$

  - (a) Why does the effort and time required to develop a program using the build and fix model increase exponentially with the size of the program ?
  - (b) What is the difference between functional and non-functional requirements ? Give one example of each type of requirement for a library automation software.
  - (c) Suggest the life cycle model that would be appropriate for developing a large object-oriented software. Briefly explain why you

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consider your suggested life cycle model is likely to be the best choice.

- (d) What is the difference between functional testing and structural testing? Is it recommendable to skip functional testing of a program unit, if through structural testing has been carried out on it? Justify your answer.
- (e) Suppose an organization mentions in its job advertisement that it has been assessed at level 3 of SEI CMM, what can you infer about the current quality practices at that organization?
- (f) What do you understand by an executable specification language? How is it different from a traditional procedural programming language? Give an example of an executable specification language.
- (g) Identify two metrics that can be determined from an analysis of a program's source code and would correlate well with the reliability of the delivered software.

- (h) Identify at least two important ways that one can adopt to increase the reusability of a function that you have written.
- (i) Give one real-life programming example of association relationship between two classes and represent it using UML syntax.
- (j) Represent the following using UML class diagram: "MCA Department runs many courses. Each course comprises of 40 hours of lecture."

2. (a) What is the difference between a data flow model and a control flow model of a program? Construct the data flow model of the following program : 6

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main() {                               | f(int a,int b){ | f1(){   | f2(){   |
int a[100,b[100];                       | if (a>b)f1(); | return; | return; |
for(i=0;i<100;i++) f(a[i],b[i]);        | else f2();   | }       | }       |
}                                         | }           |         |         |

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- (b) What is meant by CASE environment? How CASE tools are utilized in a CASE environment? 4



3. (a) What do you understand by inconsistencies, anomalies, and incompleteness in an SRS document. Identify the inconsistencies, anomalies, and incompleteness in the following requirements of an academic activity automation software of an educational institute :

“The semester performance of each student is computed as the average academic performance for the semester. The guardians of all students having poor performance in the semester are mailed a letter informing about the poor performance of the ward and intimating that repetition of poor performance in the subsequent semester can lead to expulsion. The extracurricular activities are also graded and taken into consideration for determination of the semester performance”. 5

- (b) Draw a class diagram using the UML syntax to represent the following aspects concerning a library. An issuable can either

be a book or a CD. Books can be either reference books or text books. The details of various issuable are maintained in a register called the issuable register. The library has many members whose details are maintained in a member register. A member can issue upto 10 issuable. 5

4. (a) Explain why reuse is more difficult in software development compared to hardware development. How can reusability of a piece of a code be enhanced ? 5
- (b) What do you mean by software reverse engineering ? How it contributes to software re-engineering and reuse ? 5
5. (a) What do you understand by the term phase containment of errors ? Why is phase containment of errors is important ? How can phase containment of errors be achieved ? 5
- (b) When in the life-cycle of a software product, are the non-functional requirements tested ?



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How are the different non-functional requirements tested? Explain your answer with respect to various categories of non-functional requirements. 5

6. (a) What is the difference between code inspection and code walkthrough? Give an example of the types of errors that are targeted to be detected during code inspection and code walkthrough? 5
- (b) Why is it important to properly document a software product? What are the different types of documents that need to be developed? 5
7. (a) What do you mean by black-box testing? Design black-box test suites for a function that checks whether a character string (of up to 25 characters in length) is a palindrome. 5
- (b) What do you understand by control flow graph? Why is it necessary to build a CFG? Explain with an example. 5

( 7 )

8. Write short notes (any two) :

5 × 2

- (i) Cohesion and coupling
  - (ii) Use-case diagram
  - (iii) Reverse engineering
  - (iv) Code maintainability and reusability.
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