2011

SOFTWARE ENGINEERING

Time Allotted : 3 Hours   Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

$$10 \times 1 = 10$$

i)   Which is not a type of software maintenance ?

   a)   Primitive

   b)   Corrective

   c)   Adaptive

   d)   Perfective.

ii)   Critical path method is a task of

   a)   Project planning

   b)   Project scheduling

   c)   Risk management

   d)   Configuration management.

iii) Which form of software development model is most suited to a system where all the requirements are known at the start of a project and remain stable throughout the project ?

a) Waterfall model

b) Incremental model

c) Evolutionary model

d) Spiral model.

iv) Which of the following statements is NOT true ?

a) A good design methodology should provide a clear division of design from implementation

b) A good design methodology should not promote a top-down decomposition strategy

c) A good design methodology should encourage phased development of the software

d) A good design methodology should help to minimize future maintenance.

v) Developing a new Database system is a/an

a) semi-detached type of software project

b) embedded type of software project

c) organic type of software project

d) none of these.

vi) COCOMO belongs to

    a)   Empirical estimation technique

    b)   Heuristic estimation technique

    c)   Analytical technique

    d)   none of these.

vii) Big-bang integration testing is useful for projects with

    a)   small number of modules

    b)   large number of modules

    c)   average number of modules

    d)   none of these.

viii) In COCOMO Model, if project size is typically 50-300 KLOC then which mode is to be selected ?

    a)   Organic

    b)   Semi-detached

    c)   Embedded

    d)   None of these.

ix) The data flow model of an application mainly shows

    a) the underlying data and the relationship among them

    b) processing requirements and the flow of data

    c) decision and control information

    d) communication network structure.

x) Usability defines the

    a) Extent to which a program can be reused

    b) Effort required to modify a program

    c) Effort required to locate and fix an error

    d) Effort required to learn, operate, prepare input and interpret output of a program.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.   3 × 5 = 15

2. What is Risk Management ? Explain five risk management techniques.   3 + 2

3. Why is Reliability an external atribute of the software ? List three internal product atributes that could affect reliability.

                                                         3 + 2

4. Draw a data flow diagram for the Simple Library Management System.

5. What is a control flow graph (CFG) ? Draw CFG and calculate the cyclomatic complexity for the following code :

    int x, y;

    {

        while (x! = y)

        {

        if (x>y) then

        x = x – y;

        else y = y – x;

        }

    return x;

    }   2 + 3

6. Explain the phases of Spiral Model with advantages and disadvantages.   3 + 1 + 1

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) What are conceptual models ?

    b) What are the different phases of waterfall model ? What are the major disadvantages in waterfall model of SDLC ?

    c) What are the desired characteristics of a software process model ?   3 + 8 + 4

8. a) What is ISO 9000 standard ? Why does software industry require this certification ?

   b) Define 'Software Quality' and 'Software Reliability'.

   c) What are the different coasts associated with software quality ?

   d) Briefly discuss the different stages of 'Capability Maturity Model'. What is 'Six sigma' ?

9. a) Suppose that an on-the-shelf software product for business application costs Rs. 50,000 and that its size is 40 KLOC. Assuming that in-house engineers cost Rs. 6000 per programmer-month (including overheads), would it be more cost effective to buy the product or build it ? Which elements of the cost are not included in the' COCOMO estimation model ? What additional factor should be considered in making the buy/build decision ?

   b) Explain the concept of COCOMO Model.

   c) What is risk identification ? Discuss three main categories of risks which can affect a software project.

                                          5 + 4 + 2 + 4

10. a) Draw a use case diagram for library management system.

 b) What are top-down and bottom-up design methodologies ? Give one example of each.

 c) Distinguish between black-box and white-box testing.

7 + 5 + 3

11. Write short notes on any *three* of the following : 3 × 5

 a) Cohesion and coupling

 b) Reverse engineering

 c) Object-oriented design.

 d) Petri Net Models

 e) Stub and Driver modules in unit testing.