WEST BENGAL UNIVERSITY OF TECHNOLOGY

MCA-401

SOFTWARE ENGINEERING & TQM

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable. All symbols are of usual significance.

GROUP A
(Multiple Choice Type Questions)

1. Answer any *ten* questions. $10 \times 1 = 10$

(i) According to Putnam, project effort is inversely proportional to the fourth power of development time. Doubling the development schedule for a 100 person-month project would reduce the project effort to

(A) 50 PM (B) 7.16 PM

(C) 25 PM (D) 6.25 PM

(ii) The different project parameters can be modelled using suitable mathematical expression in the estimation technique known as

(A) Analytical technique (B) Statistical technique

(C) Heuristic technique (D) Delphi technique

(iii) Which one of the following can be used to relate the number of delivered lines of code to the effort and time required to develop the software?

(A) Normal distribution curve (B) Rayleigh-Norden curve

(C) Sigmoid curve (D) Regression curve

(iv) Which of the following estimation is carried out first by a project manager during project planning?

(A) Cost (B) Duration of the project

(C) Project size (D) Development effort

(v) Sliding window planning involves

(A) planning a project before development starts

(B) planning progressively as development proceeds

(C) planning a project after development starts

(D) none of these

(vi) SCCS is a

(A) S/w configuration mgmt. tool

(B) risk item

(C) testing tool

(D) none of these

(vii) Early Design Method (EDM) is used in

(A) Basic COCOMO (B) Intermediate COCOMO

(C) COCOMO II (D) None of these

(viii) Activities of a software project can be identified by

(A) SRS document (B) SPMP document

(C) Task planning sheet (D) Work breakdown structure

(ix) Milestones are used to

(A) know the cost of the project

(B) know the status of the project

(C) know the user expectation

(D) none of these

(x) A test case should have

(A) data input (B) state of the system

(C) expected output (D) all of the above

(xi) The term module in design phase refers to

(A) functions (B) procedures

(C) sub programs (D) all of the above

(xii) To determine the reliability of the product rather than discovering errors we do

(A) regression testing (B) mutation testing

(C) stress testing (D) statistical testing

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. Differentiate among basic COCOMO model, intermediate COCOMO model and complete COCOMO model. Discuss the advantages and disadvantages of Prototyping model. 3+2

3. Explain when to use PERT chart and when to use Gantt chart. What is sliding window planning? 3+2

4. What are the different types of cohesion that may exist between two modules? What is a structure chart? 3+2

5. What is a stereotype in UML? What is the difference between a sequence diagram and a collaboration diagram? 2+3

6. What do you mean by stub and driver module? What is stress testing? 3+2

GROUP C
(Long Answer Type Questions)

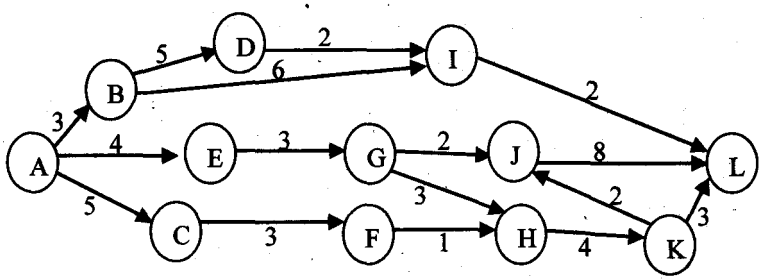
Answer any *three* questions. 3×15 = 45

7. (a) What do you understand by the term "structured programming"? How do modern programming language such as PASCAL and C facilitate writing structured programs? 2+2

   (b) How are the software project related parameters such as program length, program vocabulary, program volume, potential minimum volume, effort to develop the project, project development time estimated using analytical estimation technique? 1+1+2+1+1+1

   (c) A software uses 14 unique operators and its vocabulary is 21. Assuming that at least two operators are used in the most succinct representation of the program, along with all the unique operands, find the effort and time required for the project if the speed of mental discriminations is 18. 4

8. (a) The figure given below is an activity graph for a software development project: 3+3+3+2+1



The nodes labeled A to L are milestones. The number corresponding to each edge of the graph indicates the number of days required to complete the activities represented by the edge.

(i) For each activity compute the earliest start time (EST)
(ii) For each activity compute the latest start time (LST)
(iii) For each activity compute the float
(iv) Identify the critical path and critical activities
(v) Find out the duration of the project.

(b) What do you mean by free float and why is it necessary? 1+2

9. (a) What is the difference between a release and a version of s/w products? What do you understand by the terms change control and version control? What is Source Code Control System (SCCS) and how it works? 2+2+2+1+2

(b) A friend offers to play one of the two betting games with you. Game A is that you toss a coin twice. He pays you Rs. 10/- if you get two heads. You pay him Rs. 2/- for each tail you toss. Game B is that you also toss a coin twice, but it costs you Rs. 2/- to play and he pays you Rs. 10/- if you get two heads. Which game should you play? Draw a decision tree to show your answer. 1+3

(c) What are the objectives of formal technical review (FTR)? 2

10. (a) What is the difference between static and dynamic models in the context of object oriented modelling of systems? Identify the respective UML diagrams which provide these two models. 3+3

(b) Draw a class diagram using the UML syntax to represent the fact that an order consists of one or more order items. Each order item contains the name of the item, its quantity and the date by which it is required. Each order item is described by an item order specification object having details such as its vendor addresses, its unit price and manufacturer. 5

(c) How does data abstraction help in reducing the coupling in a design situation? Discuss the role of the data dictionary in a CASE environment. 2+2

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

(a) COCOMO II

(b) ISO 9000 Standards

(c) Function Point

(d) CASE Tool

(e) Mutation Testing

(f) Work Breakdown Structure