

Instruction to Candidates:

- 1) Section - A is compulsory.
- 2) Attempt any Nine questions from Section - B.

Section - A

Q1) (15 x 2 = 30)

- a) Define a system and its characteristics.
- b) Define in your own words critical path in the context of project scheduling.
- c) Identify one difficulty that might arise when prototyping real-time embedded computer systems.

- d) Briefly explain why keeping all members of a programming team informed about progress and technical decisions can improve group cohesion.
- e) Explain the difference between functional and non-functional requirements.
- f) What is the difference between Computer Science and Software Engineering?

- g) Define structural testing.
- h) Justify in one or two sentences the maxim “The sooner a bug is found and fixed, the cheaper.”
- i) Differentiate between top-down and bottom-up programming practice.

- j) Explain the role DFD in system design.
- k) Explain in one or two sentences why quality metrics by themselves are inadequate for predicting the quality of a software design.
- l) Differentiate between metric and model in the context of software.

- m) Name two software quality metrics.
- n) What do you mean by ISO-9000?
- o) Name two software cost estimation techniques.

(9 x 5 = 45)

Q2) Compare and contrast the Waterfall and Spiral models of the software lifecycle.

Q3) Software project planning, including both time and cost estimation, has historically been a very difficult and inaccurate activity. Give five (5) reasons why.

Q4) Give three examples of risks that may be identified by software project managers and suggest risk management strategies for each of the three risks.

Q5) What is SRS and what is the need to validate it? What are the characteristics of a good SRS?

Q6) What effect do coupling and cohesion have on integration testing? Explain what tests must be performed to ensure adequate testing of classes with high coupling.

Q7) What are the key features that distinguish structured development from object oriented development?

Q8) Consider the following function (assume that “and” and “or” expressions always evaluate both operands):

```
int f(int x, int y)
{
  int t = 0;
  if (x < 1 and y > 0) { t = y;}
  if (x > 1 or y > 10) { t = x; }
  return t;
}
```

(a) Define Decision Coverage and write down a set of test cases to achieve it.

(b) Define Condition Coverage and write down a set of tests cases to achieve.

Q9) What is data dictionary? Draw a DFD for withdrawing money from an ATM.

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Q10) Briefly explain the five levels of the Capability Maturity Model (CMM) model. What does it mean to say that company is CMM Level 4?

Q11) Define the components, connectors, and constraints of object-oriented software architectures. Give one feature of object-oriented systems that makes them easier to understand and one feature that makes them more difficult to understand.

Q12) A Video Library is in the business of renting and selling audio and video cassettes. The Library has number of suppliers enrolled with it. From time to time these vendors supply list of new cassettes to the Library. The manager after going through the list places the order with the vendor. The customers can take the membership of the Library by paying yearly registration fee to the Library. The customers who are members of the Library are also offered discounts on cassettes at the time of purchase. The normal customers who are not members can hire a cassette by paying a normal security with the shop. At the time of returning the cassette, if there is a delay a fine is also imposed. Every week a report is generated to find out the sale of cassettes and list of cassettes to be ordered. For the requirements given above develop an ER model.

Q13) What are the objectives of software design? How do we transform an informal design to a detailed design?