

B4.3-R3: SOFTWARE TESTING AND QUALITY MANAGEMENT

NOTE:

1. Answer question 1 and any FOUR questions from 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.

- a) Differentiate between top-down and bottom-up testing techniques. What is the need of drivers, stubs and scripts in performing these testing?
- b) Discuss various ways and means to minimise the cost of repairing defects. Give main objectives of a defect tracking system.
- c) Can a proof of correctness of software be provided? Discuss the purpose of performing formal technical reviews.
- d) Exhaustive testing of software is not possible. Justify this statement with an example.
- e) What are graph based testing methods? Discuss the use of graph matrices in testing.
- f) How does the testing in object oriented software differ from that in the conventional domain? Give components of the test plan document.
- g) Justify that "Software Quality Assurance is an umbrella activity." Differentiate between static and coverage analyzers.

(7x4)

2.

- a) Discuss the defect amplification model to illustrate the generation and detection of errors. Give major causes/origins of software defects along with their classification.
- b) How is the statistical quality assurance done by doing failure analysis? How does this process develop an indicator for the quality of the software?
- c) List various testability measures of software and explain any two of them.

(6+6+6)

3.

- a) Draw the control flow graph and calculate cyclomatic complexity of the following procedure

```
procedure average;
    {i=1; total.input=total.valid=0; sum=0;
      While (value[i] <> -999) && (total.input < 100)
        {total.input++;
          if (value[i]>=min) && (value[i]<=max)
            {total.valid++;
              sum=sum+value[i];}
          i++;
        }
      if (total.valid>0)
        {average=sum/total.valid;}
      else average=-999;
    }
```

- b) Briefly discuss Boundary Value Analysis and Equivalence Partitioning.
- c) Discuss objectives of the System Testing with brief discussion on Stress Testing and Security Testing.

(6+6+6)

- 4.
- Give the procedure to calculate Function Point of software. What are the limitations of function points and how new features were incorporated to overcome these limitations.
 - With simple and modified Halstead's theory of software science, calculate Length and Volume measures for the following program


```

int gcd(x, y)
{
    while (x != y)
    if (x>y) then x=x+y;
    else y=y-x;
    return x;
}
      
```
 - Write short notes on correctness and consistency of OOA and OOD Models. (7+7+4)
- 5.
- What are the objectives of software measurement? How do we measure quality of software? Give some salient attributes of the software quality.
 - What are the main software quality metrics? Discuss some of them in brief. How does testing helps in quality assurance?
 - What are the components of ISO 9001? Compare ISO-9000 and CMM. (6+6+6)
- 6.
- What do you understand by Traceability? Discuss the use of Requirements-Design Traceability matrix.
 - What are different types of risks in software projects? Briefly discuss the risk mitigation and management.
 - What is the impact of software reuse on quality, productivity and cost? (6+6+6)
7. Write short notes on the following:
- Execution flow summarizers
 - Testing of real time systems
 - Regression Testing
 - Test data generators
 - Test planning and management tool
 - Requirements verification (6x3)