Code: AC125/AT125   **Subject: SOFTWARE TESTING**

AMIETE – CS/IT (New Scheme)

Time: 3 Hours   **December - 2017**   **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1   **Choose the correct or the best alternative in the following:**   **(2×10)**

a. Which of the following is an indirect measure of product?
   (A) Quality   **(B)** Complexity
   (C) Reliability   **(D)** All of these

b. In size oriented metrics, metrics are developed based on the _____.
   (A) Number of Functions   **(B)** Number of user inputs
   (C) Number of lines of code   **(D)** Amount of memory usage

c. What leads to built-in self test?
   (A) Difference in the development of faults during manufacturing or over time
   (B) Run time errors
   (C) Over head time in fault models
   (D) Error in test domain

d. If in a program, statement at one line depends on statement at another line because it may use the value of variable defined in the previous line. What is the kind of dependence mentioned here?
   (A) Control dependence   **(B)** Data dependence
   (C) Program dependence   **(D)** Sequence dependence

e. Boundary value analysis is a selection technique that targets _____ in applications at the boundaries of equivalence classes.
   (A) Errors   **(B)** Failures
   (C) Test   **(D)** Faults

f. _____ is a visual representation of a logical relationship among inputs and outputs that can be expressed as Boolean expressions.
   (A) Category partition   **(B)** Cause effect graphing
   (C) Control flow graph   **(D)** Program dependence graph

g. Strong mutation testing uses _____ for a mutant and its parent
   to run to completion at which point their respective outputs are compared.
   (A) Internal observations   **(B)** Mutation analysis
   (C) External observations   **(D)** All of these

h. In order to test an instantiated object, messages have to be passed to various
   methods. _____ amongst the following is an effective method for this
   purpose.
   (A) Alpha-Omega method   **(B)** Beta testing method
   (C) Inheritance   **(D)** None of these

i. _____ diagram represents the different entities and relationship that exists
   among the entities.
   (A) Sequence diagrams   **(B)** Class diagrams
   (C) Activity diagrams   **(D)** State diagrams

j. Match the following
List-I	**List-II**
A. Condition coverage	1. Black-box testing
B. Equivalence class partitioning	2. System testing
C. Volume testing	3. White-box testing
D. Alpha testing	4. Performance testing

   (A) A-2, B-3, C-1, D-4   **(B)** A-3, B-4, C-2, D-1
   (C) A-3, B-1, C-4, D-2   **(D)** A-3, B-1, C-2, D-4

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2   a.   Explain Test metrics and its classification in detail.   **(7)**

      b.   Explain the following in Software and hardware testing
        (i)   Fault model   (ii)   Test domain
        (iii) Test coverage   **(3×3)**

Q.3   a.   Explain with example, data dependence and control dependence in a program-
        dependence graph.   **(8)**

      b.   What are the different types of testing with respect to source of test
        generation? Explain in detail.   **(8)**

Q.4   a.   What are the steps helpful in creating equivalence classes for a given program
        requirements. Explain.   **(8)**

      b.   Explain the various steps in the generation of tests using the category partition
        method.   **(8)**

Q.5 a. What is mutation? Explain different mutants.   **(10)**

b. Explain the procedure for test adequacy assessment.   **(6)**

Q.6 a. What is Structural and functional testing?   **(6)**

b. What is the purpose of coverage measurement?   Explain scalability of coverage measurement based on open systems.   **(10)**

Q.7 a. Explain the several tools that aid in testing OO systems?   **(8)**

b. What are the principles in which Alpha-Omega method works? What   are   the objectives achieved by Alpha-Omega method?   **(8)**

Q.8 a. Explain cause-effect graphing.   **(6)**

b. Explain test generation from predicates.   **(4)**

c. Explain following terms:
(i)   Predicates and Boolean expressions
(ii) Boolean operator fault and Arithmetic expression fault
(iii) Predicate constraints   **(3×2)**

Q.9 a. Explain the procedure for test adequacy assessment using control flow with suitable example.   **(8)**

b. Why classes have to be tested individually first in OO Testing?   **(8)**