Code: AC16/AT13   **Subject: SOFTWARE ENGINEERING**

AMIETE – CS/IT (OLD SCHEME)

Time: 3 Hours   **JUNE 2012**   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.   Alpha testing is done by

        (A) Developer   **(B)** Tester
        (C) Customer   **(D)** All the above

    b.   Management of software development dependents on

        (A) People   **(B)** Process
        (C) People and process   **(D)** Product

    c.   Statistically maximum percentage of errors belong to the following phase of SDLC

        (A) Specifications   **(B)** Coding
        (C) Design   **(D)** Testing

    d.   Level-0 DFD is similar to the process of transforming a model into source code is

        (A) Activity diagram   **(B)** Context diagram
        (C) System diagram   **(D)** State diagram

    e.   The following is not a feature of process metrics

        (A) Effort   **(B)** Cost and schedule
        (C) Time   **(D)** Number of defects

    f.   Phase sensitive effort multipliers and three level product hierarchy are used in

        (A) Putnam resource model   **(B)** Risk assessment model
        (C) COCOMO model   **(D)** Multivariable model

g. Elimination of irrelevant data and function definition is

   (A) Encapsulation   **(B)** Hiding
   (C) Secrecy   **(D)** Abstraction

h. In basic execution model, failure intensity is given by

   (A) $\lambda(\mu) = \lambda_0\left(1 - \dfrac{\mu}{V_0}\right)$ **(B)** $\lambda(\mu) = \lambda_0\left(1 - \dfrac{\mu^2}{V_0}\right)$

   (C) $\lambda(\mu) = \lambda_0\left(1 - \dfrac{V_0^2}{\mu}\right)$ **(D)** $\lambda(\mu) = \lambda_0\left(1 - \dfrac{V_0}{\mu}\right)$

i. A function of *n* variable in robust testing for boundary value analysis yields:

   (A) $6n + n$ **(B)** $6n + 1$
   (C) $6n * 1$ **(D)** $6n * n$

j. Adaptive maintenance is related to modification in software due to

   (A) Increase in complexity
   (B) Demand of new functionalities
   (C) Failures
   (D) Changes to match the working environment

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

Q.2 a. Explain Managed and Optimized CMM Levels.   **(5)**

   b. Compare the following software life cycle models – iterative enhancement model and spiral model. Give their respective applications.   **(5)**

   c. Mention various components of software. Explain features of a software process.   **(6)**

Q.3 a. Explain requirement reviews and automated cross referencing in validation phase of SRS.   **(6)**

   b. Consider railway reservation system. Give the detail SRS. Draw E-R diagrams and data flow diagrams. Give its object oriented analysis.   **(10)**

Q.4 a. Explain the following. Also give various types of each:
      (i) Module Coupling   (ii) Module Cohesion   **(7)**

b. Compare top-down, bottom-up and hybrid design models.

c. Mention any two features of each of the following verification techniques:
(i) Consistency checkers   (ii) Critical Design Review   **(4)**

Q.5 a. Explain basic information flow model and sophisticated information flow model. Give their respective FAN IN and FAN OUT equations.   **(4+2)**

b. Define the following terms and give their respective equations:
(i) Program Length   (ii) Program Volume
(iii) Program Effort   **(6)**

c. Explain the features of data structure metrics.   **(4)**

Q.6 a. Draw the flow of risk management activities. Explain the functionality of each component.   **(5)**

b. Compare basic, intermediate and detailed COCOMO models.   **(6)**

c. Consider a large scale project for which the manpower requirement K is 1000 PY and the development time is 4 year 9 months. Calculate the following:
(i) Peak manning
(ii) Manpower cost after 2 year 6 months   **(5)**

Q.7 a. Explain the relationship between software reliability and failure intensity.   **(4)**

b. Explain the following reliability models and give their respective equations:
(i) Logarithmic Poisson Model   (ii) Macro Model   **(6)**

c. Assume a program experience 150 failures in infinite time. The expected failure now is 72. The initial failure intensity was 20 failures/CPU hr. Determine the value of current failure intensity. Find the execution time between present failure intensity of 4.9 failures/CPU hr and an objective of 0.007 failures /CPU hr.   **(6)**

Q.8 a. Compare decision table based testing and equivalence class testing.   **(6)**

b. Define cyclomatic complexity.   **(1+3)**
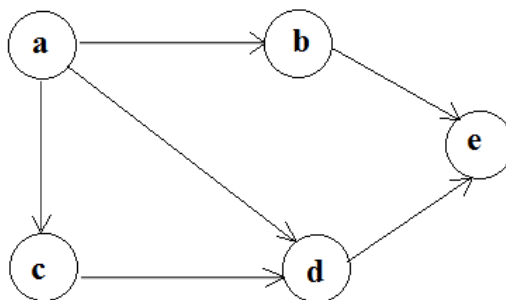
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Consider the above graph and calculate the cyclomatic complexity by:
(i) McCabe's equation
(ii) Predicate method
(iii) Region method

c. Explain any three debugging techniques. Give their respective features, advantages and disadvantages. **(6)**

Q.9   a. Compare the following categories of software maintenance techniques:
(i) Corrective maintenance
(ii) Adaptive maintenance
(iii) Perfective maintenance   **(6)**

b. Explain Boehm's software maintenance model and give its applications.   **(5)**

c. Explain the features of function oriented software design.   **(5)**