MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : MCA-401

SOFTWARE ENGINEERING & TQM

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

   i) Evolutionary model is sometimes known as
      a) meta model
      b) successive version and incremental model
      c) both (a) and (b)
      d) none of these.

   ii) What part does not belong to Feasibility Study ?
      a) Legal Feasibility
      b) Economic Feasibility
      c) Political Feasibility
      d) Operational Feasibility.

iii) Which phase is included in the SRS ?
   a) Error handling
   b) Data descriptions
   c) Functional Description
   d) Performance Description.

iv) Which of the following is able to measure the size of the software without its source code ?
   a) FPA
   b) IFM
   c) Cyclomatic Complexity
   d) None of these.

v) The most desirable type of coupling is
   a) control coupling b) Common coupling
   c) Data coupling d) Stamp coupling.

vi) Cardinality in an ER-Diagram represents
   a) number of attributes in an entity
   b) the order of co-related entities
   c) the number of sub-entities
   d) degree of a relationship.

vii) Critical Path Method is a task of
   a) Project Planning b) Project Scheduling
   c) Project Assessment d) Risk Assessment.

viii) Which of the following models require the maximum involvement of users ?
   a) V model
   b) Prototype Model
   c) Spiral Model
   d) Formal Method Model.

ix) According to COCOMO no. of cost drivers is

a) 10 b) 15

c) 20 d) 14.

x) Data hiding can be achieved by

a) Inheritance b) Encapsulation

c) Abstraction d) Polymorphism.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following $3 \times 5 = 15$

2. "Every Binary Relational schema is in BCNF". Prove this statement. Define Candidate key. 4 + 1
3. Discuss different kinds of Anomalies with an example. Define Lossless join decomposition with example. 3 + 2
4. Show by example that there are schedules possible under the Tree Protocol that are not possible under the Two Phase Protocol and vice versa. $2\frac{1}{2} + 2\frac{1}{2}$
5. Explain with example a preemptive technique for deadlock prevention.
6. Explain the usefulness of ACID properties. 1 + 4

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Consider the following set F of functional dependencies for relation schema R= (A, B, C, D, E) and F = {A->BC, CD->E, B->D, E->A}.

i) Compute F^+. (Closure of F)

ii) Compute B^+. (Closure of attribute B)

iii) List the candidate keys for R. 5 + 3 + 2

b) For the relation R = (A,B,C,D) and FD F={A→B, A→C, C→D}, R is decomposed into R1 = (A, B, C, P) and R2 = (C, D). Is the above decomposition lossless join decomposition ? Dose this decomposition preserved the dependency ? 5

8. a) Let R (A, B, C, D) be a relation, and F = {A →→B, A→→C} set of MVD. Decompose R to design 4 NF.

b) What are the features of OODBMS ? What are the advantages and disadvantages of OODBMS ?

c) State the rules of concurrency control.

5 + (3 + 2 + 2) + 3

9. a) Draw the precedence graph to test conflict serializability of the following schedule :

R1 (X); R2 (X); W1 (X); R1 (Y); W2 (X); W1 (Y).

b) What is cascadeless schedule ? Why is cascadelessness of schedules desirable ? Prove that every cascadeless schedule is also recoverable schedule.

c) Define DKNF. Give an example. 5 + (1+2+3) + (2+2)

10. a) What are the advantages of DDBMS over DBMS ?

b) Describe the different kinds of fragmentations.

c) Explain the different levels of distributed transparency. 5 + 6 + 4

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

a) Checkpoints.

b) Shadow Paging.

c) CASE tools

d) Advantages of PL/SQL over SQL.

e) Timestamp ordering protocol.