KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2023

Marks Scored:

Level : B.E./B.Sc.
Year : III
Course : COMP 302
Semester : II
Exam Roll No. :
Time: 30 mins.
F. M. : 10
Registration No.:
Date : 25-june

SECTION "A"
[20Q. × 0.5 = 10 marks]

Encircle the most appropriate option.

1. The approach used in top-down analysis and design is _____.
   a. to identify the top-level functions by combining many smaller components into a single entity
   b. to prepare flow charts after programming has been completed
   c. to identify a top-level function and then create a hierarchy of lower-level modules and components
   d. All of the above

2. Strategic information is needed for _____.
   a. day-to-day operations
   b. meet government requirements
   c. long range planning
   d. short range planning

3. Documentation of a system is prepared at _____.
   a. every stage
   b. system design
   c. system analysis
   d. system development

4. The feasibilities studied in the preliminary investigation is (are) _____.
   a. technical feasibility
   b. economic feasibility
   c. operational feasibility
   d. all of these

5. Requirements also serve as an evaluation checklist at the end of the development project, so they are sometimes called _____.
   a. System Development Life Cycle
   b. CASE tool
   c. Phased Conversion
   d. Success factors

6. The analyst learns about the manager's information needs through the use of _____.
   a. mail survey
   b. in-depth interview
   c. controlled experiment
   d. observation

7. A square symbol in a DFD _____.
   a. defines a source or destination of system data
   b. identifies data flow
   c. represents a process that transforms incoming data flow(s) into outgoing data flows
   d. is a data store-data at rest or a temporary repository of data

8. A data flow diagram is _____.
   a. the modern version of a flowchart
   b. mainly used at the systems specification stage
   c. the primary output of the systems design phase
   d. All of the above

9. Which of the following tools is **NOT** used for process descriptions?
   a. pseudocodes
   b. decision tables
   c. structured English
   d. data dictionaries

10. The following while structure is wrong because _____.

```
balance =500
while balance <=1000 do
Write (amount due - balance)
Read next record
end while
```

   a. read must appear before write
   b. this loop will never terminate
   c. no read allowed in a loop
   d. the contents of the next record are not known

11. Which of the following statements is **NOT TRUE**?
   a. Entity Relationship Diagrams are used to design files.
   b. Systems Overview can be prescribed by Data Flow Diagrams.
   c. Phases, in a Systems life cycle, are fixed and invariant.
   d. Indexed files are faster than sequential files in all situations.

12. In an ER diagram, the relationship is _____.
   a. an item in an application
   b. a meaningful dependency between entities
   c. a collection of related entities
   d. related data

13. Encapsulation in object-oriented modeling is useful as _____.
   a. it allows improving methods of an object independent of other parts of system
   b. it hides implementation details of methods
   c. it allows easy designing
   d. encapsulates attributes and operations of object

14. _____ relationship between use cases means that the base use case explicitly incorporates the behavior of another use case at a location specified in the base.
   a. Exclude
   b. Include
   c. Extend
   d. Abstract

15. Which option is **NOT TRUE** about SQA?
   a. Audits and reviews to be performed by the team
   b. Amount of technical work to be performed
   c. Evaluations to be performed
   d. Documents that are produced by the SQA team

16. Select the people who identify the document and verifies the correctness of the software _____.
   a. Project manager
   b. SQA team
   c. Project team
   d. All of these

17. The agile software development model is built based on _____.
   a. Linear Development
   b. Incremental Development
   c. Iterative Development
   d. Both Incremental and Iterative Development

18. The incremental model of software development is _____.
    a. a reasonable approach when requirements are well defined
    b. a good approach when a working core product is required quickly
    c. the best approach to use for projects with large development teams
    d. a revolutionary model that is used for commercial projects

19. Given the following relation
    Student (roll no, name, course no, course max. marks, year of study, address)
    The corresponding 3 NF relations are _____.
    a. student (roll no, name, year of study, address)
       course (course no, course max. marks)
    b. student (roll no, name, year of study, address)
       student (roll no, course no) course (course no, course max. marks)
    c. student (roll no, name, address)
       year (roll no, year of study) course (course no, course max. marks)
    d. student (roll no, name, address)
       course (course no, course max. marks, year of study)

20. A 3 NF relation is converted to BCNF by _____.
    a. removing composite keys
    b. removing multivalued dependencies
    c. dependent attributes of overlapping composite keys are put in a separate relation
    d. dependent non-key attributes are put in a separate table

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SECTION "B"
[6Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. Why is it important to use systems analysis and design methodologies when developing information systems? Briefly describe the types of information systems needed for the operational level, management level and strategic level of an organization. [1+3]

2. List the steps in the project initiation and planning process. What are the potential consequences of not assessing the technical risks associated with an information system development project? [1+3]

3. How can CASE tools be used to support requirements determination? Which type of CASE tool is appropriate for use during requirements determination? [1+3]

4. Describe what is meant by full functional dependency, how does it relates to 2NF.
Draw E-R diagrams with attributes, cardinality, and identifiers for the given description: Customers identified by a CUSTOMER-NAME and with an ADDRESS buy items, items are identified by an ITEM-NO and have a COLOR. The QTY-BOUGHT of an item by each customer is recorded. An item can be bought by many customers. [1+3]

5. What are the major roles and steps during software process inspection, Explain. [2+2]

6. What is a software process model? Identify the projects (two each) where you would use the waterfall model, evolutionary models, or Spiral model of software engineering. Give your opinion on each case. [1+3]

7. Write short notes on (*ANY TWO*): [2+2]
   a. Rapid Application Development (RAD)
   b. Joint Application Design (JAD)
   c. Software Quality Assurance (SQA)

SECTION "C"
[2Q. × 8 = 16 marks]

Attempt *ANY TWO* questions. (**Question No. 9 is compulsory**)

8. a. What is a DFD? Why do systems analysts use DFDs? Explain the rules for drawing good DFDs. [1+1+2]

   b. Develop a Context diagram and Level-0 DFD for a general online Food Ordering System. [1+3]

9. a. Describe the conditions when Structure English, Decision Tree or Decision Table is effective. [3]

b. Samjhana must decide which courses to register for this semester. She has a part-time job, and she is waiting to find out how many hours per week she will be working during the semester. If she works 10 hours or less per week, she will register for three classes, but if she works more than 10 hours per week, she will register for only two classes. If she registers for two classes, she will take one class in her major area and one elective. If she registers for three classes, she will take two classes in her major area and one elective. Use a decision table to represent this logic. [5]

10. Suppose you want to develop software for an alarm clock. The clock shows the time of day and the user can choose between a 12 hour or 24 hour format. Using buttons, the user can set the alarm time with hours and minutes fields individually. It is possible to set one or two alarms. When an alarm rings, it will make some noise. The user can turn it off, or choose to 'snooze'. If the user does not respond at all, the alarm will turn off itself after 3 minutes. 'Snoozing' means to turn off the sound, but the alarm will ring again after 10 minutes of delay. This snoozing time is pre-adjustable.

a. Identify the top-level functional requirements for the alarm clock, and model it with a use case diagram. Make use of include and extends relations wherever necessary. [4]

b. Develop a sequence diagram for the same. [4]