KATHMANDU UNIVERSITY
End Semester Examination
February, 2025

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 10 FEB 2025

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate option from each set of choices

1. The process of understanding and specifying in detail what the information system should accomplish is called system ____.
   a. Design b. Specification c. Analysis d. Administration

2. Which of the following principles of project management defines and controls the functions that are to be included in the system?
   a. Project quality management b. Project time management
   c. Project cost management d. Project scope management

3. _____ includes a review of existing procedures and information flow.
   a. Feasibility Study b. System Analysis c. System Design d. Feasibility Analysis

4. Decision tree uses:
   a. Pictorial depiction of alternate conditions
   b. Nodes and branches
   c. Consequences of various depicted alternates
   d. All of the above

5. A decision table facilitates conditions to be related to:
   a. Actions b. Programs c. Tables d. Operation

6. In order to understand the working of an organization for which a computer based system is being designed, an analyst must:
   a. Look at only current work and document flow in the organization
   b. Discuss with top level and middle level management only
   c. Interview top, middle, line managers and also clerks who will enter data and use the system
   d. Only clerical and middle level staff who have long experience in the organization and will be users of the system

7. Changing an operational information system is:
   a. Impossible b. Expensive and done selectively
   c. Never required d. Usually done

8. By metadata we mean:
   a. Very large data b. Data about data c. Data dictionary d. Meaningful data

9. A context diagram
   a. Describes the context of a system
   b. Is a DFD that gives an overview of the system
   c. Is a detailed description of a system
   d. Is not used in drawing a detailed DFD

10. Which property is possessed by a physical DFD?
   a. It does not concern itself with material flow.
   b. It has no means of showing material flow.
   c. It can show only stored material.
   d. It can show the flow of material.

11. Which of the following is not a factor in the failure of the systems development projects?
   a. Size of the company
   b. Inadequate user involvement
   c. Failure of systems integration
   d. Continuation of a project that should have been canceled

12. The set of possible values for an attribute is called a:
   a. Domain b. Range c. Set d. Key

13. The ERD is used to graphically represent the ____ database model:
   a. Condensed b. Physical c. Logical d. Conceptual

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

15. Which of the following is TRUE?
   a. Every relation is 3NF is also in BCNF.
   b. A relation R is in 3NF if every non-prime attribute of R is fully functionally dependent on every key of R.
   c. Every relation in BCNF is also in 3NF.
   d. No relation can be in both BCNF and 3NF.

16. Consider the following relational schemes for a library database:
   Book (Title,Author,Catalog_ no, Publisher, Year, Price)
   Collection (Title,Author,Catalog_ no) with the following functional dependencies:
   I. Title Author → Catalog_no
   II. Catalog_no → Title Author Publisher Year
   III. Publisher → Title Year Price
   Assume {Author, Title} is the key for both schemes. Which of the following statements is true?
   a. Both book and collection are in BCNF
   b. Both book and collection are in 3NF only
   c. Book is in 2NF and collection is in 3NF
   d. Both book and collection are in 2NF only

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17. _____ captures the intended behavior of a system.
a. Use Case b. Class c. Component d. State diagram

18. What is the purpose of a sequence diagram?
a. To show the interactions between actors and a system
b. To show the behavior of objects in a system
c. To show the flow of activities in a system
d. To show the order and timing of interactions between objects

19. The review type _____ is used for reviewing safety-critical components in a software project, a more formal, documented review, based on rules and checklists needed.
a. Informal review b. Inspection c. Walkthrough d. Technical review

20. Decision support systems (DSS) are essential for _____.
a. Top-level strategic decision-making.
b. Providing statutory information.
c. The day-to-day operation of an organization.
d. Ensuring the organization remains profitable.

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SECTION "B"
[6 Q. × 4 = 24 marks]

Attempt ANY SIX questions. Write the answers in your own words as far as practicable.

1. Describe your university or college as a system. What is the input? The output? The boundary? The components? Their interrelationships? The purpose? The interfaces? The environment? Draw a diagram for this system. [4]

2. List and describe the common skills and activities of a project manager. Describe the activities performed by the project manager during project initiation, planning and execution. [4]

3. Suppose you were asked to lead a JAD session. List 10 guidelines you would follow to assist you in playing the proper role of a JAD session leader. [4]

4. How can prototyping be used for requirements determination? Describe if it is advantageous or not over the traditional methods? [4]

5. Discuss the significance of ER Model during database analysis. [4]

   Draw E-R diagrams with attributes, cardinality, and identifiers for the given description:

   Each semester, each student must be assigned an adviser who counsels students about degree requirements and helps students register for classes. Students must register for classes with the help of an adviser, but if their assigned adviser is not available, they may register with any adviser. The system must keep track of students, their assigned adviser, and with whom the student registered for the current term.

6. What is the difference between software quality control and quality assurance? Explain the steps during software inspection. [4]

7. Describe your semester project in brief? What process model did you use for developing the project: the waterfall model, evolutionary models, Spiral model or something else, justify [4]

P.T.O.

SECTION "C"

[2 Q. × 8 = 16 marks]

Attempt ANY TWO questions. Write the answers in your own words as far as practicable.

8.

a. Why do systems analysts use Data Flow Diagrams (DFDs)? List out the key rules associated with process, data store, source/sink and data flow for creating DFDs. [4]

b. Develop a Context diagram and Level-0 DFD for a generic online food ordering system. [4]

9.

a. What is a process description? Elaborate on Structured English, Decision Tree and Decision Tables with a suitable example of each? [4]

b. Use a decision table to represent the logic given below. [4]

Abhiyan must decide which courses to register for this semester. He has a part-time job, and he is waiting to find out how many hours per week he will be working during the semester. If he works 10 hours or less per week, he will register for three classes, but if he works more than 10 hours per week, he will register for only two classes. If he registers for two classes, he will take one class in his major area and one elective. If he registers for three classes, he will take two classes in his major area and one elective.

10. Suppose you want to develop an information system for Kathmandu University. A student can enroll in a Program at a Department in a particular School. The student registers mandatory courses and can also take electives as per the rules. The student performs other activities like fee payment, sit in the examinations and view results. Make other necessary assumptions and model the system.

a. Identify the top-level functional requirements for the university system, and do the use case modeling for the system. You may complement the process with relevant use case diagrams [3]

b. Develop a sequence diagram for a use case scenario. [3]

c. Identify the potential classes for the system and model them with the help of class diagrams. [2]