

KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2025

Marks Scored:

Level : BIT

Year : I

Exam Roll No. :

Time: 30 mins.

Registration No.:

Course : COMP 302

Semester : II

F. M. : 10

Date : 08 APR 2025

SECTION "A"

[20Q. × 0.5= 10 marks]

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

1. Which of the following is the primary purpose of System Analysis?
 - a. To implement the system
 - b. To identify and understand user needs
 - c. To design the system's user interface
 - d. To test the system after development
2. Which model is a sequential design process that proceeds through stages like requirement analysis, design, implementation, testing, and maintenance?
 - a. Waterfall model
 - b. Agile model
 - c. Spiral model
 - d. V-Model
3. What is a primary purpose of a "Feasibility Study" in System Analysis?
 - a. To gather user requirements
 - b. To decide if the system is technically and financially viable
 - c. To test the developed system
 - d. To define project timelines
4. What is the main role of a System Analyst in the SDLC?
 - a. To write the code
 - b. To analyze, design, and document system requirements
 - c. To manage the project budget
 - d. To test the system
5. A Use Case Diagram is used to show:
 - a. How data flows through a system
 - b. The behavior of a system from the user's perspective
 - c. The system's architecture
 - d. The system's physical design
6. What is the primary goal of database normalization?
 - a. To improve data redundancy
 - b. To organize data in a way that reduces redundancy and improves data integrity
 - c. To increase data storage space
 - d. To decrease system performance
7. What is the first normal form (1NF) concerned with in database design?
 - a. Eliminating partial dependencies
 - b. Ensuring that each column contains atomic values
 - c. Removing transitive dependencies
 - d. Eliminating data redundancy

8. Which of the following is a characteristic of a "Prototyping" model?
 - a. It involves creating a complete system in one go
 - b. It involves repeated user feedback and system iterations
 - c. It follows a strict sequence of stages
 - d. It is less time-consuming than other models

9. Which of the following diagrams represents the interactions between users and the system?
 - a. Context Diagram
 - b. Entity-Relationship Diagram
 - c. Data Flow Diagram
 - d. Use Case Diagram

10. What does "3NF" (Third Normal Form) focus on in database design?
 - a. Eliminating transitive dependencies
 - b. Ensuring that every table has a primary key
 - c. Ensuring data redundancy
 - d. Organizing data into separate tables with foreign keys

11. Which of the following is a primary benefit of creating a system prototype?
 - a. Clear and detailed documentation of requirements
 - b. Early user feedback to improve system design
 - c. Reduced development time
 - d. It removes the need for system testing

12. Which diagram is used to represent data entities and their relationships in a system?
 - a. Data Flow Diagram
 - b. Entity-Relationship Diagram
 - c. Use Case Diagram
 - d. Sequence Diagram

13. In a Data Flow Diagram, what does a "process" represent?
 - a. A data store
 - b. An external entity
 - c. A transformation of data
 - d. A flow of data between entities

14. Which phase of the SDLC involves converting the system design into the actual system?
 - a. Analysis
 - b. Design
 - c. Implementation
 - d. Testing

15. What is the role of "End-User" involvement in the system design process?
 - a. To gather user requirements and test the system
 - b. To write code for the system
 - c. To provide detailed system documentation
 - d. To manage project budgets

16. Which type of diagram is used to show the flow of messages between objects in the system?
 - a. Sequence Diagram
 - b. Use Case Diagram
 - c. Entity-Relationship Diagram
 - d. Class Diagram

17. What does the "Entity" represent in an Entity-Relationship Diagram?
 - a. A process
 - b. A data flow
 - c. A physical object or concept about which information is stored
 - d. A user interaction

18. In system analysis, what is the purpose of creating "Data Dictionaries"?
- a. To list all the processes in the system
 - b. To define and describe data elements, their relationships, and constraints
 - c. To test system performance
 - d. To track project progress
19. Which of the following is **NOT** a characteristic of a system?
- a. It has interrelated components
 - b. It has a specific purpose or goal
 - c. It cannot be divided into smaller components
 - d. It interacts with its environment
20. Which method is used to gather system requirements from users?
- a. Data flow diagrams
 - b. Interviews and questionnaires
 - c. Class diagrams
 - d. Program coding

KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2025

Level : BIT
Year : I
Time : 2 hrs. 30 mins.

08 APR 2025

Course : COMP 302
Semester : II
F. M. : 40

SECTION "B"

[6 Q × 4 = 24 marks]

Attempt **ANY SIX** questions.

1. What do you understand by "*System Analysis and Design*"? How does it help in developing an effective information system?
2. Explain the importance of *gathering user requirements* during the system analysis phase. What methods can be used to gather these requirements effectively?
3. In your opinion, what are the main challenges a *system analyst* faces during the design phase? How can these challenges be overcome?
4. What is the significance of "*user-centered design*" in system analysis? How does it impact the overall success of a system?
5. Discuss the role of communication between *stakeholders (users, developers, and analysts)* in the system design process. How does effective communication affect system outcomes?
6. What is the difference between *functional* and *non-functional requirements* in system analysis and design? Provide examples for each.
7. What is the relationship between *system analysis* and *system design*? How does a well-conducted analysis phase influence the design and development phases?

SECTION "C"

[2 Q × 8 = 16 marks]

Attempt **ANY TWO** questions.

8. The System Analyst plays a central role in the Software Development Life Cycle (SDLC). Discuss the responsibilities of the System Analyst throughout the SDLC, from planning and analysis to design and implementation. What skills are essential for a System Analyst, and how do these skills contribute to the success of the project? Reflect on the challenges a System Analyst might face during each phase and how they can address these challenges effectively.
9. Prototyping is a widely used approach in system development, especially in the design phase. Discuss the concept of system prototyping in System Analysis and Design. What are the key advantages and disadvantages of using prototyping compared to traditional development methods? In your answer, consider the impact of prototyping on user involvement, system testing, and overall project timelines. Provide examples of situations where prototyping would be most beneficial and when it might not be the best approach.

P.T.O.

10. Discuss the concept of database normalization and explain its importance in database design. Describe the process of transforming a database from the unnormalized form (UNF) to the First, Second, and Third Normal Forms (1NF, 2NF, and 3NF). For each normal form, provide a practical example of a database table that violates that form and explain how to resolve it. Additionally, explain the potential advantages and disadvantages of normalization in database management.

KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2025

Marks Scored:

Level : B.E.

Year : I

Exam Roll No. :

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Course : ENGG 112

Semester : II

F. M. : 10

Date :

5 APR 2025

SECTION "A"

[20Q. \times 0.5= 10 marks]

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

- In a resistor, the color coding is given as follows 1st band: brown, 2nd band: black, 3rd band: black, 4th band, tolerance in %: gold. What is the value of resistance?
a. 10Ω 1% tolerance
b. 100Ω 1% tolerance
c. 10Ω 5% tolerance
d. 100Ω 5% tolerance
- Ideal voltage source has _____.
a. Zero internal resistance
b. Large value of current
c. Infinite internal resistance
d. Low value of voltage
- The resistance of delta equivalent of the star connection in **Figure 1** is equal to
a. 40Ω
b. 20Ω
c. 6.66Ω
d. 60Ω

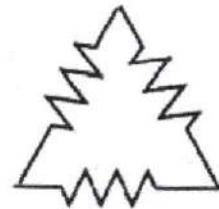
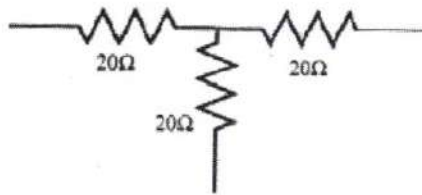


Figure 1

- A series R-L-C circuit has a series resonating frequency of 12000 Hz. If $R = 5\Omega$ and if X_L at resonance is 300Ω , the bandwidth is _____.
a. 200 Hz
b. 60 Hz
c. 40 Hz
d. 8 Hz
- The power factor at resonance in RLC series circuit is
a. 0
b. 0.8 lagging
c. 0.8 leading
d. 1
- The apparent power drawn by an AC circuit is 10kVA and active power is 8KW. The reactive power in the circuit is _____.
a. 2 kVAR
b. 6 kVAR
c. 8 kVAR
d. 10 Kvar
- The current across the open circuit is _____.
a. minimum
b. maximum
c. negative
d. zero

8. The value of I for the circuit of **Figure 2** is _____ mA
 a. 1.8 b. -1.8 c. -3.6 d. 3.6

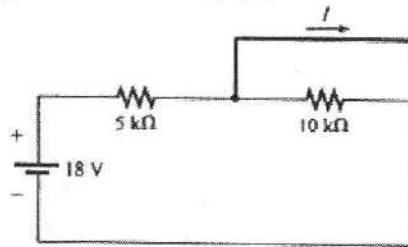


Figure 2

9. Which of the following statement is correct for the balanced three phase star connected system
 a. $V_L = V_\phi$ and $I_\phi = I_L$ b. $V_L = \sqrt{3}V_\phi$ and $I_\phi = I_L$
 c. $V_L = V_\phi$ and $\sqrt{3}I_\phi = I_L$ d. $V_L = V_\phi$ and $I_\phi = \sqrt{3}I_L$
10. Norton's Equivalent circuit consists of
 a. series combination of R_N, V_N , and R_L b. series combination of R_N, V_N
 c. parallel combination of R_N, V_N d. parallel combination of R_N, V_N , and R_L
11. You have to connect 1500Ω resistor in a circuit but you have some 1000Ω resistors only, how would you connect 1000Ω resistors to obtain 1500Ω ?
 a. 2 in parallel b. 2 in parallel and 1 in series
 c. 2 in series d. 2 in series and 1 in parallel
12. What is the phase relationship between the given sinusoidal waveforms?
 $V = 10 \sin(\omega t + 30^\circ)$ and $I = 5 \sin(\omega t - 70^\circ)$
 a. V leads I by 70° b. I leads V by 30°
 c. V leads I by 100° d. I leads V by 100°
13. Inductor behaves as open circuit at _____.
 a. infinity frequency b. zero frequency
 c. resonance frequency d. cut-off frequency
14. For maximum power transfer to the load, the value of load resistance (R_L) should be _____.
 a. maximum b. minimum c. R_{TH} d. $4R_{TH}$
15. In DC machines, number of commutator segments is equal to _____.
 a. number of armature coils b. number of armature coil sides
 c. number of armature turns d. number of armature conductors
16. In a series RL circuit, if the apparent power is 300 kVA and the reactive power is 180 kVAR, the reactive power is _____.
 a. 80 kW b. 240 kW c. 233 kW d. 90 kW

17. In the following **Figure 3**, current flowing through the $30\ \Omega$ resistor is _____.

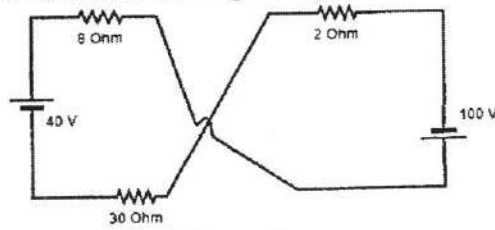


Figure 3

- a. 5.5 A b. 3.5 A c. 1.5 A d. 0.5A
18. At what frequency will an inductor of 5 mH have the same reactance as a capacitor of $0.1\ \mu\text{F}$?
- a. 2.13 KHz b. 5.67 KHz c. 7.12 KHz d. 9.32 KHz
19. The value of current I of the circuit in **Figure 4** is approximately _____.
- a. $72.57 \angle 38^\circ$ b. $40.16 \angle 60^\circ$ c. $51.61 \angle 32^\circ$ d. $43.36 \angle 66^\circ$

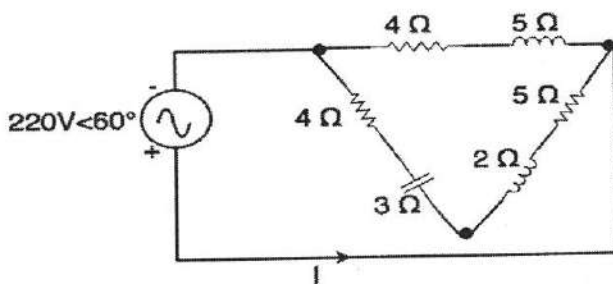


Figure 4

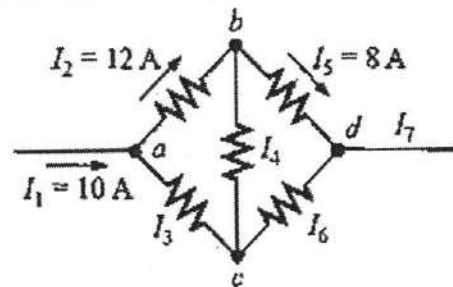


Figure 5

20. The current (I_3) in the circuit of **Figure 5** is _____ A.
- a. 2 b. 10 c. 22 d. 30

