



RAN-2511000902022003

Second Year Bachelor of Computer Applications (Sem. - II) Examination October - 2025

Digital Logic and Computer Organization

સૂચના : / Instructions

- (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book.
- (2) All questions are compulsory.
- (3) Figures to the right indicate full marks.

Seat No.:

Student's Signature

Q. 1. Multiple Choice Questions (1 mark each) (Any 5)

(05)

1. Which of the following statements is true about digital signals?
 - A) They have infinite precision.
 - B) They can take only discrete values.
 - C) They are continuous in nature.
 - D) They are always represented in decimal form.
2. A multiplexer is also known as:
 - A) Data selector
 - B) Data distributor
 - C) Encoder
 - D) Decoder
3. What is the primary purpose of the instruction cycle?
 - A) Fetch the instruction from memory
 - B) Decode the instruction
 - C) Execute the instruction
 - D) All of the above
4. Which of the following is a basic memory element?
 - A) Multiplexer
 - B) Flip-Flop
 - C) Decoder
 - D) ALU
5. Which of the following is NOT a type of bus architecture?
 - A) System Bus
 - B) Address Bus
 - C) Data Bus
 - D) Graphics Bus
6. Which of the following is NOT a combinational circuit?
 - A) Adder
 - B) Decoder
 - C) Flip-flop
 - D) Multiplexer
7. A demultiplexer is used to:
 - A) Select one input out of many outputs
 - B) Direct a single input to multiple outputs
 - C) Perform binary addition
 - D) Encode multiple inputs into a single output

Q. 2. Short Questions (Any 5)

(05)

- A. Define Boolean algebra.
- B. Why are digital systems preferred over analog systems in computing?
- C. What is the function of registers in a CPU?
- D. What is the toggling condition in a T flip-flop?
- E. What is Direct Memory Access (DMA)?

- F. Which type of shift register can shift data in both directions?
- G. What are the different levels of cache memory?

Q. 3. Answer the Following (Any 2) (10)

1. Explain how a NAND gate can be used to implement other basic logic gates. Support your answer with logic circuit diagrams.
2. Design and explain the working of a 2-to-4 decoder with a truth table.
3. What is a parity generator? Explain the working of even and odd parity generators with a circuit diagram and an example.

Q. 4. Answer the Following (Any 2) (10)

1. Differentiate between primary and secondary memory. Discuss the characteristics and functions of primary and secondary memory in a computer system, providing examples of each.
2. Differentiate between synchronous and asynchronous counters.
3. What are shift registers? Explain their types and applications in digital circuits with a block diagram.

Q. 5. a. Answer the Following (Any 2) (10)

1. Describe the Von Neumann architecture with a labeled diagram.
2. Explain the concept of pipelining in a CPU.
3. Discuss the main components of a computer system, including the central processing unit (CPU), memory, input/output devices, and how they interact within the system.

Q. 5. b. Answer the Following (Any 2) (10)

1. Explain the different types of optical and magnetic storage systems. Discuss the working principles, examples and applications of each type of storage system.
2. Explain the different types of buses in a computer system.
3. Describe the working of direct memory access (DMA) and its advantages.
