

Dr. Babasaheb Ambedkar Open University
Term End Examination July – 2026

Course	: BCA	Date	: 09-07-2026
Subject Code	: BCAIN/BCAOL-204	Time	: 03:00pm to 05:15pm
Subject Name	: Digital Electronics and Computer Organization	Duration	: 02.15 Hours
		Max. Marks	: 70

Section A

Answer the following (Attempt any three) (30)

1. Explain different Number Systems used in Digital Electronics.
2. Discuss the fundamental Boolean laws, De Morgan's Theorems and their applications in simplifying logic expressions.
3. Discuss Flip-Flops in detail.
4. List various Logic Gates and Explain any two in detail.
5. Discuss Stack Organization, Addressing Modes and Program Interrupts.

Section B

Answer the following (Attempt any four) (20)

1. Differentiate between Analog Signals and Digital Signals.
2. Explain the concept of 2's Complement with a suitable example.
3. Write a short note on Gray Code.
4. Explain the working of a Multiplexer.
5. What is Direct Memory Access (DMA)? State its advantages.
6. Explain Memory Organization in a Digital Computer.

Section C

Part – A (Multiple Choice Questions) (10)

Q.1 Which number system uses sixteen distinct symbols?

- | | |
|-----------|----------------|
| A) Binary | B) Decimal |
| C) Octal | D) Hexadecimal |

Q.2 A NOT gate is also known as what?

- | | |
|-----------------|------------------|
| A) An inverter | B) A buffer |
| C) A comparator | D) An oscillator |

Q.3 When both J and K inputs of a JK Flip-Flop are HIGH ($J = 1$, $K = 1$), the output will:

- | | |
|---------------------|------------------------------|
| A) Remain unchanged | B) Reset to 0 |
| C) Set to 1 | D) Toggle its previous state |

Q.4 Which digital circuit selects one input from several inputs and forwards it to a single output?

- | | |
|----------------|-------------|
| A) Decoder | B) Encoder |
| C) Multiplexer | D) Register |

Q.5 Which memory retains stored information even after the power supply is switched OFF?

- | | |
|--------|---------|
| A) SRM | B) DRAM |
|--------|---------|

C) ROM

D) Cache Memory

Q.6 Which register generally stores the address of the next instruction to be executed?

A) Memory Data Register

B) Instruction Register

C) Program Counter

D) Accumulator

Q.7 Which addressing mode directly specifies the operand value within the instruction?

A) Direct Addressing

B) Indirect Addressing

C) Immediate Addressing

D) Indexed Addressing

Q.8 Which bus transfers memory addresses from the CPU to memory?

A) Control Bus

B) Address Bus

C) Data Bus

D) I/O Bus

Q.9 Which cache mapping technique allows a memory block to be placed in any cache line?

A) Direct Mapping

B) Fully Associative Mapping

C) Set Associative Mapping

D) Sequential Mapping

Q.10 Which device enables high-speed data transfer between an I/O device and main memory without continuous CPU intervention?

A) ALU

B) DMA Controller

C) Decoder

D) Encoder

Part – B (State whether the following statements are true or false)

(10)

- 1 Gray Code is commonly used to minimize errors during digital state transitions.
- 2 A NAND gate is considered a universal logic gate.
- 3 JK Flip-Flop can operate without an invalid input condition.
- 4 A Multiplexer has one input and multiple outputs.
- 5 ROM is a non-volatile memory.
- 6 The Program Counter contains the address of the next instruction to be executed.
- 7 Immediate Addressing Mode stores the operand within the instruction itself.
- 8 The Address Bus is generally bidirectional.
- 9 DMA allows data transfer between memory and I/O devices with minimal CPU involvement.
- 10 Cache Memory generally provides faster access than Main Memory.
