



**C20-CAI-305**

**7320**

**BOARD DIPLOMA EXAMINATION, (C-20)**

**OCTOBER/NOVEMBER—2023**

**DCAI – THIRD SEMESTER EXAMINATION**

**DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION**

*Time : 3 Hours ]*

*[ Total Marks : 80*

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**PART—A**

3×10=30

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **three** marks.  
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. List any three postulates in Boolean algebra.
2. What is universal gate? List universal gates.
3. Define positive and negative levels.
4. Distinguish between synchronous and asynchronous counters.
5. List the types of registers.
6. Compare fixed point and floating point representation.
7. Define macro-operation and micro-operation.
8. State the principle of locality of reference.
9. Distinguish between main memory and auxiliary memory.
10. List the four bus systems.

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **eight** marks.  
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

**11.** (a) Implement AND, OR, NOT, EX-OR gates using NAND gates only.

**(OR)**

(b) Draw and explain 4-bit parallel adder using full adders.

**12.** (a) Explain the working of parallel-in serial-out shift register.

**(OR)**

(b) Explain the block diagram, waveforms and truth tables and working of R-S flip flop.

**13.** (a) Describe the sequential execution of a program stored in memory by the CPU.

**(OR)**

(b) Explain different types of instruction formats with examples.

**14.** (a) Explain memory hierarchy in computer.

**(OR)**

(b) Explain the principle of virtual memory organization in a computer.

**15.** (a) Explain synchronous and asynchronous data transfer.

**(OR)**

(b) Explain DMA controlled data transfer.

**PART—C**

10×1=10

- Instructions :** (1) Answer the following question.  
(2) The question carries **ten** marks.

- 16.** Draw and explain module -16 synchronous counter circuit diagram with waveforms and truth tables.

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