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B. TECH.
(SEM III) THEORY EXAMINATION 2022-23
DIGITAL ELECTRONICS

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data, then choose suitably.

SECTION A

1. Attempt all questions in brief. **2 x 10 = 20**

- (a) Explain the signed binary number.
- (b) Define the term universal gates and their applications.
- (c) Elaborate the term Combinational Circuits.
- (d) Define BCD codes and convert $(A5D8)_{16}$ into BCD number.
- (e) Explain the term storage elements.
- (f) Illustrate the term sequential logic.
- (g) Define the use of clock in digital circuits.
- (h) Explain the term synchronous circuits.
- (i) Illustrate the use of logic families in digital circuits.
- (j) Elaborate the term Fan-in in digital circuits.

SECTION B

2. Attempt any three of the following: **10x3=30**

- (a) Convert the following.
 1. $(5162)_{10} = ()_2$
 2. $(11011001101)_{2} = ()_{10}$
 3. $(6273)_{10} = ()_8$
 4. $(7869)_{10} = ()_{16}$
 5. $(A23B8)_{16} = ()_{10}$
- (b) Design 4:1 multiplexer using gates.
- (c) Elaborate the characteristic equations of S-R and J-K Flip-Flops.
- (d) Illustrate the State reduction technique for Digital Circuits.
- (e) Define the TTL (Transistor-Transistor-Logic) logic Family used for digital circuits.

SECTION C

3. Attempt any one part of the following: **10x1=10**

- (a) Design an XOR gate by using NAND gate implementation.
- (b) Define the De-morgans theorem of Logic Simplification for SOP & POS forms.

4. Attempt any one part of the following: **10x1=10**

- (a) Design a 4-bit adder circuit using gates.
- (b) Design a 3:8 Decoder circuit using gates.

5. Attempt any *one* part of the following: **10x1=10**

- (a) Elaborate the working and circuit of a Serial-in-Serial-Out shift register.
- (b) Explain the working and circuit of a modulo-5 counter using gates.

6. Attempt any *one* part of the following: **10x1=10**

- (a) Illustrate the working and applications of Asynchronous sequential circuits.
- (b) Explain the term, Hazard. Define different types of Hazards along with detection and reduction of Hazards.

7. Attempt any *one* part of the following: **10x1=10**

- (a) Define the SRAM cell with working and circuit diagram along with applications.
- (b) Elaborate the PLA (Programmable Logic Array) along with working and applications.

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