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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. $(11011001)_2 = ()_{10}$
3. $(6273)_{10} = ()_8$
4. $(7860)_{10} = ()_{16}$
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.