

**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.

QP23DP2\_290

| 25-03-2023 13:27:43 | 117.55.242.132