RV University

School of Computer Science and Engineering

B.Tech (Hons) Degree Examinations- January 2025

Semester : I

Course Code : CS1101

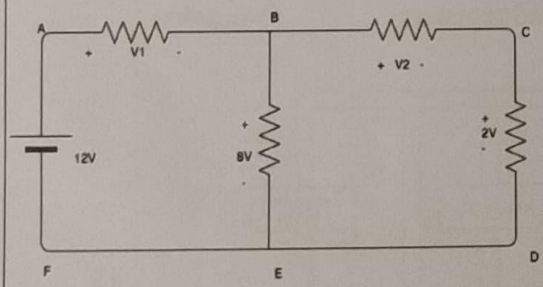
Course Title : Digital Systems and Computer Architecture

Duration : 2 Hours

Max. Marks: 30

Instructions to students:

- **Answer all questions**
- **No calculators are allowed**

Sl. No.	PART A – Max Marks(10)	Marks	L1-L6	CO
1.	**a.** Design a Half Subtractor with Truth Table and Implement it using appropriate Logic gates.**(2 marks)** **b.** Convert the following numbers into expected format. **(2 marks)** **(i) 0x7A to Octal** **(ii) $(56.27)_{10}$ to 5421 BCD code** **c.** Determine the Complement of Following Boolean expression A+B)C+D. **(1 Mark)**	5	L3	CO2
2.	**a.** Analyze the given circuit to identify the value of V1 and V2. **(2 marks)**  **b.** Analyze the importance of Q-Point in functioning of a Diode with a neat diagram. **(2 mark)** **c.** Analyze the behaviour of a capacitor in circuits with DC source. **(1 marks)**	5	L4	CO1

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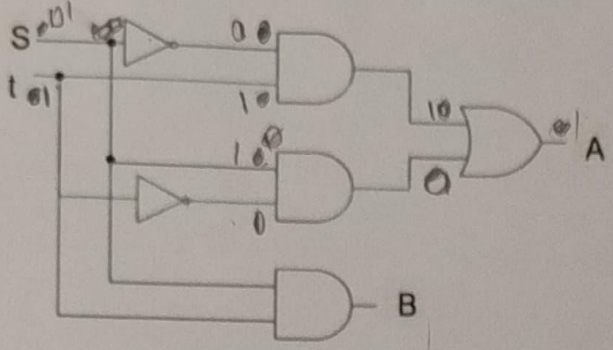
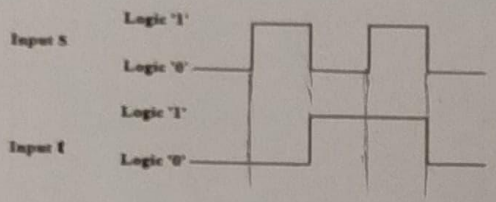
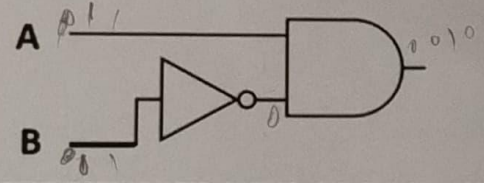
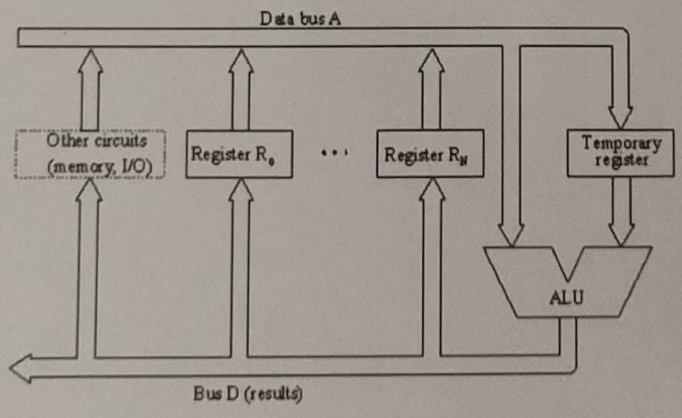
Sl. No.	PART B – Max Marks(20)	Marks	L1-L6	CO
1.	a. Simplify the Boolean expression F=AB+AB'+BC using both Karnaugh Map and Boolean algebra. Also draw the minimized circuit. **(3 marks)** b. Generate the output waveform for output A of the given circuit by applying the given input waveforms for **S and t.(2 marks)**   c. Differentiate between flip-flops and latches. **(2 marks)** d. Construct the below circuit with NAND gates only and write the truth table. **(3 marks)** 	10	L3	CO3
2.	a. Describe the sequence of operation for the instruction $R_0 = R_N + R_N$ using the ALU and registers **(3 marks)**  b. Describe how memory latency affects CPU performance and how cache memory helps reduce this impact. **(2 marks)**	10	L2	CO3

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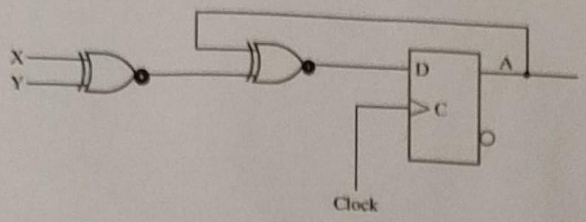
	c. Explain the process of deriving the state equation, state table, and state transition diagram for the given block diagram, and describe the relationships among these components.**(2 marks)**  **d.** Explain the operations that takes place after we turn on a computer. **(3 marks)**			