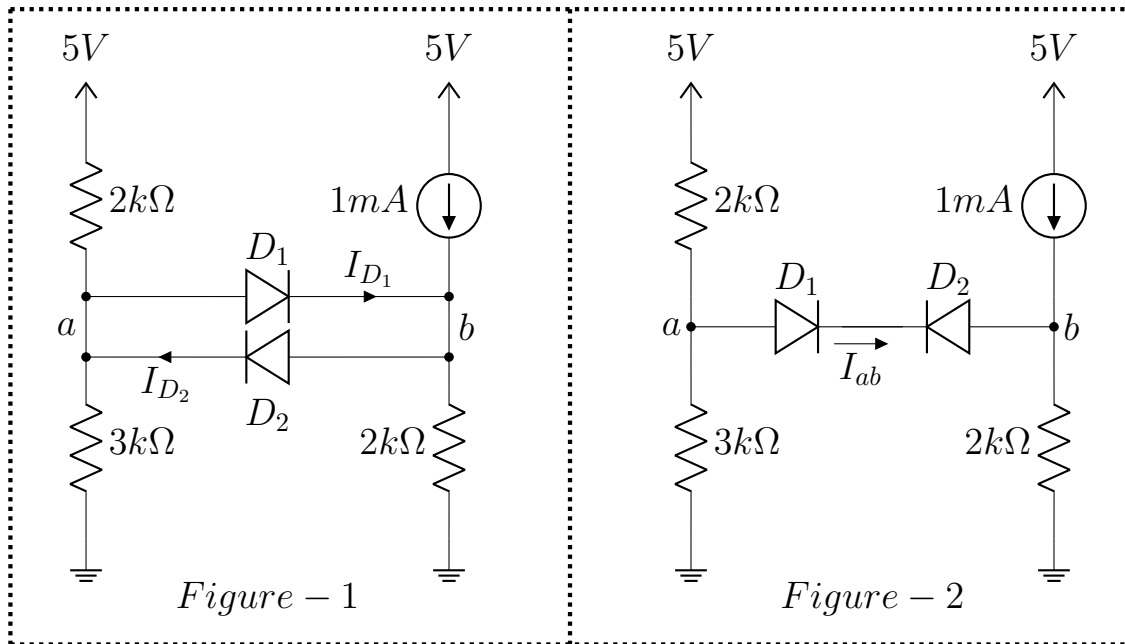


- ✓ **All questions** are compulsory. Marks allotted for each question are mentioned beside each question.
- ✓ Symbols have their usual meanings.

■ Question 1 of 2 [CO1, CO2, CO3] [10 marks]

- (a) [3 marks] **Calculate** the voltages at node a and b in Figure-1 if both of the diodes are disconnected.
- (b) [7 marks] **Analyze** the circuit in Figure-1 and **calculate** I_{D_1} and I_{D_2} using the method of assumed states. You must **validate** your assumptions. Use the CVD model with $V_{D_0} = 0.7V$ for both diodes.



■ Question 2 of 2 [CO1, CO2, CO3] [10 marks]

In the adjacent circuit $V_{DD} = 5\text{ V}$ and other parameters are as follows:

Input Voltages Diode Barrier Voltages

$V_1 = 2.0\text{ V}$ For D1: $V_{D1} = 0.3\text{ V}$

$V_2 = 2.2\text{ V}$ For D2: $V_{D2} = 0.7\text{ V}$

$V_3 = 2.4\text{ V}$ For D3: $V_{D3} = 0.5\text{ V}$

$V_4 = 2.5\text{ V}$ For D4: $V_{D4} = 0.9\text{ V}$

For D5 & D6: $V_{D5} = V_{D6} = 1\text{ V}$

Based on the given circuit, answer the following questions.

(a) [4 marks] **Determine** the values of V_{O1} and V_{O2} .

(b) [3 marks] **Calculate** the value of V_O .

(d) [3 marks] Solve the circuit to find V_O , assuming $V_3 = -2\text{ V}$ and $V_4 = -3\text{ V}$, while all other voltages remain unchanged. **Identify** the states of the diodes D3 and D4. [Hint: You may need to use the method of assumed states in order to determine V_{O2} .]

