Brac University

Semester: Summer 2025 Course Code: CSE251

Electronic Devices & Circuits

Section: 07 Faculty: TAV



Assessment: Quiz 4 Duration: 25 minutes Date: September 08, 2025 Full Marks: 15

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■ We value your input! Please provide specific suggestions for enhancing both the learning experience and the lecture materials. Think about areas like lecture pacing, clarity of explanations, use of visual aids, class engagement, or any specific topics you feel could be expanded or improved. I apologize for any shortcomings on my part. [5 marks]

Question 1 of 1

[CO2] [10 marks]

analyze the Circuit and calculate I_{DS} and V_{out} using the method of assumed states. You must validate your

sumptions. Here, $V_T = 1v$ and $K = 2mA/v^2$

Vet saturation mode,

Let saturation mode,

$$\int_{DS} = \frac{1}{2} \times \left(\frac{Y_{GS} - Y_{T}}{S_{GS} - Y_{S}}\right)^{\perp}$$

$$\Rightarrow I_{OS} = \frac{1}{2} \times 2 \left(5 - \frac{1}{2}\right)^{\perp}$$

$$\Rightarrow I_{OS} = \left(4 - \frac{1}{2}\right)^{2}$$

Again,
$$I_{DS} = \frac{\sqrt{5}}{3}$$

$$\Rightarrow \frac{\sqrt{5}}{3} = (4 - \sqrt{5})^{\frac{1}{2}}$$

$$V_{5} = 3, 5.33$$
Take this value

Rularie

1.
$$V_0 = 5 \rightarrow 1$$

2. Any assumption $\rightarrow 1$

3. formula $\Rightarrow 1$

4. kel $/V = IR \rightarrow 1$

5. $2 \text{ eqs} \rightarrow 2$

6. Solve $\Rightarrow 1$

1. $M\Omega$

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Q1

Resident ΔR_0

8. Validation ΔR_0

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$$J_{D} = \frac{3}{3} = 1 \text{ mA}$$

$$V_{GS} = 5 - 3 = 2V$$

$$I_{DS} = \frac{10 - V_{D}}{5} \Rightarrow 1 = \frac{10 - V_{D}}{5} \Rightarrow V_{D} = 5V$$

$$V_{OS} = 5 - 3 = 2V$$

$$V_{OV} = V_{OS} - V_{T} = 2 - 1 = 1V$$

$$V_{DS} > V_{OV} = V_{OS} - V_{T} = 2 - 1 = 1V$$

$$V_{DS} > V_{OV} = V_{OS} - V_{T} = 2 - 1 = 1V$$