

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, December 2024

B. Tech. Semester I, 2023-24

Roll No.....

EE1118: Fundamentals of Electrical and Electronics Engineering Time: 3 Hrs.

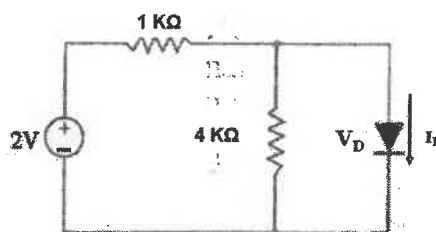
Max.
Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Mention all the assumptions for your answers clearly.

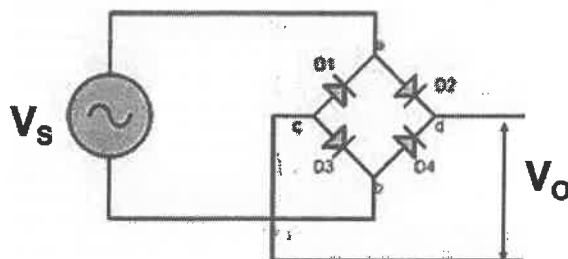
- Q 1.** In the circuit shown below, determine the state of the diode and find the diode current and voltage across it. Assume Si Diode.

5.0
(EE118.2)



OR

Sine wave of 25 V is applied at input of bridge circuit of full wave rectifier shown in figure below, what will be the peak inverse voltage of diodes. Assume that cut-in voltage of diodes is 0.75V. Additionally, can we use the same diodes to make a centered tap full wave rectifier designed for same output voltage as the bridge rectifier? Provide justifications.



- Q 2.** Explain how built in potential is formed at p-n junction. In a pn junction, $N_A = 10^{15} \text{ cm}^{-3}$ and $N_D = 10^{16} \text{ cm}^{-3}$. Given $n_i = 1.5 \times 10^{10} \text{ cm}^{-3}$, find the electron and hole concentrations in both the regions (ie n region and p region).

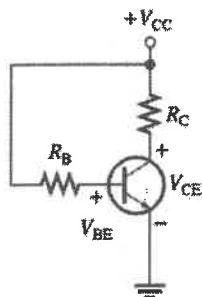
5.0
(EE118.1)

- Q 3.** Draw the schematic diagram showing BJT as a switch. Draw and explain the transfer characteristics of BJT switch, mentioning the input and output voltages at two modes of operation of the switch.

5.0
(EE118.3)

- Q 4. Determine the I_C and V_{CE} for the circuit in Figure below. Assume $V_{CC} = 5V$, $V_{BE} = 0.6V$, $R_B = 100\text{ k}\Omega$ and $R_C = 500\text{ }\Omega$, $\beta = 100$. What should be value of I_C so that BJT just enters saturation?

5.0
(EE1118.4)



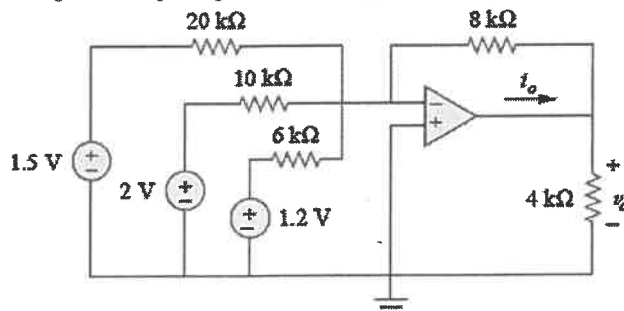
- Q5(a) A differential amplifier with a common-mode input of 200 mV and a difference-mode input of 64 mV has an output of 2 mV due to the common mode input and 8 V due to difference-mode input. Find the common-mode rejection ratio in decibels.

2.5+2.5
(EE1118.5)

- 5(b) Calculate the maximum peak output voltage obtainable from an op-amp with a slew rate of $1\text{ V}/\mu\text{sec}$ for input sinusoidal voltage having frequency of 100 kHz. What are assumptions made in these calculations?

- Q 6. Calculate the v_o and i_o in the op-amp circuit shown below

5.0
(EE1118.5)



OR

Calculate the v_o in the op-amp circuit shown below:

