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BTECH
(SEM II) THEORY EXAMINATION 2021-22
BASIC ELECTRONICS

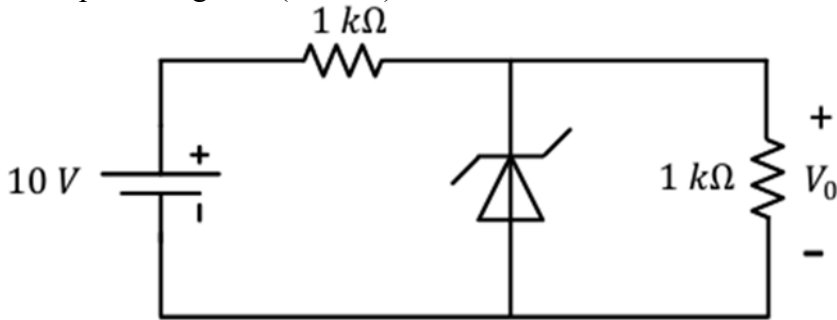
Time: 3 Hours

Total Marks: 70

Note: Attempt all Sections. If require any missing data; then choose suitably.

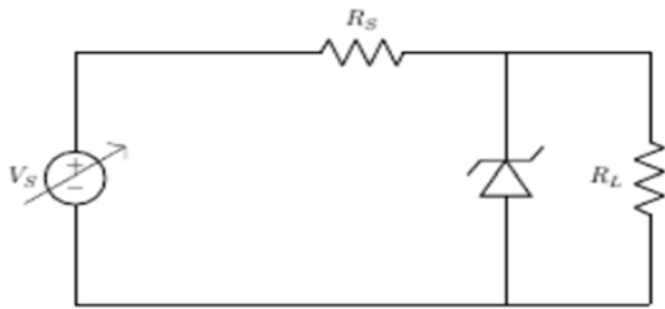
SECTION A

1. Attempt all questions in brief. 2x7 = 14

a.	What is the significance of PIV value?
b.	What is modulation?
c.	What is voltmeter.
d.	Calculate the forward bias current of a Si diode when forward bias voltage of 0.4V is applied, the reverse saturation current is $1.17 \times 10^{-9} \text{A}$ and the thermal voltage is 25.2mV
e.	What is transconductance of JFET.
f.	In the circuit shown below, the Zener diode is ideal and Zener voltage is 6 V. The output voltage V_0 (in volts) is <div style="text-align: center;"></div>
g.	What is input offset current?

SECTION B

2. Attempt any three of the following: 7x3 = 21

a.	Define n type enhancement MOSFET with characteristic graph.
b.	What is oscilloscope? Define with basic building block diagram.
c.	Derive the expression for inverting and non-inverting summer.
d.	What is modulation? Discuss the modulation and demodulation technique for AM.
e.	Determine the I_S and I_Z , where $R_S=5\text{K}\Omega$, $V_Z=50\text{V}$, $R_L=10\text{K}\Omega$ $80 \leq V_S \leq 120$. <div style="text-align: center;"></div>

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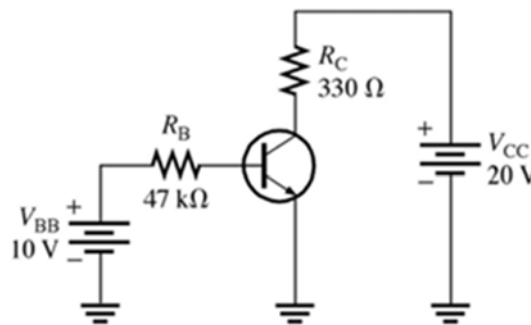
SECTION C

3. Attempt any *one* part of the following: 7x1 = 7

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|----|---|
| a. | Define ideal characteristic of op-amp. Draw the block diagram of ideal op-amp and state the virtual ground condition. |
| b. | Define slew rate and CMRR for op-amp. If, differential gain is 48db, and common mode gain is 2db then calculate CMRR in db. |

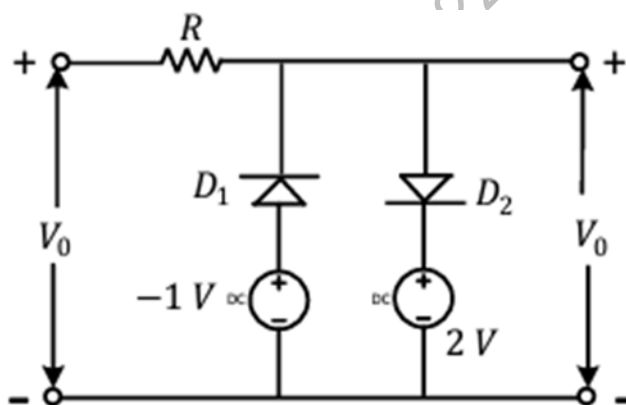
4. Attempt any *one* part of the following: 7x1 = 7

- | | |
|----|---|
| a. | Discuss the AC analysis of CE amplifier with r_e model, calculate the power gain, and current gain. |
| b. | Determine the Q-point and find the maximum peak value of the base current for linear operation. Assume $\beta_{dc} = 200$. |



5. Attempt any *one* part of the following: 7x1 = 7

- | | |
|----|---|
| a. | Two silicon diodes, with a forward voltage drop of 0.7 V, are used in the circuit shown in the figure. The range of input voltage V_i for which the output voltage $V_0 = V_i$ is |
|----|---|





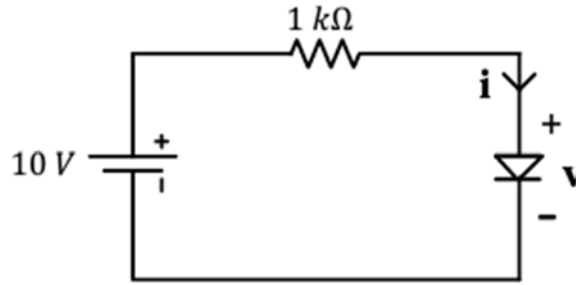
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b. The $i - v$ characteristics of the diode in the circuit given below are:

$$i = \begin{cases} \frac{v - 0.7}{500} A, & v \geq 0.7 V \\ 0A, & v < 0.7 V \end{cases}$$



6. Attempt any *one* part of the following:

7x1 = 7

a.	Discuss the working of CRO and state how to measure phase and frequency using neat diagram.
b.	Explain the working of DSO with neat diagram also state how DSO is different from analog oscilloscope.

7. Attempt any *one* part of the following:

7x1 = 7

a.	Explain communication system. state unit step and ramp signal.
b.	An audio frequency signal $5\sin(400t)$ is used to amplitude modulate a carrier of $25\sin 4\pi \times 10^7 t$. Calculate: <ul style="list-style-type: none"> (i) Modulation index (ii) Amplitude of Each side band (iii) Total power delivered to the load of 2 k ohms. (iv) Bandwidth