Rajiv Gandhi Institute of Petroleum Technology

Mid Semester Examination, 2021-22

B. Tech, Second Semester (EE, CS, IDD, IT, MC)

Fundamental of Electronics Engineering (ECE 102)

Maximum Marks: 100 **Maximum Time:** 2 Hours

Note: There are eight problems, and all are compulsory. Be very precise, while answering the questions.

Pb.1. For the network shown in Figure 1. .....**15 Marks**

a. Design the network of Figure 1, to maintain V_L at 12 V for a load variation I_L from 0 mA to 200 mA. That is determine Rs and Vz.

b. Determine P_Z max for the Zener diode of part (a).

c. If load current is maintained at 100 mA, find the range of input voltage which can be applied to get a constant 12 V across the load. (Consider the value of Rs from part a)

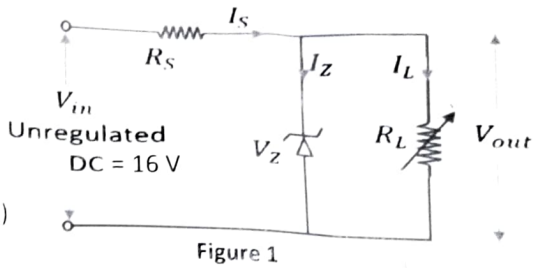
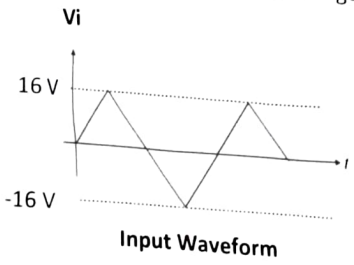


Figure 1

Pb.2. a. Determine output waveform for the network shown in Figure 2.1 (Treat diode as an Ideal diode).

b. Make a series clipper circuit for getting same output waveform (for same input).

c. Find out output waveform of Figure 2.2 (Treat diode as an Ideal diode). ..... 15 Marks



Input Waveform

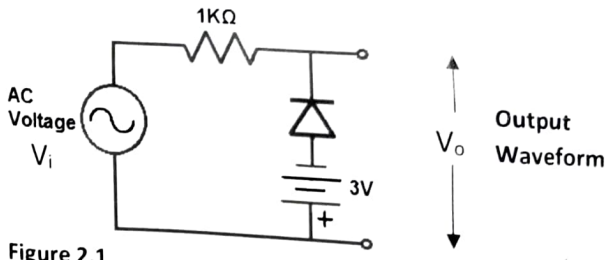


Figure 2.1

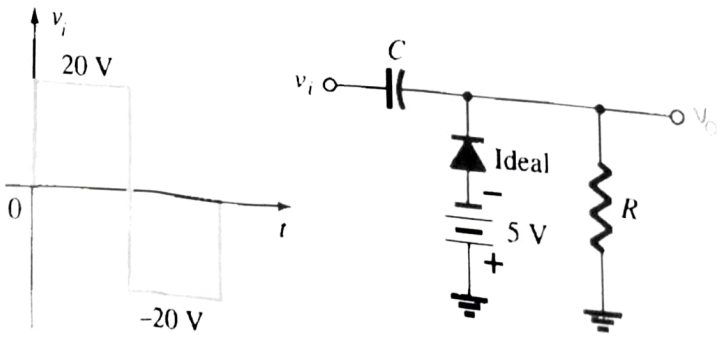


Figure 2.2

Pb.3. a. Determine Vo, I_1, I_{D1} & I_{D2} for the parallel diode configuration (Figure 3.1).

b. Sketch Vo for the given network (Figure 3.2) and determine the DC voltage available.

..... **10 Marks**

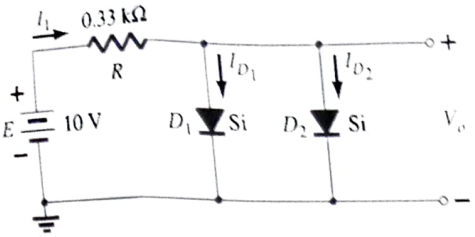


Figure 3.1

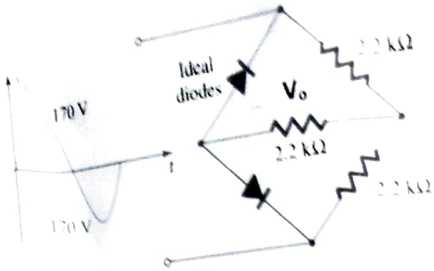


Figure 3.2

Pb.4. Follow the nodal analysis procedure to find out the node voltages V_1, V_2, V_3, V_4 and branch voltage V_x for the given circuit (Figure 4). ..... **15 Marks**

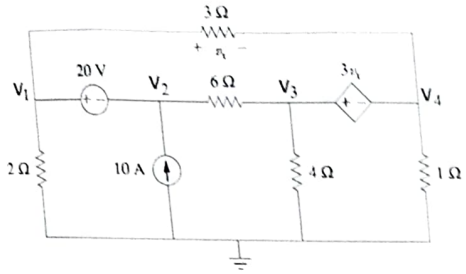


Figure 4

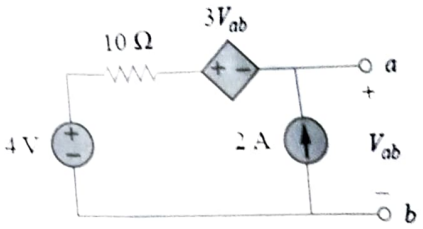


Figure 5

Pb.5. Define Superposition theorem. Find the terminal voltage V_{ab} using superposition theorem (Figure 5). ..... **7 Marks**

Pb.6. Determine the Thevenin equivalent and Norton equivalent of the circuit in Figure 6 at terminals a-b.
..... **8 Marks**

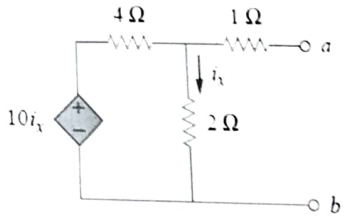


Figure 6

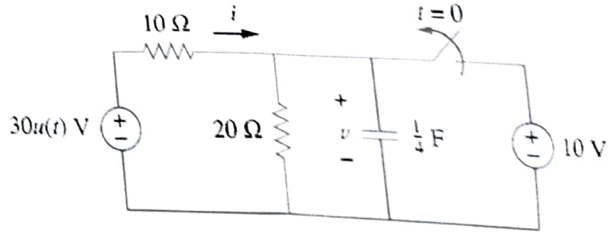


Figure 7

Pb.7. In Figure 7, the switch has been closed for a long time and is opened at $t = 0$. Find i and v for all time. ..... **15 Marks**

Pb.8. a. In Figure 8.1, convert all elements into frequency domain and make equivalent frequency domain circuit.

b. Find Thevenin equivalent circuit of Figure 8.2 across a-b. ..... **15 Marks**

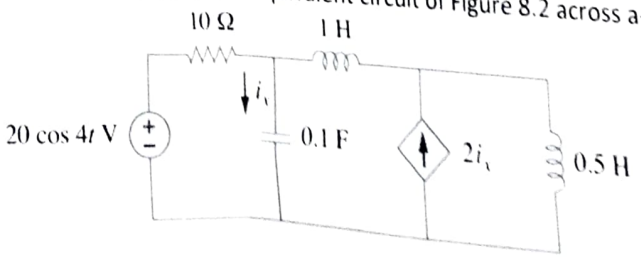


Figure 8.1

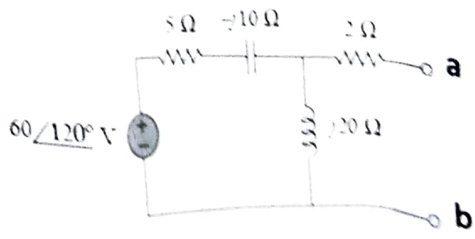


Figure 8.2