

DEPARTMENT OF ELECTRONIC AND ELECTRICAL ENGINEERING

Spring Semester 2010 (30 minutes)

EEE 103 ANALOGUE CIRCUITS MID TERM TEST

Answer **ALL** questions. The numbers given after each section of a question indicate the relative weighting of that section.

REGISTRATION NUMBER:

WRITE YOUR ANSWERS ON THIS QUESTION PAPER

- 1 State the direction of conventional forward current flow (ie, "R to S" or "S to R") through the diode of figure 1. {1 mark}

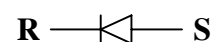


figure 1

Q1 Ans

- 2 On figure 2, mark with a "+" sign the positive end of the 0.7 V drop that appears across diode D when it conducts. What is the conduction state of the D ? If D is conducting, what is its forward current? If D is not conducting, what is its reverse bias voltage? {3 marks}

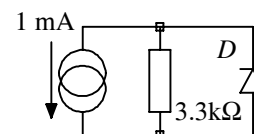


figure 2

Q2 Ans

- 3 In the circuit of figure 3 the diode has a forward voltage drop of 0.7V. At what value of V_i is the diode on the point of changing state from conducting to non-conducting? What is the value of I_D if (a), $V_i = 5V$? and (b), $V_i = -5V$? {5 marks}

Q3 Ans

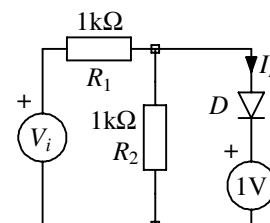


figure 3

- 4 The circuit of figure 4 is driven by the step function shown. The step occurs at $t = 0$ and $t = 0^-$ and $t = 0^+$ are times just before and just after the step respectively. Answer the eight questions in the answer box. {8 marks}

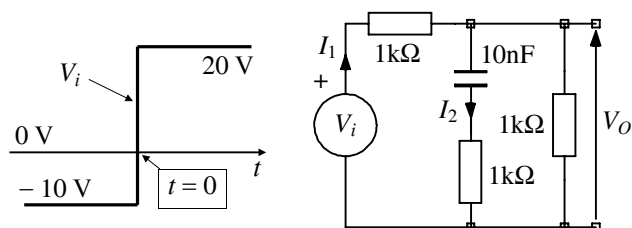


Figure 4

Q4 Ans

What is the value of I_1 for $t = 0^-$?	What is the value of I_2 for $t = 0^-$?
What is the value of V_O for $t = 0^-$?	What is the value of V_O for $t = 0^+$?
What is the value of V_O for $t \Rightarrow \infty$?	What is the value of I_1 for $t = 0^+$?
What is the value of I_2 for $t \Rightarrow \infty$?	What is the circuit time constant ?

- 5 The diodes in figure 5 have a forward voltage drop of zero. On the axes in the **Q5** answer box, sketch the response of the circuit of figure 5 to the input pulse shown. Write down the rising and falling edge time constants in the boxes provided. {3 marks}

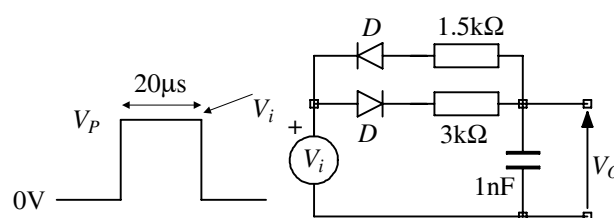
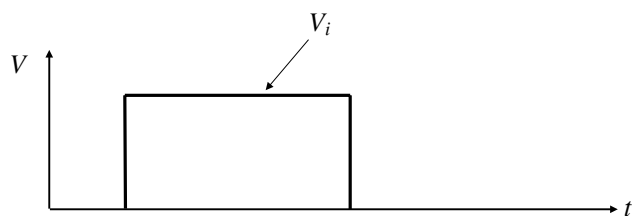


figure 5

Q5 Ans



rising edge time constant =

falling edge time constant =

- 6 In figure 6 there are 4 circuit shapes that you have come across. In the **Q6** answer box, associate each circuit with the appropriate name from the following list;
clamping circuit, clipping circuit, voltage multiplier, peak detector. {4 marks}

Q6 Ans

circuit (a) is a
circuit (b) is a
circuit (c) is a
circuit (d) is a

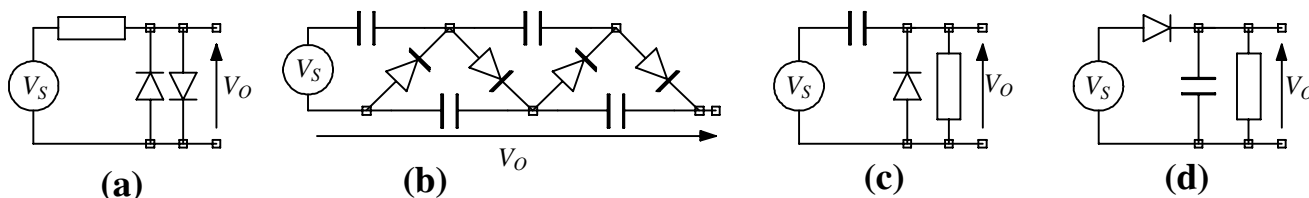


Figure 6

END OF TEST