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# Daffodil International University

Department of Electrical and Electronic Engineering
Faculty of Engineering

**Mid-Term Examination, Spring – 2025**

(42

Course Code: 0714-211 | Course Title: Electronics I
Section: A, B, C | Level-Term: L2-T1 | Teacher's Initial: SD
Full Marks: 25 | Exam Date: March 15, 2025 | Time: 1.5 Hours

[There are five (05) questions, answer all of them.]
[The figures in the right-hand margin indicate the allocated marks.]
[COs represent learning outcomes of the course.]

**Q1. (a)** **Justify** the statement - "Semiconductor materials have a negative temperature co-efficient of resistance". CO-1 C(2) [2]

**(b)** Suppose you need to construct a counter for counting products in a factory setup. **Find** the type of Diode you will need for this case. Also, **explain** its working principle. CO-1 C(2) [3]

**Q2.** **Describe** the operation of a Diode Bridge Full Wave Rectifier with necessary diagrams. If the input to a diode bridge full wave rectifier is $20 \sin 60t$ V, **determine** the output dc voltage and PIV rating of the diodes used in the rectifier. CO-2 C(2) [5]

**Q3.** **Determine** $I_{D1}$, $I_{D2}$ and the voltage at node **E** for the following circuit in Fig. Q3. Here, both the diodes are made of Silicon. CO-2 C(3) [5]

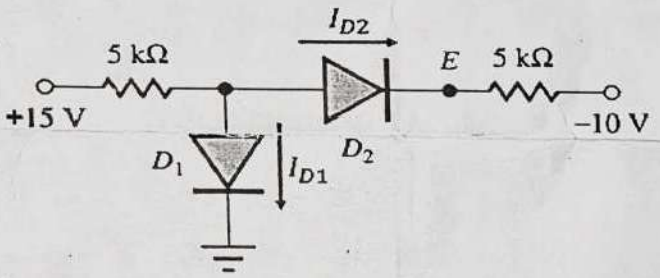



Fig. Q3

**Q4.** **Determine** and **sketch** the output signal of the following clipper circuit in Fig. Q4 for the given input signal. CO-2 C(3) [5]

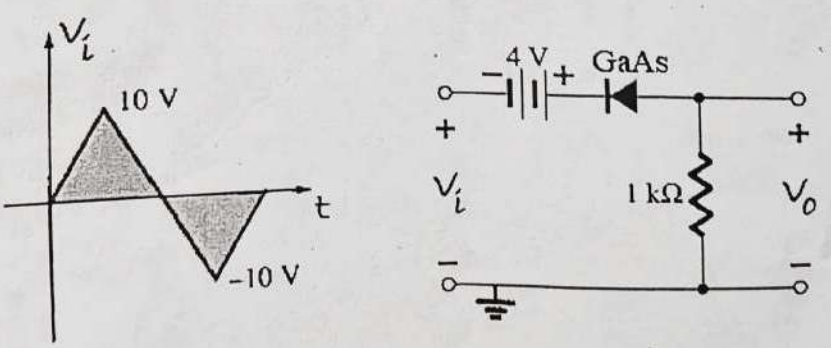



Fig. Q4

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**Q5.** For the following circuit in Fig. Q5: CO-2 C(3) [5]

(i) **Determine** the range of $V_i$ that will maintain $V_L$ at 8 V and not exceed the maximum power rating of the Zener diode.

(ii) **Find** the value of $V_L$ if $V_i$ is within the range found in (i), but the polarity of the Zener diode is reversed in Fig. Q5.

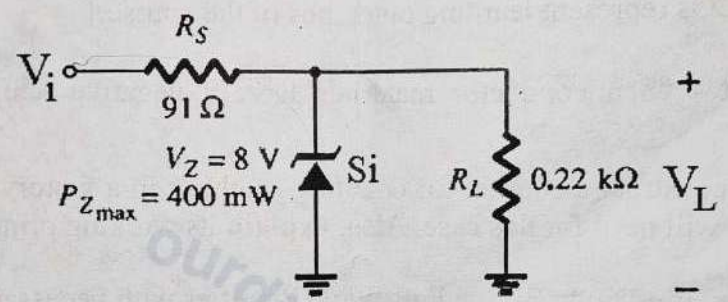



Fig. Q5