American International University- Bangladesh (AIUB) Faculty of Engineering

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| **Course Name:** | Electronic Devices | **Course Code:** | EEE 2103 |
| **Semester:** | Spring 2022-23 | **Section:** |  |
| **Faculty:** |  | Term | Mid |

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| **Assignment No:** | 1 |
| **CO Number** | **CO1** [**Apply the semiconductor diode principles in the practical application having different electronic arrangements**] |
| **POI Number** | **P.b.1.C4** with K1 [Identify first principles of natural sciences and engineering sciences in practical applications] |

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| **Student Name:** |  | **Student ID:** |  |

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| **Submission Date:** |  | **Due Date:** |  |

# Marking Rubrics (to be filled by Faculty):

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| Problems | Excellent [14] | Proficient [11-13] | Good [9-12] | Acceptable [7-8] | Needs Improvement  [3-6] | Unacceptable [1-2] | No Response [0] | Secured Marks |
| **(i)**  **(K1)** | Detailed unique response explaining the systematic diode theories properly and answer is correct with all works clearly  shown. | Response with no apparent errors and the answer is correct, but systematic diode theories explanation is not adequate. | Response shows understanding of the problem, but the systematic diode theories applications/ex planations may  not be correct. | Partial problem is solved; response indicates part of the problem was not understood clearly and partial application of systematic diode theories. | Partial problem solved with minor error that needs to be fixed. | Unable to clarify the understanding of the problem and systematic diode theories. | No Response |  |
| Problems | Excellent [6] | Proficient [5] | Good [4] | Acceptable [3] | Needs Improvement  [2] | Unacceptable [1] | No Response [0] | Secured Marks |
| **(ii)**  **(K1)** | Detailed unique response explaining the concept properly and  answer is correct with all works clearly  shown. | Response with no apparent errors and the answer is  correct, but explanation is not  adequate/uniqu e. | Response shows understanding of the problem, but the final answer may not be correct | Partial problem is solved; response indicates part of the problem was not understood clearly. | Partial problem solved with no/vague conclusion regarding optimum choice of component | Unable to  clarify the understanding of the problem and method of the problem solving was not correct. | No Response |  |
| **Comments** |  |  |  |  |  |  | **Total marks (20)** |  |

***INSTRUCTIONS:***

In digital logic design laboratory, you need to use the dc power supply to see the NAND operations by using the diodes. Your laboratory uses AC supply of (**ID**+100) V (rms) at 50 Hz. You are asked to design a dc power supply having the output, Vo of [(**last three digits of your ID**) mV X 10]. This output also can be considered as level 1 of two inputs of the NAND gates. Consider the peak voltage of the AC supply is smaller than the PIV of the diodes.

A picture containing text, screen

Description automatically generated

Fig. 1: Block diagram for the signal rectification and NAND gate operation

Hints: If your student ID is 12-34567-8, then **ID** will be 12 and the **last three digits of your ID** are the digits before the hyphen i.e. 567. Moreover, if **last three digits of your ID** is less than 500 then you need to add 500 with that value. For example, **last three digits of your ID** is 400 then 400 + 500 = 900 mV.

*Based on this criterion,* ***prepare*** *the following:*

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| i. | **Identify** which circuit is necessary for making the DC power supply from AC supply. **Illustrate** input-output signals with appropriate labeling. | [14] |
| ii. | Use the output of the dc power supply to **analyze** the NAND operation. | [06] |

## Note: Copied/identical submissions will be graded as 0 for all parties concerned.