American International University- Bangladesh (AIUB) Faculty of Engineering

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| **Course Name:** | Electronic Devices | **Course Code:** | EEE 2103 |
| **Semester:** | Summer 2023-24 | **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:** |  | **Sec:** |  |
| **Student ID:** |  | **Marks Obtained:** |  |

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

# Marking Rubrics (to be filled by Faculty):

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Problems | Excellent [10] | Good  [7-9] | Average  [5-6] | Needs Improvement  [3-4] | 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 plantations may  not be correct. | 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 |  |
| **(ii)**  **(K1)** | Detailed unique response explaining the concept properly with correct answers and properly showing all works. | Response with no apparent errors and the answer is  correct, but explanation is not  adequate/unique e. | Response shows understanding of the problem, but the final answer may not be correct | 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:**

1. ***Use this page as a cover page for this assignment submission. Different cover page or without cover page, assignment submission will not be acceptable.***
2. ***You MUST use your ID values whenever it is needed/ asked in the question.***
3. ***No late submission is allowed.***
4. ***You must use the A4 pages.***
5. ***Copied/identical submissions will be graded as 0 for all parties concerned.***

***Consider your ID = AB-CDEFG-H. Choose the appropriate digits when solving the problems.***

1. ***Problem 1:***

A mobile phone user has a broken charger that requires [5 V + (E + F + G) mV] DC to charge the phone. This user now has only a transformer, a resistor, a capacitor, a few GaAs diodes, and an AC supply [220 + (C + D + E) V] at home. So, a prototype of the mobile charger needs to be designed using the components mentioned above. ***Design*** *a prototype of the mobile charger showing proper calculations and waveshapes. [10]*

1. ***Problem 2:***

There is a television and an air conditioner at home. However, the television and air conditioner can’t be operated simultaneously due to the circuit breaker having the lowest capacity. The circuit breaker trips when both appliances are turned on at a time. However, any one device (either the television or air conditioner) can be turned on at once. ***Analyse*** this problem by considering the circuit breaker will be active if both devices are turned on at the same time. The solution must be represented by designing logic gates using only a few ideal diodes, resistors, and a DC voltage source, showing a proper table or explanation. *[10]*