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|   | | FACULTY OF INDUSTRIAL SCIENCES & TECHNOLOGY | | MARKS: <div style="font-size: 2em; text-align: center;">/10</div> |
| SUBJECT: FUNDAMENTAL DISCRETE STRUCTURE | | CODE: BUM1233 | TOPIC: ABSTRACT ALGEBRA | |
| ASSESSMENT: QUIZ | | NO: 5 | DUE/DURATION: 15 MINUTES | |
| NAME: | | STUDENT ID: | SECTION: | |

Given the following sets. Fill in all the boxes with **YES** or **NO** where necessary.

(a) $M_2(\mathbb{Z}) = \left\{ \begin{bmatrix} a & b \\ c & d \end{bmatrix} \mid a, b, c, d \in \mathbb{Z} \right\}$ under multiplication of matrices.

| Properties of Group | | | | Abelian? |
|---------------------|--------------|-----------|----------|----------|
| Closed? | Associative? | Identity? | Inverse? | |
| | | | | |

(b) A set consists of all even integers under addition.

| Properties of Group | | | | Abelian? |
|---------------------|--------------|-----------|----------|----------|
| Closed? | Associative? | Identity? | Inverse? | |
| | | | | |

(c) $\{(0,0), (1,1), (2,2), (3,0), (4,1), (5,2)\}$ as a subset of $\mathbb{Z}_6 \times \mathbb{Z}_3$ where “ \times ” is Cartesian product.

| Properties of Group | | | | Abelian? |
|---------------------|--------------|-----------|----------|----------|
| Closed? | Associative? | Identity? | Inverse? | |
| | | | | |

(d) A set consists of all integers under division.

| Properties of Group | | | | Abelian? |
|---------------------|--------------|-----------|----------|----------|
| Closed? | Associative? | Identity? | Inverse? | |
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