MTH210 – SUBMISSION_202210139

For $n \in \mathbb{Z}^+$, $n \geq 2$, put $X_n = \{1,2,\ldots,n\}$ and put $V = \{0,1\}$. How many functions are there from X_n to V, which :

a) Are injective ? (*1 mark*)

b) Assign 0 to both 1 and n ? (2 *marks*)

c) Assign 1 to exactly one of the positive integers < n ? (2 *marks*)

Note: *Show your calculations if any, and give a brief explanation of your approach (one or two sentences).*

RUBRIC

List of Common Errors and Marks Deductions:

1. Using an undefined symbol.
2. Writing an equation in which the LHS and RHS are nt comparable. For example, the LHS is a set, and the RHS is an integer.
3. Writing a meaningless or completely illogical statement.

Deduct 0.5 marks for each occurrence of an error of the above type. **However, the total marks for the submission should remain non-negative.**

Marks to be awarded as follows:

Part a) $\rightarrow$ 0.25 marks for each correct answer (2 cases, n =2, $n \geq 3$); 0.25 marks for each explanation.

Part b) $\rightarrow$ 1 mark for answer; 1 mark for explanation.

Part c) $\rightarrow$ 1 mark for answer; 1 mark for explanation.

Remark: Very easy questions – no partial credit.