

- 4 A program includes the following assignment statement:

Result \leftarrow STR_TO_NUM(x) / STR_TO_NUM(y)

When the program evaluates the expression in the statement, it performs a calculation.

Variable Result is of type real and variables x and y are of type string.

Two checks are required before the calculation is performed:

1. The two strings represent valid numeric values.
2. The numeric value of string y is not zero.

- (a) Identify the type of error that could occur if these checks are **not** carried out **and** state a cause of this error.

Type

.....

Cause

.....

[2]

- (b) The designer considers implementing the **checks and calculation** as a module (a procedure or a function). One reason for this is that the same checks and calculations are performed at several places in the program.

Give **another** reason why this is a suitable approach **and** state what is avoided by this approach.

Reason

.....

Avoided

.....

[2]

- (c) The module to perform the checks and calculation will be implemented as a function. The function will need to return both a real **and** a Boolean value. To achieve this a record type is defined in pseudocode as follows:

```
TYPE Result  
    DECLARE Done : BOOLEAN  
    DECLARE Value : REAL  
ENDTYPE
```

The function Evaluate() will:

- take two parameters of type string representing the two numeric values
 - return a variable of type Result with the Done field set to FALSE if either of the following applies:
 - at least one of the strings does **not** represent a valid numeric value
 - the numeric value of the string representing value y is zero
 - otherwise return a variable of type Result with the Done field set to TRUE and the Value field assigned the result of the formula (based on the numeric value of the two parameters).

Write pseudocode for the function Evaluate().