

Books, watches, notes or cell phones are **not** allowed. The **only** calculators allowed are the Sharp EL-531***. You **must** show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 1. (5 marks) Let A and B , be 3×4 matrices such that B is obtained from the matrix A using the following elementary row operations:

- a. Switch the first and 3rd row.
- b. Multiply the 2nd row by $\frac{1}{3}$
- c. Add twice the first row to the 3rd row.

Find a matrix C , such that $A = CB$.

Question 3.(3 marks each) Determine whether the following statement is true or false. If the statement is false provide a counterexample. If the statement is true provide a proof of the statement.

- a. Every elementary matrix is invertible.

- b. An expression of an invertible matrix as a product of elementary matrices is unique.