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. (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. Consider a system of linear equations with augmented matrix A. If there are no solutions then A has no row of zeros.

b. If each equation in a consistent linear system is multiplied through by a constant *c*, then all solutions to the new system can be obtained by multiplying solutions from the original system by *c*.

Question 2. (3 marks) Find (if possible) conditions on a and b such that the system has no solution, one solution, and infinitely many solutions. Justify.

$$\begin{cases} x & -2y = 1 \\ ax & +by = 5 \end{cases}$$

