Overall the exam was done relatively well. Below are some comments on each question.

Q1: Generally done well.

Q2: Generally done well. Most students realised the best way to find the rank was to reduce the given matrix the row echelon form. Some students seemed to forget the definition of the null space, while some found the correct subspace but did not write down a basis, as was required.

Q3: Parts a) and b) generally well done, with most errors being simply careless mistakes. However part c) caused problems, with relatively few students recognising what they should do. Of those students who attempted it, many tried to prove the $2 \times 2$ case first, and then incorrectly use induction.

Q4: Parts a) and b) generally done well, with the most common mistake being students confusing the definition of a spanning set with that of a span. In part c) many students struggled with the definitions of the sets involved ($U \cap W$ and $U + W$), and some attempted to use ideas from other areas of mathematics (probability in particular), without success.

Q5: Part a) generally well answered. A common mistake in part (iii) was forgetting to state that $U$ must be finite dimensional when stating the Rank Theorem. In part (iv), to get full marks it was necessary to state where the fact that $T$ and $S$ are linear transformations is used. Part b) caused the most problems, despite the proof appearing in the notes, with a number of students attempting to use the Rank Theorem, which was not applicable as $V$ is not necessarily finite dimensional. Part c) was generally answered well.