

MA377 EXAMPLE SHEET IV

Q. 1. Let M be the regular representation of $M_5(\mathbb{C})$. Find a composition series for M . What is the length of M ?

Q. 2. Find all semi-simple algebras over \mathbb{R} of dimension ten.

Q. 3. Let A be a finite dimensional algebra with radical R . Find the two radicals of $A[x]$ and the radical of $M_n(A)$.

Q. 4. Let A_1 and A_2 be finite dimensional algebras with radicals R_1 and R_2 . Find the radical of the algebra $A_1 \oplus A_2$.

Q. 5. Let A_1 and A_2 be finite dimensional algebras with radicals R_1 and R_2 . Let M be a bimodule. Find the radical of the triangular algebra

$$\begin{pmatrix} A_1 & M \\ 0 & A_2 \end{pmatrix}$$