M1. (a) Electron transitions/electrons excitedin d shell **(1) o**r d-d transition Do NOT allow charge transfer

(Energy in) visible range (1)

(NOT emits in visible region)

2

(b) Change 1: (Different) oxidation states (1)

Change 2: (Different) ligands (1)

Change 3: (Different) co-ordination number (1)

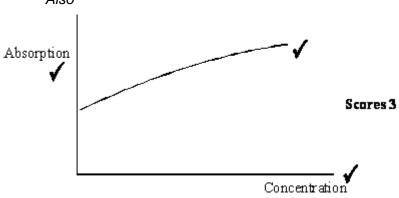
Do not allow shape as an answer

3

(c) Add an appropriate (or a given correct) ligand to intensify colour (1) e.g. thiocyanate (CNS) or bipyridyl
Make up solutions of known concentration (1)
Measure absorption or transmission (1)
Plot graph of results or calibration curve (1)
Measure absorption of unknown and (1)
compare

N.B.: Allow concentration statement if included in graph statement

Allow adsorption but circle the d Also



[10]