4. (a) Give the definition of a key. [4]

(b) Consider the relation schema PERSON(*age*, *first name*, *surname*, *postcode*) and the relation state given below. Identify potential keys of PERSON. [6]

age	first name	surname	postcode
40	Barbara	Taylor	CV4 7AL
40	Bernard	Jones	CV3 8AK
41	Brenda	Taylor	CV4 7AM
42	Boris	Smith	CV5 2XY
43	Barbara	Taylor	CV4 7XX
44	Boris	Smith	CV1 5GH

(c) Which of the following dependencies may hold in the above relation? If a dependency cannot hold, specify the tuples that cause the violation.

  i. *age* → *first name* [3]

  ii. *first name* → *surname* [3]

  iii. *surname* → *first name* [3]

(d) Is it true that $X \rightarrow Y$ and $Y \rightarrow Z$ imply $X \rightarrow Z$? Justify your answer. [6]

Total mark for this question: 25