Name:$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ Student Number:$\cdots\cdots\cdots\cdots\cdots\cdots\cdots$

Q1: Let P be the relation on $A = \{1, 2, 3, 4, 5\}$ represented by the following matrix

$$M_P = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 \end{pmatrix}$$

1. List all ordered pairs of P. (1 marks)

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2. Show that P is a partial ordering relation. (3 marks)

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3. Represent P by a hasse diagram. (2 marks)

Q2: Let E be the equivalence relation defined on $B = \{a, b, c, d, e, f\}$ by
$E = \{(a, a), (a, c), (a, f), (b, b), (c, a), (c, c), (c, f), (d, d), (d, e), (e, d), (e, e), (f, a), (f, c), (f, f)\}$.
Find all distinct equivalence classes of E. (2 marks)

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Q3: Let G be a graph with degree-sequence: $x, x, x + 1, x - 1, x - 2, x + 2$. Find the value
of x if G has 9 edges. (2 marks)

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