$$
\text { CMSC } 203 \text { - Homework Assignment } 5 \text { - Due December 5, } 2002
$$

1. Consider the database with the following records:

| Part | Serial Number | Quantity in Stock | Weight (ozs.) | Price (\$) |
| :---: | :---: | :---: | :---: | :---: |
| Widget | 11223344 | 200 | 305 | 10 |
| Gizmo | 11225566 | 110 | 150 | 15 |
| Whacker | 22114433 | 110 | 250 | 10 |
| Thumper | 99999911 | 475 | 900 | 75 |
| Sweeper | 12341234 | 250 | 456 | 22 |
| Sweeper | 12345678 | 250 | 800 | 35 |

(a) What field(s) would suffice as Primary Key(s)?
(b) Find $\mathrm{P}_{2,3,5}$

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2. (a) Find the matrix representing the relation on $\{1,2,3,4,5\}$ given by:

$$
\mathrm{R}=\{(1,4),(1,3),(3,2),(3,5),(2,2),(4,4),(2,5),(4,1),(4,2),(5,1),(5,2),(5,3),(5,4),(5,5)\}
$$

(b) Find $\left(\mathrm{M}_{R} \wedge \mathrm{M}_{R}\right),\left(\mathrm{M}_{R} \vee \mathrm{M}_{R}\right)$, and $\mathrm{M}_{R}{ }^{2}$ for the relation on $\{1,2,3,4\}$ whose matrix
representation is $\mathrm{M}_{R}=\left[\begin{array}{llll}1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1\end{array}\right]$.

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3. Consider the relation, $R$, on the set $A=\{1,2,3,4,5,6,7,8\}$ given by the graph:

(a) Find [1]
(b) Find the partition of A induced by R

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4. Find the relation, R, that induces the partition $\{\{1,3\},\{2,4,6,9\},\{5\},\{0,7,8\}\}$.

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5. Find the Truth Table for the Boolean Function, $\mathrm{F}(w, x, y, z)=(w x)^{\prime}+z\left(w^{\prime}+y\right)$


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6. Find the Disjunctive Normal Form of the Boolean Function, $\mathrm{F}(w, x, y, z)=w z^{\prime}+x y^{\prime} z$

