MCQs

C D B A B

C C C B A

E A C E B

Q16

...

Q17

$\{T \mid \exists C_1 \in City,\ \exists C_2 \in Country$
$(C_1.name = C_2.capital \wedge C_1.country = C_2.name$
$\wedge T.name = C_1.name \wedge T.country_name = C_1.country$
$\wedge T.population = C_2.population)\}$

Q18

$\{T \mid \exists C_1 \in City\,(\forall C_2 \in Country\,(C_1.name = C_2.name \Rightarrow C_1.country = C_2.country) \wedge T.name = C_1.name)\}$

Q19

```
SELECT code
FROM Country
WHERE NOT EXISTS (
SELECT * FROM City
WHERE City.country = Country.name
AND City.population > 2000000);
```

Q20

$\pi_{City.name,\,City.country}\,(\sigma_{City.name<>Country.capital}\,(City \otimes_{City.country=Country.name} Country))$

Q21

(quite clueless here)

1. $F = \{AC \to B, CD \to A\}$
2. $F = \{AB \to C, C \to D\}$
3. $F = \{A \to BC, C \to D\}$

Q22

(even worse)

1. $F = \{C \to AB, D \to A, A \to CD\}$
2. $F = \{C \to D, A \to B, A \to D\}$

Q23

The result can be infinite because relational calculus operates on tuples or domain variables. If a particular domain is inifite, the result can be infinite becuase they are not restricted to the tuples in the database.

Q24

The result in relational algebra is always finite because operands in algebra are relations, relations are finite, and no operators would produce infinite result.