TMA 05 M203

1)a) We have to find all the elements x for which

$$x = gxg^{-1}$$

for all $g \in S_6$. This is done by forming x above a permuted form of x, and reading off the answer.

(153642)	(153642)	(153642)	(153642)
(215364)	(421536)	(642153)	(364215)
(124635)	(143)(265)	(16)(23)(45)	(134)(256)

(153642)	(153642)
(536421)	(153642)
(153642)	(1)(2)(3)(4)(5)(6) = e

The set of elements in S_6 that conjugate (153642) to itself are therefore

$\{e, (153642), (134)(256), (16)(23)(45), (143)(265), (124635)^3\}$.

b) (e) = (1)(2)(3)(4)(5)(6) has order 1. — even parity ✓

(153642) has order 6, odd parity ✓

(134)(256) has order 3, even parity ✓

(16)(23)(45) has order 2, odd parity ✓

(143)(265) has order 3, even parity ✓

(124635) has order 6, odd parity. ✓

10/10

c) Construct the Cayley table

∘	e	(124635)	(143)(265)	(16)(23)(45)	(134)(256)	(153642)
e	e	(124635)	(143)(265)	(16)(23)(45)	(134)(256)	(153642)
(124635)	(124635)	(143)(265)	(16)(23)(45)	(134)(256)	(153642)	e
(143)(265)	(143)(265)	(16)(23)(45)	(134)(256)	(153642)	e	(124635)
(16)(23)(45)	(16)(23)(45)	(134)(256)	(153642)	e	(124635)	(143)(265)
(134)(256)	(134)(256)	(153642)	e	(124635)	(143)(265)	(16)(23)(45)
(153642)	(153642)	e	(124635)	(143)(265)	(16)(23)(45)	(134)(256)

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