(15)

v) The canonical equation of the 1st surface is $aabbcc = 1$. Append the front with dd^{-1} to give $dd^{-1}aabbcc = 1$, then $S \simeq 3\mathbb{RP}^2$ or
✓ $S^2 \# 3\mathbb{RP}^2$.

The edge eqtn for the 2nd surface is $ab^{-1}abcc^{-1} = 1$
or $aabbcc^{-1} = 1$ (using Lemma 1)
✓ so $S \simeq 2\mathbb{RP}^2 \# S^2$ (or $2\mathbb{RP}^2$)
The edge equation for the 3rd surface is $ab^{-1}ab^{-1}cc^{-1} = 1$ or
$aabb^{-1}cc^{-1}$ (using Lemma 1)
$\frac{3}{3}$ ✓ So $S \simeq \mathbb{RP}^2 \# 2S^2$ (or $\mathbb{RP}^2$).
(no need) to include S^2 when other surface components are present

7) i) $w^2 - 2wz + (z^3 + z^2 - 1) = 0$
To determine infinite points of form (∞, w), Put $z = \frac{1}{\tilde{z}}$, $w = w$

$$w^2 - \frac{2w}{\tilde{z}} + \frac{1}{\tilde{z}^3} + \frac{1}{\tilde{z}^2} - 1 = 0$$

$$w^2\tilde{z}^3 - 2w\tilde{z}^2 + 1 + \tilde{z} - \tilde{z}^3 = 0$$

✓ Set $\tilde{z} = 0$ to give $1 = 0$ $\therefore$ no infinite points of form (∞, w)

To determine infinite points of form (z, ∞), put $w = \frac{1}{\tilde{w}}$, $z = z$

$$\frac{1}{\tilde{w}^2} - \frac{2z}{\tilde{w}} + z^3 + z^2 - 1 = 0$$

$$1 - 2z\tilde{w} + \tilde{w}^2(z^3 + z^2 - 1) = 0$$

✓ Set $\tilde{w} = 0$ to give $1 = 0$ $\therefore$ no infinite points of form (z, ∞)