3.49 This problem asks for the determination of Bravais-Miller indices for several planes in hexagonal unit cells.

(a) For this plane, intersections with the a_1, a_2, and z axes are ∞a, $-a$, and ∞c (the plane parallels both a_1 and z axes). In terms of a and c these intersections are ∞, –1, and ∞, the respective reciprocals of which are 0, –1, and 0. This means that

$h = 0$

$k = -1$

$l = 0$

Now, from Equation 3.7, the value of i is

$$i = -(h + k) = -[0 + (-1)] = 1$$

Hence, this is a $(0\bar{1}10)$ plane.

(b) For this plane, intersections with the a_1, a_2, and z axes are $-a$, $-a$, and $c/2$, respectively. In terms of a and c these intersections are –1, –1, and 1/2, the respective reciprocals of which are –1, –1, and 2. This means that

$h = -1$

$k = -1$

$l = 2$

Now, from Equation 3.7, the value of i is

$$i = -(h + k) = -(-1 - 1) = 2$$

Hence, this is a $(\bar{1}\bar{1}22)$ plane.

(c) For this plane, intersections with the a_1, a_2, and z axes are $a/2$, $-a$, and ∞c (the plane parallels the z axis). In terms of a and c these intersections are 1/2, –1, and ∞, the respective reciprocals of which are 2, –1, and 0. This means that

$h = 2$

$k = -1$

$l = 0$

Now, from Equation 3.7, the value of i is

$$i = -(h + k) = -(2 - 1) = -1$$