

**Character Table 5**
**The Groups  $C_{nh}$  ( $n = 2, 3, 4, 5, 6$ )**

$C_{2h}$ ( $2/m$ )	$E$	$C_2$	$I$	$\sigma_h$		
$A_g$	1	1	1	1	$R_z$	$x^2, y^2, z^2, xy$
$B_g$	1	-1	1	-1	$R_x, R_y$	$xz, yz$
$A_u$	1	1	-1	-1	$z$	
$B_u$	1	-1	-1	1	$x, y$	

$C_{3h}$ ( $\bar{6}$ )	$E$	$C_3$	$C_3^2$	$\sigma_h$	$S_3$	$S_3^5$		$\varepsilon = \exp(2\pi i/3)$
$A'$	1	1	1	1	1	1	$R_z$	$x^2 + y^2, z^2$
$E'$	$\left\{ \begin{array}{cccccc} \mathbf{1} & \varepsilon & \varepsilon^* & \mathbf{1} & \varepsilon & \varepsilon^* \\ \mathbf{1} & \varepsilon^* & \varepsilon & \mathbf{1} & \varepsilon^* & \varepsilon \end{array} \right\}$						$(x, y)$	$(x^2 - y^2, 2xy)$
$A''$	1	1	1	-1	-1	-1	$z$	
$E''$	$\left\{ \begin{array}{cccccc} \mathbf{1} & \varepsilon & \varepsilon^* & -\mathbf{1} & -\varepsilon & -\varepsilon^* \\ \mathbf{1} & \varepsilon^* & \varepsilon & -\mathbf{1} & -\varepsilon^* & -\varepsilon \end{array} \right\}$						$(R_x, R_y)$	$(xz, yz)$

$C_{4h}$ ( $4/m$ )	$E$	$C_4$	$C_2$	$C_4^3$	$i$	$S_4^3$	$\sigma_h$	$S_4$		
$A_g$	1	1	1	1	1	1	1	1	$R_z$	$x^2 + y^2, z^2$
$B_g$	1	-1	1	-1	1	-1	1	-1		$(x^2 - y^2, 2xy)$
$E_g$	$\left\{ \begin{array}{cccccccc} \mathbf{1} & \mathbf{i} & -\mathbf{1} & -\mathbf{i} & \mathbf{1} & \mathbf{i} & -\mathbf{1} & -\mathbf{i} \\ \mathbf{1} & -\mathbf{i} & -\mathbf{1} & \mathbf{i} & \mathbf{1} & -\mathbf{i} & -\mathbf{1} & \mathbf{i} \end{array} \right\}$								$(R_x, R_y)$	$(xz, yz)$
$A_u$	1	1	1	1	-1	-1	-1	-1	$z$	
$B_u$	1	-1	1	-1	-1	1	-1	1		
$E_u$	$\left\{ \begin{array}{cccccccc} \mathbf{1} & \mathbf{i} & -\mathbf{1} & -\mathbf{i} & -\mathbf{1} & -\mathbf{i} & \mathbf{1} & \mathbf{i} \\ \mathbf{1} & -\mathbf{i} & -\mathbf{1} & \mathbf{i} & -\mathbf{1} & \mathbf{i} & \mathbf{1} & -\mathbf{i} \end{array} \right\}$								$(x, y)$	

**Character Table 5 (cont...)**

**The Groups  $C_{nh}$  ( $n = 2, 3, 4, 5, 6$ )**

$C_{5h}$	$E$	$C_5$	$C_5^2$	$C_5^3$	$C_5^4$	$\sigma_h$	$S_5$	$S_5^7$	$S_5^3$	$S_5^9$		$\varepsilon = \exp(2\pi i/5)$
$A'$	1	1	1	1	1	1	1	1	1	1	$R_z$	$x^2+y^2, z^2$
$E'_1$	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^2 & \varepsilon^{*2} & \varepsilon^* \\ 1 & \varepsilon^* & \varepsilon^{*2} & \varepsilon^2 & \varepsilon \end{Bmatrix}$										$(x, y)$	
$E'_2$	$\begin{Bmatrix} 1 & \varepsilon^2 & \varepsilon^* & \varepsilon & \varepsilon^{*2} \\ 1 & \varepsilon^{*2} & \varepsilon & \varepsilon^* & \varepsilon^2 \end{Bmatrix}$										$z$	$(x^2 - y^2, 2xy)$
$A''$	1	1	1	1	1	-1	-1	-1	-1	-1		
$E''_1$	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^2 & \varepsilon^{*2} & \varepsilon^* & -1 & -\varepsilon & -\varepsilon^2 & -\varepsilon^{*2} & -\varepsilon^* \\ 1 & \varepsilon^* & \varepsilon^{*2} & \varepsilon^2 & \varepsilon & -1 & -\varepsilon^* & -\varepsilon^{*2} & -\varepsilon^2 & -\varepsilon \end{Bmatrix}$										$(R_x, R_y)$	$(xz, yz)$
$E''_2$	$\begin{Bmatrix} 1 & \varepsilon^2 & \varepsilon^* & \varepsilon & \varepsilon^{*2} & -1 & -\varepsilon^2 & -\varepsilon^* & -\varepsilon & -\varepsilon^{*2} \\ 1 & \varepsilon^{*2} & \varepsilon & \varepsilon^* & \varepsilon^2 & -1 & -\varepsilon^{*2} & -\varepsilon & -\varepsilon^* & -\varepsilon^2 \end{Bmatrix}$											

$C_{6h}$ ( $6/m$ )	$E$	$C_6$	$C_3$	$C_2$	$C_3^2$	$C_6^5$	$i$	$S_3^5$	$S_6^5$	$\sigma_h$	$S_6$	$S_3$		$\varepsilon = \exp(2\pi i/6)$
$A_g$	1	1	1	1	1	1	1	1	1	1	1	1		$x^2+y^2, z^2$
$B_g$	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1		
$E_{1g}$	$\begin{Bmatrix} 1 & \varepsilon & -\varepsilon^* & -1 & -\varepsilon & \varepsilon^* & 1 & \varepsilon & -\varepsilon^* & -1 & -\varepsilon & \varepsilon^* \\ 1 & \varepsilon^* & -\varepsilon & -1 & -\varepsilon^* & \varepsilon & 1 & \varepsilon^* & -\varepsilon & -1 & -\varepsilon^* & \varepsilon \end{Bmatrix}$												$(R_x, R_y)$	$(xz, yz)$
$E_{2g}$	$\begin{Bmatrix} 1 & -\varepsilon^* & -\varepsilon & 1 & -\varepsilon^* & -\varepsilon & 1 & -\varepsilon^* & -\varepsilon & 1 & -\varepsilon^* & -\varepsilon \\ 1 & -\varepsilon & -\varepsilon^* & 1 & -\varepsilon & -\varepsilon^* & 1 & -\varepsilon & -\varepsilon^* & 1 & -\varepsilon & -\varepsilon^* \end{Bmatrix}$													$(x^2 - y^2, 2xy)$
$A_u$	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	$z$	
$B_u$	1	-1	1	-1	1	-1	-1	1	-1	1	-1	1		
$E_{1u}$	$\begin{Bmatrix} 1 & \varepsilon & -\varepsilon^* & -1 & -\varepsilon & \varepsilon^* & -1 & -\varepsilon & \varepsilon^* & 1 & \varepsilon & -\varepsilon^* \\ 1 & \varepsilon^* & -\varepsilon & -1 & -\varepsilon^* & \varepsilon & -1 & -\varepsilon^* & \varepsilon & 1 & \varepsilon^* & -\varepsilon \end{Bmatrix}$												$(x, y)$	
$E_{2u}$	$\begin{Bmatrix} 1 & -\varepsilon^* & -\varepsilon & 1 & -\varepsilon^* & -\varepsilon & -1 & \varepsilon^* & \varepsilon & -1 & \varepsilon^* & \varepsilon \\ 1 & -\varepsilon & -\varepsilon^* & 1 & -\varepsilon & -\varepsilon^* & -1 & \varepsilon & \varepsilon^* & -1 & \varepsilon & \varepsilon^* \end{Bmatrix}$													