



# IEST5001

: fUa Yk cf\_g: cf'9bj ]fcba YbhU`A UbU[ Ya Ybh

GYa YghYf'C bY`##`&\$%

7ci fgY`Cj Yfj JYk

`GHUZZ7cbhUWhi8YHU]`g`

`7cbj Ybcfg`

B Ua Y	9a U]`	5j U]UV]`]m	@WUhc b	D\cbY
8f`>Ybb]Zf`?Ybh	^W_Ybh4 i bgk "YXi "Ui	6mUddc]bha Ybh cb`m		

`@YWi fYfg`

B Ua Y	9a U]`	5j U]UV]`]m	@WUhc b	D\cbY
5#DfcZDUi ``6fck b	dUi ``Vfck b4 i bgk "YXi "Ui	VmUddc]bha Ybhcb`m		

GWx cc``7cbhUWhi`bZcfa Uh]cb

GWx cc``cZ<i a Ub]h]Yg`UbX`@Ub[ i U[ Yg

@WUhc b. GWx cc``C Z]WZA cfj Yb`6fck b`6i ]X]b[ ž`@Yj Y``&ž&),

C dYb]b[ `<ci fg. A cbXUm! : f]XUmž`- Ua `!(. (.) da

D\cbY. Ž`\*%&`-' , ) `\*% , %

: U! . Ž`\*%&`-' , ) ; +\$)

9a U] : [\U`4 i bgk "YXi "Ui](#)

5hY`bXUbW`F Yei ]fYa Ybhg

5`ghi XYbh]g`YI dYW`X`hc`U`hY`bX`U``WUgg`W`cbhUWh`l`ci fg`Zcf`U`ZUW`!`hc`!`ZUW`f`l`&`E`cf`V`Yb`XYX`W`ci fgY`UbX`W`ca`d`Y`h`U``UW]j`]h]Yg`Zcf`U`V`Yb`XYX`cf`Z` ``mcb`]bY`W`ci fgY"

5`ghi XYbhk` \c`Uff]j`Yg`a`cfY`h`Ub`%)`a`]bi`hYg`U`hY`a`UmVY`dYbU`]gYX`Zcf`bcb!`U`hY`bX`UbW``Zgi`W`U`dYbU`hm`]g`]a`d`cgYXž`hY`gh`XYbhia`i`ghVY`]bZcfa`YX`j`YfVU`mi`U`h`Y`YbX`cZ`WUgg`UbX`UXj`]gYX`]b`k`f]h]b[ `k`]h`]b`&(`\`ci`fg"

ZU`ghi XYbhYI`dYf]YbW`g`]`bYggž`a`]gUXj`Ybh`fY`cf`ch`Yf`cW`ffYbW`h`Uha`U`Yg`UVgYbW`Zca`U`WUgg#UW]j`]mi`bUj`c]XUV`Yž`cf`YI`dYW`g`hc`VY`UVgYbhZca`U`Zcf`h`W`ca`]b[ `WUgg#UW]j`]mž`h`Ymg`l`ci`X`g`YY`\_`dYfa`]gg]cb`Zca`h`Y`7`ci`fgY`5i`h`cf]mž`UbX`k` \YfY`Udd`]WUW`Yž`h`Y`f`f`Yei`Yghg`l`ci`X`VY`UW`W`ca`dUb]YX`VmUb`cf][`]bU`cf`W`f]j]YX`W`dmcZU`a`YX]W`W`f]j]WU`h`cf`ch`Yf`Zcfa`cZ`Udd`f`d`f]U`h`Y`j`]XYbW"

5`7`ci`fgY`5i`h`cf]`ma`UmYI`W`gY`U`gh`XYbhZca`WUggYg`cf`UW]j`]h]Yg`Zcf`i`d`hc`cbY`a`cbh`" `<`ck`Yj`Yfž`h`Ym`a`UmUgg][`b`UXX]h]cbU`UbX`#`f`U`hY`fb`Uh]`Y`hUg`\_`g`hc`Ybgi`fY`W`ca`d`]UbW`"5`7`ci`fgY`5i`h`cf]mW`bg]XYf]b[ `h`Y`[`f`Ub]h]b[ `cZ`UVgYbW`a`i`ghVY`g`Uh]gZ]YX`U`gh`XYbhk`]`gh`VY`UV`Y`hc`a`YY`h`h`Y`W`ci`fgY`g`Y`Ufb]b[ `ici`h`W`ca`Yg`UbX`#`f`j`ci`a`Y`cZ`Y`Ufb]b[ "5`ghi`XYbhgYY\_]b[ `Udd`f`cj`U`hc`VY`UVgYbhZcf`a`cfY`h`Ub`cbY`a`cbh`a`i`gh`Udd`m`]b`k`f]h]b[ `hc`h`Y`8`Y`Ub`UbX`d`fcj`]XY`U``cf][`]bU`cf`W`f]j]YX`gi`dd`cf]h]b[ `XcW`a`Yb`h]cb"

:`cf`a`cfY`]bZcfa`Uh]cb`UVci`h`h`Y`U`hY`bX`UbW`d`f`ch`W`g`]b`h`Y` :`UW`h`mcZ5`f`g`UbX`Gc`W]U`GWYbW`g` : [\h`d`g`.#`k`k`"U`f`g`i`bgk`"YXi`"Ui`#W`ffYbh\]gh`XYbhg#UW\]j\]Y`a`W\]bZcfa`Uh\]cb#d`f`ch`W`g`l`i`\]XY`\]bYg#](#)

## 5 WUXYa JWbZcfa Uh]cb`

: cfYggYbh]U`ghi XYbh]bZcfa Uh]cb`fY`Uh]b[ `hc. fYei Ygrg`Zcf`YI hYbg]cb/fYj ]Yk `cZa Uf\_g/cVW dUh]cbU`\\YU`h  
UbX`gUZ`m/YI Ua ]bUh]cb`dfcW`Xi fYg/gdYW]U`W`bg]XYfUh]cb`]b`hY`Yj Ybh]cZ]`bYgg`cf`a ]gUXj Ybh] fY/  
ghi XYbhYei ]mUbX`X]gUV]`]m/UbX`chYf`YggYbh]U`UWUXYa ]W]bZcfa Uh]cb`z  
gYY`[\hdg.#k k "Uftrg"i bkg "YXi "Ui #W ffYbh\]ghi XYbtrg#UWUXYa \]W\]bZcfa Uh\]cb`dfcfcW`g!\[i \]XY`\]bYg#](#)

# 7 ci fgY'8YHJ]g

7 fYX]hDc]bng \* .

Gi a a UfmcZ\Y'7 ci fgY

H\]g'Wci fgY'dfcj ]XYg'Ub]bfcXi W]cb'hc'hY'A UghY'fcZ9bj ]fcb a YbhU'A UbU[ Ya Ybhdfc[ fUa "'Mci 'k ]''[ U]b  
 Ub'UddfYW]U]cb'cZ\Y'Wca d'YI 'UbX'fUbg]X]gW]d']bUfmbUhi fY'cZYbj ]fcb a YbhU'']ggi Yg'UbX'cZ\Y'']b\YfYbh  
 W\U''Yb[ Yg]b'a i 'h]X]gW]d']bUfmiUddfcUWYg'hc'Ybj ]fcb a YbhU''a UbU[ Ya Ybh'H\Y'Ya d\Ug]g]g'cb'YI d'cf]b[  
 WcbW'dh U''UbX'dfUW]W''ZUa Yk cf\_g'UbX'['cVU'ghfUHY[ ]Yg'Zcf'UXUdh] Y'Ybj ]fcb a YbhU''a UbU[ Ya Ybh'  
 GHUfh]b[ 'Zca 'hY'dfYa ]gY'cZ'gi ghU]bUV'Y'XYj Y'cda Ybh[ cU'g''Ug'U'W ffYbhVfcUX'mYbXcfYX'ZUa Yk cf\_  
 Zcf'Ybj ]fcb a YbhU''a UbU[ Ya Ybh'z'mci f'YI d'cfU]h]cb'k ]''bW' XY'hY'XYj Y'cda Ybh'cZ\Y'WcbW'dhg'cZ  
 gi ghU]bUV'Y'XYj Y'cda Ybh'UbX'gi ghU]bUV']]miUbX'dfcV'Ya g]b'dfUW]W'm]bH'fdYf]b[ 'UbX']a d'Ya Ybh]b[  
 gi ghU]bUV']]m' 'Mci 'k ]''YbWci bh'f'U'fUb[ Y'cZf'Y'Yj UbhdYfgdYW]j Yg]bW' X]b[ 'Zcf'YI Ua d'Y'X] [ Ybci g  
 k cf'X'j ]Yk gZ'd\]cgcd\mUbX'Yh]WgZ'gcW]U''g]hW]Z'd'Ubb]b[ z'Y'Wcbca ]WgZ'YU'h'gW]YbW'gZ'Y'Wc'c[ mZ'a YX]Uz  
 UbX'W'hi fU''UddfcUWYg''Mci 'k ]''YI d'cfY'hY'df]bW]d'Yg'cZgi ghU]bUV'Y'XYj Y'cda Ybh]b'hY]f'Udd']W]h]cbz  
 ]bW' X]b[ [ c] YfbUbW'fYgdcbgYg'hc'hY''gi ghU]bUV'Y'XYj Y'cda Ybh[ cU'g''U]h]X]ZY'fYbh'Yj Y'g'cZ  
 [ c] Yfba Ybh'z'Vmbcb [ c] Yfba Ybh'cf[ Ub]nU]cbgZ'VmiW'fdcfU]h]cbgZ'UbX'VmdfcZ'gg]cbU''cf[ Ub]nU]cbg''Mci  
 k ]''YbWci bh'f'W]h]ei Yg'cZgi ghU]bUV']]miUg'U'ZUa Yk cf\_'Zcf'Ybj ]fcb a YbhU''a UbU[ Ya Ybh'z'UbX'YI d'cfY  
 U'h'fbU]h] Y'a cXY'gZ'UbX'dcgg]V'Y'gc'i h]cbg"

# 5 h\Y'WcbWi g]cb'cZ\]g'Wci fgY'h\Y'ghi XYbhk ]''VY'UV'Y'hc

- % " 8]gW gg'hY'W\Ub[ ]b[ 'ghU]cZ\Y'Ybj ]fcb a Ybh'UbX'dYfgdYW]j Yg'cb'W ffYbh\_YmYbj ]fcb a YbhU'  
 ]ggi Yg'Ug]bZi Ybh]U'ZUW'fcg]b'ZUa Yk cf\_g[ c] Yfb]b[ 'Ybj ]fcb a YbhU''a UbU[ Ya Ybh
- & " XYbh]Zm'hY'\_YmghU\_Y\c'XYfg'UbX'fY'Yj UbhX]gW]d']bYg'Zcf'UXXfYgg]b[ 'gdYW]Z'WYbj ]fcb a YbhU'  
 a UbU[ Ya Ybh]ggi Yg'UbX'YI d'U]b'hY]f'fY'U]j Y'fc'Yg'UbX'a cXYg'cZdUfh]W]dU]h]cb
- ' " HU\_Y'U'c'g]h]Vz']bH'fX]gW]d']bUfmiUddfcUW'hc'UbU'mg]b[ 'Ybj ]fcb a YbhU''a UbU[ Ya Ybh]ggi Yg  
 (" 9I d'U]b'UbX'W]h]ei Y'hY'j Ufh]b[ 'WcbW'dhg'cZgi ghU]bUV']]miUbX'gi ghU]bUV'Y'XYj Y'cda Ybh'z[ ]j ]b[  
 Xi Y'fY'Wc[ b]h]cb'hc'hY]f'a Ubm]bH'fdYfU]h]cbgZ'UbX'U'h'fbU]h] Y'WcbW'dhg'UbX'ZUa Yk cf\_g  
 )" XYbh]ZmVUff]Yfg'hc'gi ghU]bUV']]miXYf]j ]b[ 'Zca 'U'VfcUX'fUb[ Y'cZd\]cgcd\]W]U'UbX'Yh]W]Z  
 Uxa ]b]ghfU]h] Yz'Y[ U'zdc'h]W]Z'gcW]U''UbX'Y'Wcbca ]WZUW'fcg
- \* " 5dd'm'hY'df]bW]d'Yg'cZgi ghU]bUV']]miUbX'X]gW gg'\ck [ c] Yfba Ybh'gZ'Vi g]bYgg'UbX'Wca a i b]m  
 cf[ Ub]gU]h]cbg'W]b]a d'Ya Ybhgi ghU]bUV'Y'XYj Y'cda Ybhd'fcW'ggYg]b[ ]j Yb'W]gY'ghi Xmg]h]U]h]cbg

# HYUW]b[ 'GhfUHY[ ]Yg'

H\fcI [ \ 'h]g'Wci fgY'mci 'k ]''[ U]b'Ub'i bXYfg]bX]b[ 'cZ\Y'ZUa Yk cf\_g'k ]h]b'k \]W\ UXUdh]j Y  
 Ybj ]fcb a YbhU''a UbU[ Ya Ybh]U\_Yg'd'UW''K Y'k ]''ghUfhVmiYa d\Ug]g]b[ 'UbX'YI d'cf]b[ 'hY'Wca d'YI ]miUbX  
 bUhi fY'cZYbj ]fcb a YbhU''a UbU[ Ya Ybh]ggi Yg'UbX'hY'']b\YfYbhW\U''Yb[ Yg]b']bH'fX]gW]d']bUfmi[ fci d  
 UddfcUWYg'hc'Ybj ]fcb a YbhU''a UbU[ Ya Ybh'UbX'gi ghU]bUV']]m' 'Mci f'[ fci d'Vf]b[ g'U'k ]XY'j Uf]YhmicZ  
 X]gW]d']bUfmiVUW] [ fci bXg'UbX'dfcZ'gg]cbU''UbX''Z'YI dYf]YbW'g'hc'hY'gY'YbXYUj ci fgZ'Ug'k Y''Ug'U'k ]XY  
 gdfYUX'cZ[ Yc[ fUd\]WVUW] [ fci bXg'UbX'YI dYf]YbW'Vch'Zca 'k ]h]b'5i ghU]U'UbX']bH'fbU]h]cbU''m': cf'cb!  
 W]a di g'gh'XYbh'gZ'X]gW gg]cbg'k ]''VY']bh[ fU]h'X]b'hc'hY'' !\ci f'WUgg'h]a Y'YUW'k Y'Y'z'k \]Y'Zcf'X]ghU]bW  
 gh'XYbh'X]gW gg]cbg'k ]''HU\_Y'd'UW'cb']bY''Hc'dfcj ]XY'VUW] [ fci bX'Zcf'h]g'Wci fgY'k Y'k ]''Vf]YZmfYj ]Yk  
 W ffYbh\_YmYbj ]fcb a YbhU'']ggi Yg'cZ'WcbW'fb ]bW' X]b[ 'W]a U]h'W\Ub[ Yz'U]f'UbX'k U]h'f'dc''i h]cbz'cgg'cZ  
 V]cX]j Yfg]miUbX'Y'Wc'c[ ]W]U'']bh[ f]mz'Ug'ZUW'fcg]bZi YbW]b[ 'hY'ZUa Yk cf\_g'Zcf'Ybj ]fcb a YbhU'  
 a UbU[ Ya Ybh'z'UbX'Wcbg]XYf'fYbXg]b'hY'gY''K Y'k ]''YI d'cfY'hY'W]i gU]h]j Y'UW]j ]h]Yg'UggcW]U]h'X'k ]h'hY'gY  
 ]ggi Yg'UbX'hY'fYgi 'h]b[ 'Ybj ]fcb a YbhU''a UbU[ Ya Ybh'W\U''Yb[ Yg]'H\Y'a U]b'Ya d\Ug]g]b[ fUa Yk cf\_g'Zcf  
 9bj ]fcb a YbhU''a UbU[ Ya Ybh]g'cb'YI d'cf]b[ 'WcbW'dh U''UbX'dfUW]W''ZUa Yk cf\_g'Zcf'Ybj ]fcb a YbhU'

a UbU[ Ya YbH'5 \_Yma YggU[ Y' ]g' hUhhYgY' ZUa Yk cf\_g' UfY' bchghUqWwi hWbhb'bi U`mYj c`j ]b[ žk ]h' hY  
dUW' cZVXUb[ Y' dUfh'W `Uf'mfUd]X' UhdFYgYbH'

# 5ggYgga Ybh

## 5ggYgga YbhHUg\_g`

5ggYgga YbhHUg_	K Y][ \h	8i Y'8UH	Gh XYbh@YUfb]b[ Ci hWta Yg'5ggYggYX
7ca a YbhUf]Yg`	&\$i	gYY'a ccX`Y	%z&Z ž(
5bbchUHx'6]V`c[ fUd\m	' \$i	gYY'a ccX`Y	%z&Z ž( ž)
F YgYUfW`DUdYf`	) \$i	gYY'a ccX`Y	%z&Z ž( ž) ž*

## 5ggYgga Ybh8YHU]`g

### 5ggYgga Ybh%`7ca a YbhUf]Yg

GHUfhXUH`.

8YHU]`g. '8YHU]`YX`UbU`mg]cZhfY`gdYWZYX`fYUX]b[ g"5ddfcI`%) \$\$`k cfXg"K f]hYb`ZYXVUW`dfcj ]YX

### 5ggYgga Ybh&.`5bbchUHx'6]V`c[ fUd\m

GHUfhXUH`.

8YHU]`g. '6f]YZgi a a Uf]Yg`Zcf`\_YmdUdYfgz`Vcc`\_WUdhYfg`UbX`chYf`fYZYfbW`g"5ddfcI`%) \$\$`k cfXg"  
K f]hYb`ZYXVUW`dfcj ]YX`UW`fX]b[ `hc`U`fi Vf]W

### 5ggYgga Ybh' .`F YgYUfW`DUdYf`

GHUfhXUH`.

8YHU]`g. 'DUdYf`]b`k` \]W`mci`Udd`mU`g]l`ghYd`gi ghU]bUV`Y`XYj`Y`cda`YbhUbU`mg]g": ]bU`Ugg][ ba`YbhZcf`hY  
Wci`fgY"UddfcI`" \$\$\$`k cfXg"K f]hYb`ZYXVUW`dfcj ]YX`UW`fX]b[ `hc`U`fi Vf]W

# Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

Gh XYbng`UFY`YI dYW`X`hc`di h`h`Y`f`b`Ua`Yg`UbX`gh`XYb`hbi`a`VYfg`cb`Yj`YfmdU[`Y`c`Z`h`Y`f`Ugg][`ba`Y`b`ng`"

## Hi fb]h]b`Gi Va ]gg]cb

z`mci`Y`b`W`ci`b`h`f`U`d`f`c`V`Ya`k`Y`b`U`h`Y`a`d`h]b[`h`c`gi`Va`]h`mci`f`Ugg][`ba`Y`b`h`f`c`i`[`h`i`fb]h]b`z`d`Y`U`g`Y`  
h`Y`d`l`c`b`Y`9I`h`f`b`U`G`i`d`d`c`f`h`c`b`-`'`,`)`"``"``"``%`c`f`Y`a`U`]`h`Y`a`c`b`[YI`h`f`b`U`h`Y`h`g`i`d`d`c`f`h`i`b`g`k`"Y`X`i`"U`i`"Gi`d`d`c`f`h`  
l`c`i`f`g`U`f`Y``,`.\\$`\\$`U`a`-`-%`\\$`.\\$`\\$`d`a`c`b`k`Y`Y`\\_`X`U`m`g`U`b`X`-`-`.\\$`\\$`U`a`-`-`-`.\\$`\\$`d`a`c`b`k`Y`Y`\\_`Y`b`X`g`f`l`\\*\)`X`U`m`g`U`m`Y`U`f`l`"z`mci`  
U`f`Y`i`b`U`V`Y`h`c`gi`Va`\]h`mci`f`Ugg\]\[`ba`Y`b`h`X`i`Y`h`c`U`Z`U`i`h`k`\]h`h`i`fb\]h\]b`mci`a`U`m`i`U`d`d`m`i`z`c`f`U`b`Y`i`h`Y`b`g\]c`b`z`V`i`h`mci`  
a`i`g`h`f`Y`h\]b`mci`f`h\]W`Y`h`b`i`a`V`Y`f`z`c`a`9I`h`f`b`U`G`i`d`d`c`f`h`f`U`c`b\[`k`\]h`U`b`m`c`h`Y`f`f`Y`Y`j`U`b`h`X`c`W`a`Y`b`h`g`l`h`c`  
\]b`W`i`X`Y`U`g`Y`j`\]X`Y`b`W`h`c`gi`d`d`c`f`h`mci`f`Y`i`h`Y`b`g\]c`b`U`d`d`\]W`h\]c`b`"z`mci`Y`a`U`\]9I`h`f`b`U`G`i`d`d`c`f`h`mci`k`\]`  
U`i`h`c`a`U`h\]W`m`i`f`Y`W`\]Y`U`h\]W`Y`h`b`i`a`V`Y`f`z`V`i`h\]Z`mci`h`Y`d`l`c`b`Y`mci`k`\]`b`Y`Y`X`h`c`g`d`Y`W`Z\]W`m`i`U`g`\\_`z`c`f`c`b`Y`"  
H`i`fb\]h\]b`U`g`c`d`f`c`j`X`Y`g`i`d`X`U`h`Y`g`c`b`h`Y`f`g`m`g`h`Y`a`g`h`U`h`g`c`b`H`k`\]h`Y`f`"](#)

;`Y`b`Y`f`U`m`z`U`g`g`Y`g`g`a`Y`b`h`U`g`\_`g`a`i`g`h`V`Y`g`i`Va`]h`Y`X`Y`Y`W`f`c`b]W`m`j`]U`Y`]h`Y`f`h`i`fb]h]b`c`f`U`A`c`c`X`Y`  
U`g`g][`ba`Y`b`h`-`b`]b`g`h`U`b`W`g`k`Y`f`Y`h`l`g`]g`b`c`h`i`d`c`g`g]V`Y`Z`]h`k`]`V`Y`g`h`U`h`X`c`b`mci`f`W`ci`f`g`Y`g`A`c`c`X`Y`g`]h`Y`k`]h`  
U`h`f`b`U`h]Y`g`i`Va`]gg]cb`X`Y`h]g`"

## @U`h`Y`5ggYgga YbhDYbU`h]Yg

5`b`U`g`g`Y`g`g`Y`X`h`U`g`\_`]g`X`Y`Y`a`Y`X`U`h`Y`Z`]h]g`g`i`Va`]h`Y`X`U`Z`Y`f`h`Y`g`d`Y`W`Z]Y`X`h`a`Y`U`b`X`X`U`h`Y`U`g`g`Y`h`c`i`h]b`h`Y`  
W`ci`f`g`Y`@`Y`U`f`b]b[`A`U`b`U[`Y`a`Y`b`h`G`m`g`h`Y`a`f`@`A`G`l`"

H`Y`U`h`Y`d`Y`b`U`h`m]g`h`Y`c`g`g`c`Z`i`c`Z`h`Y`h`c`h]d`c`g`g]V`Y`a`U`f`\_`g`z`c`f`h`Y`h`U`g`\_`z`c`f`Y`U`W`X`U`m`c`f`d`U`f`h`h`Y`f`Y`c`Z`h`Y`  
k`c`f`\_`]g`U`h`Y`@`U`h`Y`b`Y`g`g`k`]`]b`W`i`X`Y`k`Y`Y`\_`Y`b`X`g`U`b`X`d`i`V`]W`l`c`]X`U`m`g`"H`l`g`X`c`Y`g`b`c`h`U`d`d`m`i`h`c`U`h`U`g`\_`h`U`h]g`  
U`g`g`Y`g`g`Y`X`Vi`h`b`c`a`U`f`\_`]g`U`k`U`f`X`Y`X`"

K`c`f`\_`g`i`Va`]h`Y`X`z`c`i`f`h`Y`b`f`%`L`X`U`m`g`U`Z`Y`f`h`Y`X`i`Y`X`U`h`Y`k`]`V`Y`a`U`f`\_`Y`X`U`b`X`Z`Y`X`V`U`W`\_`d`f`c`j`]X`Y`X`Vi`h`b`c`a`U`f`\_`  
k`]`V`Y`f`Y`W`c`f`X`Y`X`"z`h`Y`k`c`f`\_`k`c`i`X`U`j`Y`f`Y`W`]j`Y`X`U`d`U`g`g`a`U`f`\_`Vi`h`z`c`f`h`Y`U`h`Y`b`Y`g`g`U`b`X`h`Y`k`c`f`\_`]g`U`  
W`c`a`d`i`g`c`f`m`W`c`i`f`g`Y`W`c`a`d`c`b`Y`b`h`z`U`g`h`i`X`Y`b`h`k`]`V`Y`X`Y`Y`a`Y`X`h`c`U`j`Y`a`Y`h`h`U`h`f`Y`e`i`]f`Y`a`Y`b`h`H`l`g`X`c`Y`g`b`c`h`  
U`d`d`m`i`h`c`U`h`U`g`\_`h`U`h]g`U`g`g`Y`g`g`Y`X`Vi`h`b`c`a`U`f`\_`]g`U`k`U`f`X`Y`X`"

K`c`f`\_`g`i`Va`]h`Y`X`h`k`Y`b`h`m`c`b`Y`f`%`L`X`U`m`g`U`Z`Y`f`h`Y`X`i`Y`X`U`h`Y`k`]`b`c`h`V`Y`U`W`W`d`h`Y`X`z`c`f`a`U`f`\_`b[`c`f`Z`Y`X`V`U`W`  
U`b`X`k`]`f`Y`W`]j`Y`b`c`a`U`f`\_`c`f[`f`U`X`Y`"z`h`Y`U`g`g`Y`g`g`a`Y`b`h`U`g`\_`]g`U`W`c`a`d`i`g`c`f`m`W`c`a`d`c`b`Y`b`h`c`Z`h`Y`W`c`i`f`g`Y`U`  
g`h`i`X`Y`b`h`k`]`U`i`h`c`a`U`h]W`m`i`Z]j`h`Y`W`c`i`f`g`Y`"

## GdY`W`U`7`c`b`g]X`Y`f`U`h]c`b`5`d`d`]W`h]c`b`g

M`c`i`W`b`U`d`d`m`i`z`c`f`g`d`Y`W`U`W`c`b`g]X`Y`f`U`h]c`b`k`Y`b`]`b`Y`g`g`c`f`c`h`Y`f`W`f`W`a`g`h`U`b`W`g`]b`h`f`Z`Y`f`k`]h`mci`f`  
U`g`g`Y`g`g`a`Y`b`h`d`Y`f`z`c`f`a`U`b`W`"

G`]W`\_`b`Y`g`g`z`a`]g`U`X`j`Y`b`h`f`Y`c`f`c`h`Y`f`W`f`W`a`g`h`U`b`W`g`V`Y`n`c`b`X`mci`f`W`c`b`l`f`c`a`U`m`

f`D`f`Y`j`Y`b`h`mci`z`c`a`W`c`a`d`Y`h]b[`U`W`c`i`f`g`Y`f`Y`e`i`]f`Y`a`Y`b`h`z`

f`?`Y`Y`d`mci`z`c`a`U`h`Y`b`X]b[`U`b`U`g`g`Y`g`g`U`V`Y`U`W`]j`]m`z`

f`G`h`c`d`mci`gi`Va`]h]b[`U`g`g`Y`g`g`U`V`Y`k`c`f`\_`z`c`f`U`W`c`i`f`g`Y`z`

f`G][ b]Z]W]b]h]m]U]Z]Y]W]h]m]c]i] f]d]Y]f]Z]c]f]a] U]b]W]W] ]b]U]g]g]Y]g]g]U]V]`]Y]`]k] c]f]\_]ž]V]Y]`]h]U]`]Z]c]f]a] U]`]Y]b]X]!]c]Z]g]Y]a] Y]g]h]Y]f]`]Y]I] U]a] ]b]U]h]c]b]ž]U] W]U]g]g]`]h]Y]g]h]ž]U]`]U]V]c]f]U]h]c]f]m]h]Y]g]h]ž]U]`]g]Y]a] ]b]U]f]d]f]Y]g]Y]b]h]U]h]c]b]`]c]f]U]b]m]c]h]Y]f]`]Z]c]f]a] `]c]Z]U]g]g]Y]g]g]a] Y]b]h]`

: c]f]`]Z] f]h]Y]f]`]X]Y]h]U]`]g]`]b]`]f]Y]`]U]h]c]b]`]h]c]`]G]d]Y]W]U]`]7]c]b]g]X]Y]f]U]h]c]b]`]b]W]i] X]b]b] [ ``]K] \]Y]b]`]h]c]`]5]d]d]`]m]ž]``<]c]k]`]h]c]`]5]d]d]`]m]`]U]b]X] ``]G]i] d]d]c]f]h]b] [ ]8]c]W] a] Y]b]h]U]h]c]b]``]d]`]Y]U]g]Y]`]f]Y]Z]f]`]h]c]`]h]Y]`]G]d]Y]W]U]`]7]c]b]g]X]Y]f]U]h]c]b]`]k] Y]V]g]h]Y]`.

[\\]h\]d\]g.\]#\]g\]h\] X\]Y\]b\]h\]i\] b\]g\]k\] "Y\]X\]i\] "U\]i\] #\]g\]d\]Y\]W\]U\]`\]!\]W\]c\]b\]g\]X\]Y\]f\]U\]h\]c\]b\]](#)



5 WUXYa ]W<c bYghmUbX 'D`U[ ]Uf]ga

D`U[ ]Uf]ga ]g`i g]b[ 'hY`k cfXg`cf]XYUg`cZchYfg`UbX`dfYgYbh]b[ 'hYa`Ug`mci f`ck b" #WUb`hU`Y`a Ubm  
Zcfa gZ`Zca`XY`]VYfUHY`WXYU]b[ 'hc`UWV]XYbU`mW`dm]b[ `Zca`U`gci fW`k ]h`ci hUW`bck`YX[ Ya`Ybh`

I BGK` [ fci dg`d`U[ ]Uf]ga` ]bhc`hY`Zc`ck ]b[ `WUHY` [ cf]Yg.

7cdm]b[ .`i g]b[ 'hY`gUa`Y`cf`j Yfmg]a ]Uf`k cfXg`hc`hY`cf][ ]bU`hY`hcf`]XYU`k ]h`ci hUW`bck`YX[ ]b[ 'hY`  
gci fW`cf`i g]b[ `ei chU]cb`a Uf`g`H`]g`U`gc`Udd`]Yg`hc`]a U[ YgZ`UfhUbX`XYg][ `b`dfc`YWgZ`Ug`k`Y`Ug`  
dfYgYbhU]cbg`k`Y`fY`gca`YcbY`dfYgYbh]b[ `Ubc`hY`f`g`]XYUg`cf`k`cfXg`k`]h`ci hW`YX]h`

#Uddfcdf]UHY`dUfUd`fUg]b[ .`W`Ub[ ]b[ `U`Zy`k`cfXg`UbX`d`fUgYg`k`Y`a`cghm`fYU]b]b[ 'hY`cf][ ]bU`  
g]h`i`W`fY`UbX`]bZcfa`U]cb`k`]h`ci hUW`bck`YX[ Ya`Ybh`H`]g`U`gc`Udd`]Yg`]b`dfYgYbhU]cbg`k`Y`fY`gca`YcbY`  
dUfUd`fUgYg`Ubc`hY`f`g`]XYUg`cf`k`cfXg`k`]h`ci hW`YX]h` #U`gc`Udd`]Yg`hc`d`]YW]b[ `hc`[ Y`hY`f`ei`chYg`UbX`  
dUfUd`fUgYg`]bhc`U`bYk`k`c`Y`Z`k`]h`ci hY`ZY`fYbW]b[ `UbX`U`gh`XYbh`g`ck`b`UbU`mg]g`hc`V`f]b[ 'hY`a`U`hY`f]U`  
hc`[ Y`hY`f`

7c`i`g]cb.`k`cf\_]b[ `k`]h`chYfg`Vi`hdUgg]b[ `cZ`hY`k`cf\_]Ug`U`dYfgcb`g`]bX]j ]Xi`U`k`cf\_]7c`i`g]cb`U`gc`  
]bWi`XYg`dfcj`X]b[ `mci`f`k`cf\_]hc`Ubc`hY`f`gh`XYbhVY`Zc`fY`hY`Xi`Y`XU`hY`Zc`f`Zc`f`hY`di`fdcgY`cZ`hY`a`  
d`U[ ]Uf]g]b[ `Uh`Ubmi]a`Y`Z`dUm]b[ `Ubc`hY`f`dYfgcb`hc`dY`Zc`fa`Ub`UW`XYa`]W`hUg`\_`Z`ghY`U`]b[ `cf`UW`ei`]f]b[  
Ubc`hY`f`dYfgcb`g`UW`XYa`]W`k`cf\_]UbX`W`dm]b[ `]Z`c`ZY`f]b[ `hc`W`ca`d`Y`hY`Ubc`hY`f`dYfgcb`g`k`cf\_]cf`gY`Y\_]b[  
dUma`YbhZc`f`W`ca`d`Y`h]b[ `UW`XYa`]W`k`cf\_]`

#Uddfcdf]UHY`W`hU]cb.`7`h]b[ `gci`fW`g`k`W`U`j`Y`bchV`Y`b`fY`U`X`Z`k`]h`ci hUW`bck`YX[ ]b[ 'hY`gY`W`bX`U`f`m`  
gci`fW`Zc`a`k`W`\_`bck`YX[ Y`cZ`hY`a`U`g`V`Y`b`c`V`h]bYX`

8i`d`]W`h]cb`f`f`gY`Z`d`U[ ]Uf]ga`E`gi`Va`]h]b[ `mci`f`ck`b`k`cf\_]b`k`c`Y`cf`]b`dU`f`Z`k`Y`fY`]h`U`g`d`fY`j`ci`g`m`  
V`Y`Y`b`d`fY`dU`fY`X`c`f`gi`Va`]hY`X`Zc`f`Ubc`hY`f`UggY`gga`Ybhcf`W`ei`fgY`U`hI`BGK`cf`Ubc`hY`f`i`b]j`Yfg]m`

7c`fY`W`hY`Z`fY`bW]b[ `d`fU`W]W`g.





F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

- 6cc\_`-<UfX]b[ žF`"YhU`f&\$\$-Ł'9bj ]fcbā YbHJ`8YWg]cb!A U\_]b[ .`9I d`cf]b[ `Wta d`YI ]mUbx  
WcbhYI hž: YX`DfYggžGmXbYm

F YWta a YbXYX`F Ygci fWg

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7F ⇒ CG

7F ⇒ CG`Dfcj ]XYf`7cXY.`\$\$\$- , ;