



## ARTS2461

HYfa YX]UH`7 \]bYgY`Zcf'6UW\_[ fci bX`GdYU\_Yfg'5

HYfa `Cby`#`&\$%-

7ci fgY`Cj Yfj ]Yk

`GHUZZ7cbhUW`i8YHU]`g`

`7cbj Ybcfg`

B Ua Y	9a U]`	5j U]`UV]`]m	@cW]h]cb	D\cbY
7\Yb[!K Y]`K Ub[	V\Yb[!k Y]`k Ub[ 4 i bgk "YXi "Ui	VmUddc]b]h Ybh	A cfj Yb`6fck b`&(\$	- ' , ) `&, %)

`@YWi fYfg`

B Ua Y	9a U]`	5j U]`UV]`]m	@cW]h]cb	D\cbY
7\Yb[!K Y]`K Ub[	V\Yb[!k Y]`k Ub[ 4 i bgk "YXi "Ui	VmUddc]b]h Ybh	A cfj Yb`6fck b`&(\$	- ' , ) `&, %)

`Hi hcfg`

B Ua Y	9a U]`	5j U]`UV]`]m	@cW]h]cb	D\cbY
7\Yb[!K Y]`K Ub[	V\Yb[!k Y]`k Ub[ 4 i bgk "YXi "Ui	VmUddc]b]h Ybh	A cfj Yb`6fck b`&(\$	- ' , ) `&, %)

GWcc`7cbhUW`i`bZcfa Uh]cb

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

@cW]h]cb. GWcc`C Z]WZA cfj Yb`6fck b`6i ]X]b[ ž@Yj Y`&ž&),

%o

%o

7ci fgY'8YHJ]`g

7fYX]hDc]bhr '\*`

Gi a a UfmicZ\hY'7ci fgY

Gi VYWh5fYU.'5Z[ WēWE fgV[Wē

H\]g'Wēi fgY'jg'ZcfVUW[ fci bX'gdYU\_Yfg'Uh\hY'`bHfa YX]UH'@Yj Y''`#]g'cdYb'hc'gh XYbhr'k \c'\Uj Y' [ fck b  
i d']b'U'ZJa ]'micf'Ybj ]fcb a Ybhk \YfY'A UbXUf]b'cf'Ubm7\]bYgY'X]U'YWg'\Uj Y'VYb'i gYX']b'XU]m  
g]h Uh]cbg" #ifYei ]fYg'U'fYUgcbUV'Y`Yj Y'cZgdc\_Yb'7\]bYgY'UbX'U'k cf\_]b[ '\_bck`YX[Y'cZbc`Ygg'h\Ub  
+) \$'VXUfUWYfg" #h\]g'Wēi fgY'Zmci`k ]''`ja dfcj Y'mci f'7\]bYgY'g\_]`g' ]b'h\Y'UfYUg'cZgdYU\_]b[ 'ž`]ghYb]b[ ž  
fYUX]b[ ž'UbX'k f]h]b[ ž'UbX'k ]''`a U\_Y'g][ b]Z]W]bh[ U]bg' ]b'h\Y'UWēi ]g]h]cb'cZj cW]Vi `UfmUbX'[ fUa a Uf''Mci  
k ]''`U'gc`VY ]b]fcXi WYX'hc'h\Y'gcW]U'ž'W`h' fU'`UbX'\]g]cf]W]''\_bck`YX[Y'h\UhUfY'fY'UhYX'hc'h\Y'hd]Wg' ]b'h\Y  
hYI h/cc\_"` #UXX]h]cb'hc'XU]mX]gWēi fgY'UbX'UVghfUWh]XYUgž'hd]Wg'h\UhYei ]fY'W]h]W'`h.]b\_]b[ 'UbX'\][ \Yf  
'Ub[ i U[ Y' ]bH[ fUh]cb'UfY'k cj Yb' ]bhc'h\]g'`Yj Y'cZ'Ub[ i U[ Y'gh Xn'

7ci fgY'@YUfb]b[ `Ci hWca Yg

%" I bXYfghUbX'U'k ]XY'fUb[ Y'cZHI hg Zfca`j Uf]ci g'gci fW'g'UbX'cb'U'j Uf]YfmicZ'hd]Wg  
&" 7ca dcgY'g\cfhYggUm] ]b'7\]bYgY'cb'U' [ ]j Yb'hd]W  
' " 5Wēi ]fY'Wēa a i b]W]h]cb'g\_]`gž'UbX' ]XYbh]ZmWēa a i b]W]h]cb'ghmYg' ]b'7\]bYgY  
( " 8Ya cbghfUH' ]bHfa YX]UH'!Yj Y'`\_bck`YX[Y'cZ`]b[ i ]gh]WVY\Uj ]ci fžgcW]YfmUbX'W`h' fY' ]b'7\]bYgY!  
gdYU\_]b[ %o X %o %o

# 5ggYgga Ybh

8YhU]YX`jbgfi Wjcbg'cb`U`UggYgga YbhHug\_g`UfY`Uj U]UVY`cb`A ccXY

## 5ggYgga YbhHug\_g`

5ggYgga YbhHug_g`	K Y][ \h	8i Y`8UH`	Gh XYbh@YUfb]b[ Ci hWta Yg`5ggYggYX
HYgh%	&)	% `A UfWk `]b`@YWh` fY	%ž&ž(
C fU`dfYgYbhHjcb`	&)	K YY_`*`/`K YY_`+`	` ž(
HYgh&`	` \$	%+`5df]`]b`@YWh` fY	%ž&ž(
HYgh` `	&\$	%A Um]b`@YWh` fY	%ž&ž(

## 5ggYgga Ybh8YhU]`g`

5ggYgga Ybh%`HYgh%

GhUfhXUH`. Bch5dd`]WV`Y

8YhU]`g`. HYgh]b[ `j`cWUvi`Ufmž[ fUa a Ufž`a UghYfmcZk f]h]b[ `WXUfUWWh`fg`UbX`k`f]h]b[ `g\_]`g`f@Yggcb`%!`  
@Yggcb`+`E`YYXVUW`UbX`Wta`a`Ybhg]b`hi`hc]U`g`

Hi`fb]h]b`gYHh]b[`. H\]g`]g`bchU`Hi`fb]h]b`Ugg][`ba`Ybh

5ggYgga Ybh&`. C fU`dfYgYbhHjcb`

GhUfhXUH`. Bch5dd`]WV`Y

8YhU]`g`. Gh XYbhg`UfY`U`cWUHX`]b`[`fci`dg`Uh`h`Y`ghUfhcZ`h`Y`gYa`YghYfz`UbX`YUW`[`fci`d`dfYgYbhg`cb`Ub`  
Ugg][`bYX`hc]d]W`C`fU`ZYXVUW`]b`WUgg

Hi`fb]h]b`gYHh]b[`. H\]g`]g`bchU`Hi`fb]h]b`Ugg][`ba`Ybh

5ggYgga Ybh` `HYgh&`

GhUfhXUH`. Bch5dd`]WV`Y

8YhU]`g`. HYgh]b[ `j`cWUvi`Ufmž[ fUa a Ufž`a UghYfmcZk f]h]b[ `WXUfUWWh`fg`UbX`k`f]h]b[ `g\_]`g`f@Yggcb`(`!  
@Yggcb`+E`YYXVUW`UbX`Wta`a`Ybhg]b`hi`hc]U`g`

Hi`fb]h]b`gYHh]b[`. H\]g`]g`bchU`Hi`fb]h]b`Ugg][`ba`Ybh

5ggYgga Ybh(`HYgh`

GhUfhXUH`. Bch5dd`]WV`Y

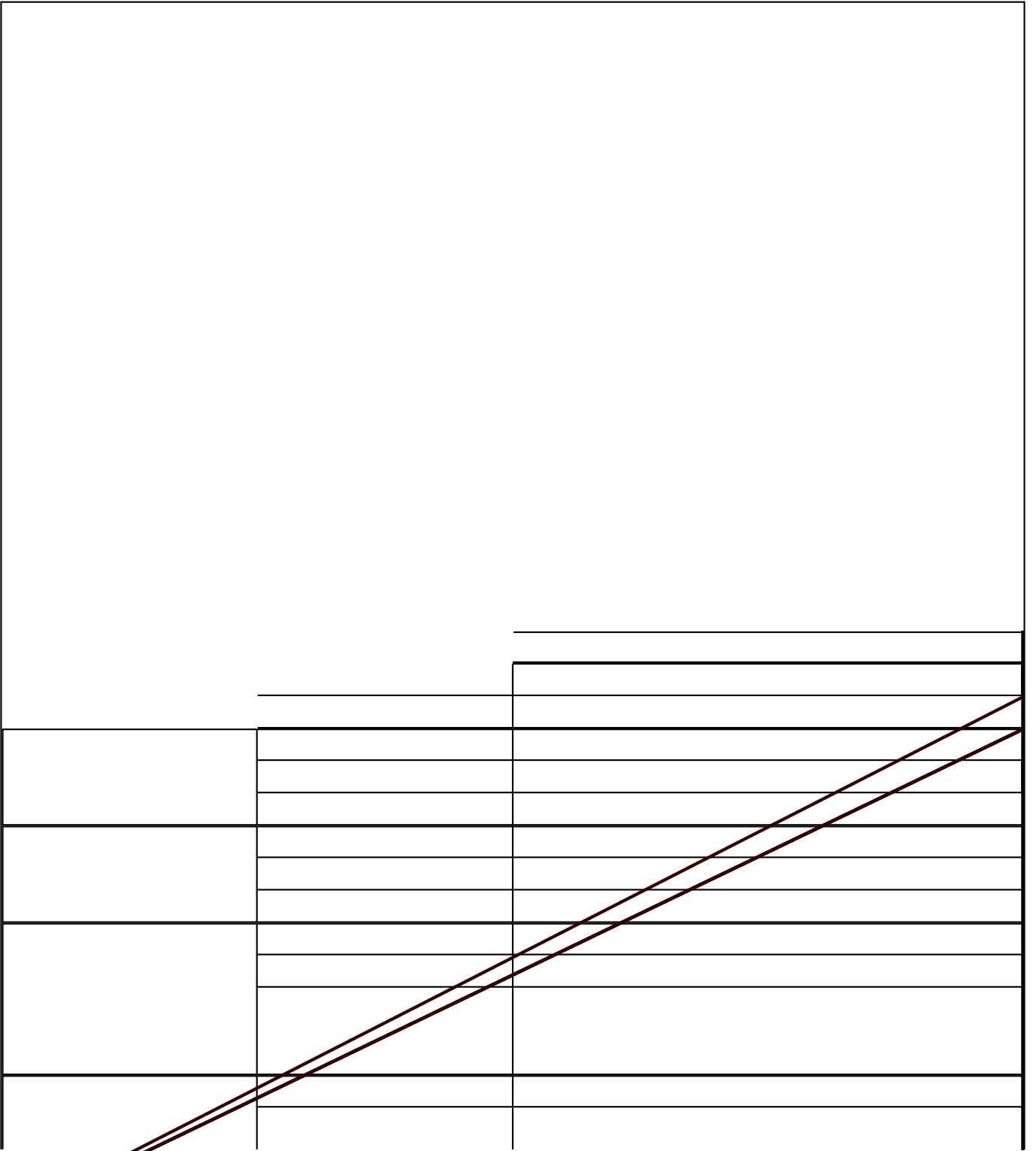
8YhU]`g`. H\]g`k`]`VY`Ub`cb`]bY`HYgh`HYgh]b[ `j`cWUvi`Ufmž[ fUa a Ufž`a UghYfmcZk f]h]b[ `WXUfUWWh`fg`UbX`  
k`f]h]b[ `g\_]`g`f@Yggcb`,`!`@Yggcb`%\$E`YYXVUW`UbX`Wta`a`Ybhg]b`hi`hc]U`g`H\]g`]g`h`Y`Z]bU`UggYgga YbhZcf

UHYbXUbWV`di fdcgYg"

5XX]h]cbU`XYHJ]g.

HYgh' `k ]`gh` VY`U`dUdYf!VUgYX`hYghf]bghYUX`cZUb`cb`]bY`cbYE" `k ]` VY`Y`X`Xi f]b[ `h\Y`fYgYei YbW`X  
@YW`h fY`cb`K YXbYgXUmK YY\_`%%"

Hi fb]h]b`gYh]b[ . `H\]g`]g`bchU`Hi fb]h]b`Ugg][ ba Ybh



K YY_%% '&- 5df]'!:% A Um	5ggYgga Ybh	HYgh' . . . f&\$i ɛ
------------------------------	-------------	---------------------

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

%`bH[ fUHx`7\]bYgYzJ c`i a Y" ž( ħ`9X"žHYI Hcc\_`fDUdYfVUW\_žG]a d`]ZYX/`HfUX]h]cbU`L"GG6B.  
- +, %\* &&- %%) \*%Q

&"bH[ fUHx`7\]bYgYzJ c`i a Y" ž( ħ`9X"žK cf\_Vcc\_`fDUdYfVUW\_žG]a d`]ZYX/`HfUX]h]cbU`L"GG6B.  
- +, %\* &&- %%) +, Q

F YWca a YbXYX`F Ygci fWg

5i X]c`fYWcfX]b[ g`cZĤY`HfI Hcc\_`UbX`k cf\_Vcc\_žUj U]UVY`cb`A ccXY"

%`Gfrc\_Y`C fXYf

`5fW`7\]bYgY.`\hd.## k k "UfWVW]bYgY"Wca

M`ck`6f]X[ Y.`\hd.## k k "mY`ck Vf]X[ Y"Wca #\X]bYgY#\X]bYgY!X]W]cbUfm`d\`d

&"7\]bYgY!9b[ `]g\`8]W]cbUfm

A UbXUf]b`Hcc`g.`\hd.## k k "a UbXUf]b`cc`g"Wca # cfXX]W`\ha`

A 86; .`.\hd.## k k "a XV[ "bYh#\X]bX]W#\X]bX]W`d`d`fU`gc`U`[ ccX`gci fW`cZ`cc\_i d`cZgfrc\_Y`cfXYfL

'`"7\]bYgY!7\]bYgY`8]W]cbUfmfUXj UbVWXL`

.`.\hd.## \") %) \*YXi "Wca`

.`.\hd.## k k "nX]WbYh

7ci fgY`9j U`i Uh]cb`UbX`8Yj Y`cda Ybh

5j U]UVY`cb`A ccXY



Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

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

≠mci`YbWci bHYf`U`dfcV`Ya`k`Yb`U`HYa`dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybh`h`fci`[`\`Hi`fb]h]b`z`d`YUgY`  
HY`Yd`cbY`9I`HYfbU`Gi`ddcfhcb`-`,`),`'`,`'`,`%cf`Ya`U]`h`Ya`cb`YI`HYfbU`HY`hgi`ddcfh4`i`bgk`"YXi`"Ui`"Gi`ddcfh`  
`ci`fg`UfY`,`.\$\$Ua`-`%\$.\$\$da`cb`k`YY`XUmg`UbX`-`.\$\$Ua`-`).\$\$da`cb`k`YY`YbXg`fI`\*)`XUmg`U`mY`UfL`≠mci`  
UfY`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`YbhXi`Y`hc`U`ZU`ihk`]h`Hi`fb]h]b`mci`a`Um`Udd`mi`Zc`f`Ub`YI`HYbg]cb`z`Vi`hmc`i`  
a`i`ghfY`hU]b`mci`f`h]W`Yhbi`a`VYf`Zca`9I`HYfbU`Gi`ddcfhfU`cb[`k`]h`Ubmc`h`Yf`fY`Yj`UbhXcW`a`Yb`hg`L`hc`  
]bWi`XY`Ug`Yj`]XYbW`hc`gi`ddcfhmc`i`f`YI`HYbg]cb`Udd`]W]h]cb"≠mci`Ya`U]`9I`HYfbU`Gi`ddcfhmc`i`k`]"`

## 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" `hWUb`hU`Y`a Ubm  
Zcfa gž`Zca `XY`]VYfUHY`WXYU]b[ `hc`UWV]XYbhU`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.

7 cdm]b[ .`i g]b[ `hY`gUa Y`cf`j Yfmg]a ]Uf`k cfXg`hc`hY`cf][ ]bU`hYI 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[ YgžUfhUbX`XYg][ b`dfc`YWgžUg`k Y`Ug  
dfYgYbhU]cbg`k \YfY`gca YcbY`dfYgYbh]g`UbchYf`g]XYUg`cf`k cfXg`k ]h`ci hWYX]h`

hUddfcdf]UHY`dUfUd`fUg]b[ .`7`U`b[ ]b[ `U`ZYk`k cfXg`UbX`d`fUgYg`k`Y`a cghmifYU]b]b[ `hY`cf][ ]bU`  
ghfi W`fY`UbX`#`f`dfc[ fYgg]cb`cZ]XYUg`cZ`hY`cf][ ]bU`ž`UbX`]bZcfa U]cb`k ]h`ci hUW\_bck`YX[ Ya Ybh`H\]g`U`gc  
Udd`]Yg`]b`dfYgYbhU]cbg`k \YfY`gca YcbY`dUfUd`fUgYg`UbchYf`g]XYUg`cf`k cfXg`k ]h`ci hWYX]hU`bX`hc  
d]YW]b[ `hc[ YhYf`ei chYg`UbX`dUfUd`fUgYg`]bhc`U`bYk`k`c`Yž`k ]h`ci hUddfcdf]UHY`fYZYfYbW]b[ "

7 c`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\_]7 c`i g]cb`U`gc  
]bWi XYg`dfcj ]X]b[ `mci f`k cf\_]hc`UbchYf`gh`XYbhVYZc`fY`hY`Xi Y`XUHYž`cf`Zc`f`hY`di fdcgY`cZ`hY`a

- i bXYfghUbx'mci f'f][ \hg'UbX'fYgdcbg]V]h]Yg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[ ]Uf]ga ž'Wc'dmf][ \hž' BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5W'W'dhUV'Y'I gY'cZ I BGK '⇒H'F'Ygci f'W'g'Dc`]W'h
- VY'Uk UfY'cZ'U'g'U'f'X'g'c'Z'V'Y'U'j ]ci f'Y'I d'Y'W'X'c'Z'Y'j Y'f'm'c'b'Y'']b'h'Y'I BGK 'W'c'a'a'i'b]m
- 'c'W'U'h'g'Y'f'j ]W'g'U'bx'j'b'Z'c'f'a U'h'c'b'U'V'c'i h'l BGK 'U'bx'I BGK '@]V'f'U'f'm

Gca Y'cZ'U'g'Y'U'f'Y'U'g'k ]''V'Y'Z'J'a ]]U'f'h'e'm'c'i ž'c'h'Y'f'g'k ]''V'Y'b'Y'k ''; U]b]b[ 'U'g'c'X'i bXYfghUbx]b[ 'cZU''h'Y'f'Y'U'h'X'U'gd'Y'W'g'c'Z'9'@'G'9'k ]''\Y'd'm'c'i 'a U\_Y'h'Y'a c'g'h'c'Z'm'c'i f'g'h X]Y'g'U'hl BGK ''

[\h'c'.#\]j' V'Y'W'f'i \]X'Y'g'' \]V'f'U'f'm'i b'g'k "Y'X'i "U'i #' \]g'Y'#\]V'c'i h' \]g'Y](#)

5 WUXYa ]WbZcfa Uh]cb`

: cf`YggYbh]U`ghi XYbh]bZcfa Uh]cb`fY`Uh]b[ `hc.

- fYei Yghg`ZcfYI hYbg]cb/
- `UhY`gi Va ]gg]cbg`[ i ]XY`]bYg/
- fYj ]Yk `cZa Uf\_g/
- I BGK `<YU`h`UbX`GUZY`midc`]WYg/
- YI Ua ]bUh]cb`dfcVWXi fYg/
- gdYW]U`Vc]bg]XYfUh]cb`]b`hY`Yj Ybhcz]`bYgg`cf`a ]gUXj Ybh fY/
- ghi XYbhYei ]miUbX`X]gUV`]`]m/
- UbX`chYf`YggYbh]U`UWUXYa ]W]bZcfa Uh]cbz`gYY

[\h\]dg.#k k k "Ufmg"i bgk "YXi "Ui #W ffYbh\]ghi XYbh\]bZcfa Uh\]cb`#dfchVc`g!\[ i \]XY`\]bYg#](#)

⇒ U[ Y`7 fYX]h

D\chc`Vm>YffmiK Ub[ `cb`l\_bgd`Ug\`"

7F ⇒ CG

7F ⇒ CG`Dfcj ]XYf`7cXY.`\$\$\$- , ;