

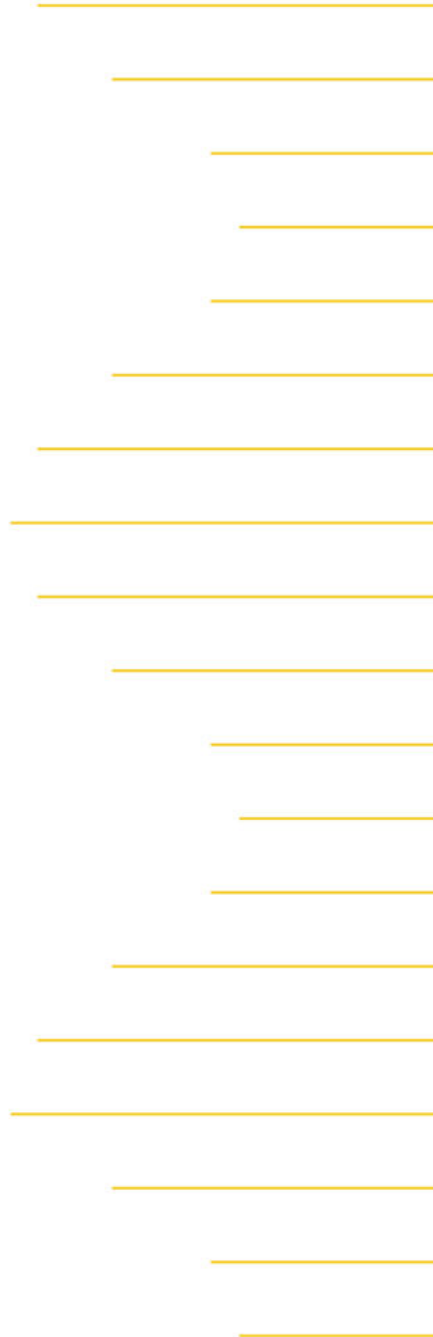


RIGOL

DSG5000 Series

Microwave Signal Generator

User Guide
Oct.2022



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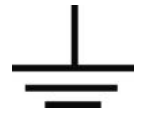
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[\ki^ \ek fi n Xki % ßñi [`Xñe^ Xep n Xki fi f k\i f Ya Zj `ekf`k\`Z_Xj j] n`Xk\`
_ \Xk [j j] gXkf e_f d % N _\e Z d Xe`e^ k\`C ; #k\ b`Zk\`kf`Xñi [j Zk] p e^`k%

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K_\`hl `gd \ekd Xp Zf ekXe`j I Yj kXeZj`k_XkZf I đ Y\`_Xid] I đ kf`k\`emif ed \ek fi
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Xggif gi`Xk p kf`e j I i \k_Xkd f j kd Xki Xg`Xi \i \j \[`fi i \ZpZd [`gif g\i p % G d Xj \ Zf ekZk p f I i đ ZcX I k_f i`k\j`j f i [`] g f j Xc f i i \ZpZc e^`e] f i d Xk f e%

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K_\`Zfej`^e\i`fi`ZXi`\i`j`_XcV\`cXYd`]fi`k_\[XdX^\`k`k_\`ejki`d\`eki\`j`l`de^
]if`d`j_gd\ek%`@FCnfi`q`efkY\`i\`j`gf`ej`Yd`]fi`ji\`d`XeKeXeZ\`&\`nf`ib`fi
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@`Zj\`f`]`Xep`d\`Z_Xe`Zc[XdX^\`#d`jj`e^`gXi`k`#fi`]Xt`i\`e`gXj`e^`k_\`\`dZi`Zc
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*%_\`Zb`k_\`XZZ\`jj`fi`\`j

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[XdX^\`fi`eZfdgdK#gdXj\`ZfekXZkpf`l`i`l`@FCj`Xdj`i\`gi\`j\`ekXknh`%

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`ejkil d\ekj kXj Xi k`d XkZ\ap X]ki k_\ i\Xi gXe\c\gf n\i jn`kZ_`j` Kie\ [fe%

*%LJ9?FJK

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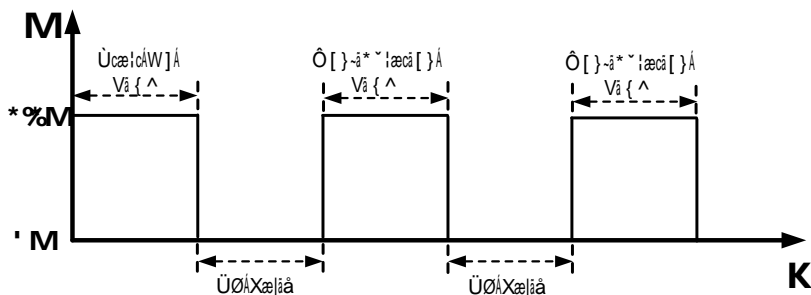
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Lj\ ['kf`Zf ee\Zk k\`gf n\i`Zfi [%k_\`8: `gf n\i`jg\Z]Zk f e j`f]k_\`ej ki d\`ek`j
Xj`j f`af`nj 1(`' `MkZ`k`)+' `MkZ`#+, `?`q`k`f`'++' `?`q`k`_\`gf n\i`Zf e j l d`g`k`f`e`f]k_\`
`ej ki d\`ek`Z`X`e`e`f`k\`o`Z\`[-, `N`ž`k`_`X`c`k`_\`f`g`k`f`e`j`n`f`i`b`e`^`Z`N`_`l`e`k`_\`j`^`e`X`c`
^`l`e`i`X`k`f`i`j`Z`f`e`e`Z`k` [`k`_`k`_\`8: `gf n\i`j`f`l`i`Z`n`X`k`_\`gf n\i`Z`f`i` [#`k`_\`ej ki d\`ek`
Xl`k`d`X`k`Z`X`a`p`X` [d`j`k`j`_`k`j`d`k`f`n`k`_`e`k`_\`g`i`f`g`l`i`n`f`i`d`X`^`i`X`e`^`#`X`e` [`p`f`l` [`f`e`f`k`
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/`%`F` : `O`F` ž`f`g`k`f`e`F` : `O`F` \$` ' /`ž`

F` : `O`F` ž`f`m`e` : `f`e`k`i`f`o` [: `i`p`j`k`X`f`j`Z`o`k`f`i`ž`Z`X`e`g`i`f`m` [\`X`_`^`_`p`j`k`Y`d`]`i`h`l`v`e`Z`p`
i` \]`i`l`e`Z`f`m`i`k`d`g`l`i`X`k`i` \ `n`i`X`k`f`e`j`%

K`@`

8`+'`\$`d`e`l`k`n`X`i`d`\$`g`j`i`h`l`i` \]`j`i`F` : `O`F`k`f`i`X`Z`_`k`j`e`f`d`e`X`c`j`i`h`l`v`e`Z`p`%



O`%`'`D`?`q`@`

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Z`f`Z`b`j`^`e`X`c`n`_`Z`_`j`i`j` \ [`k`f`j`p`e`Z`_`i`f`e`q`k`_\`^`l`e`i`X`k`f`i`n`k`_`f`k`_\`i`_`e`j`k`i`d`l`e`k`j`%

(`'`%`'`D`?`q`F`L`K`

i` \]`i`l`e`Z`j`^`e`X`c`f`l`g`l`k`Z`f`e`e`Z`k`f`i`%`@`j`i`j` \ [`k`f`_`e`g`l`k`k`_\`e`k`i`e`X`c`(``D`?`q`
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((`%`+`%`>`?`q`@`

+`%`>`?`q`_`e`g`l`k`Z`f`e`e`Z`k`f`i`%`@`j`i`j` \ [`k`f`_`e`g`l`k`k`_\`d`k`i`e`X`c`+`%`>`?`q`i` \]`i`l`e`Z`Z`f`Z`b`
j`^`e`X`c`%

()`%`+`%`>`?`q`F`L`K`

+`%`>`?`q`f`l`g`l`k`Z`f`e`e`Z`k`f`i`%`@`j`i`j` \ [`k`f`_`f`l`g`l`k`k`_\`e`k`i`e`X`c`+`%`>`?`q`i` \]`i`l`e`Z`Z`f`Z`b`
j`^`e`X`c`%

(*`%`<`O`K`D`F` ; `@`

<`d`k`i`e`X`c`d`f` [l`o`k`f`e`_`e`g`l`k`Z`f`e`e`Z`k`f`i`%`N`_`l`e`k`_\`d`f` [l`o`k`f`e`j`f`l`i`Z`f`]`8`D`#`=`D`#`f`i`
G`D`_`j`i`<`d`k`#`k`_`j`Z`f`e`e`Z`k`f`i`j`i`j` \ [`k`f`_`e`g`l`k`k`_\`d`k`i`e`X`c`d`f` [l`o`k`f`e`j`^`e`X`c`%

+`%` **K`f` `L`j` \ ; `J` > , ` ' ` ' `]`f`i` `k`_` \ `= `i`j`k`K`d` **

+`%`%` **K`f` : `f`e`e`Z`k`k`f` `8` : `G`f`n` \ i`**

G`o`X`j` \ i`j` \ `k`_\`gf`n` \ i`Z`f`i` [`g`i`f`m` [\ [`^`e`k`_\`X`Z`Z`j`f`i` \]`k`f`Z`f`e`e`Z`k`k`_\`j`^`e`X`c`^`l`e`i`X`k`f`i`
k`f`_`k`_\`8: `gf`n` \ i`j`f`l`i`Z`#`X`j`_`f`n`e`^`e`^`/`i` \ `+`%`%`k`_\`8: `gf`n` \ i`j`l`g`g`o`j`g`Z`]Z`k`f`e`f`]
k`_`j` [\ `m`Z`_`j`(``'`\$`)+` `M`k`Z`#`+,` \$`+`'`?`q`k`_\`gf`n` \ i`Z`f`e`j`l`d`g`k`f`e`f]k`_\`e`j`k`i`d`l`e`k`
Z`X`e`e`f`k` \ o`Z` \ [-, `N`ž`k`_`X`c`k`_\`f`g`k`f`e`j`n`f`i`b`e`^`Z`N`_`l`e`k`_\`j`^`e`X`c`^`l`e`i`X`k`f`i`j`

(% =: _Xee\c; `jgõp`8i\X

\$; jgõpj k_\]i\hl \eZp#õm#g_Xj\#d f [I õKf e j kKk # =f l lgl kj kKk `f]\XZ_ Z_Xee\c%õXgf j_fnj `n_Z_Z_Xee\c`j j\õZk [%

\$ <XZ_Z_Xee\c`j `e[`ZkK[`e[`]]\i\ekel d Y\ij `Xe[`Zf ð ij %k_\ `Zf ð i f] k_\ Z_Xee\c`j `Zf e j j kKekn `k_k_Xkf] k_\ I =f l lgl kZf ee\Zf i %k_\ `I F E i f i F = j kKk I e [\i k_\ Z_Xee\cE f %e[`ZkKj k_\ I =f l lgl kj kKk j `f] k_\ j g\Z] \ Z_Xee\c%`f i \XZ_Z_Xee\c[`jgõp\ [`e k_\ `d Xe `ek i] XZ \ #k_\ `õ] k j \ Zk f e `j `lj j i \ hl \ eZp [`jgõp X i \ X #Xe[k_\ i `^_k j \ Zk f e `j `lj `õm c [`jgõp X i \ X %

\$: cZb`f i kXg`X`Zi kXe`Z_Xee\c`f j\õZk`k%k_\ `d \el `k d j `f] k_\ j\õZk [Z_Xee\c`i \ \eZf j \ [`Yp`X`Z_\ `Zb`Yf`õn`f j \ `Zf ð i `j k_\ j Xd \ `Xj k_\ k_Xkf] Z_Xee\c%`f i \õXd gõ`#n_\e: ? (`j j\õZk [#k_\ `Z_\ `Zb`Yf`õ] f i \ eZf j `e^`k_\ gX i Xd \ k i j `f] : ? (#k_\ `Zf ee\Zk e^`c e \ k_Xk Zf ee\Zk k_\ : _Xee\cE f %e[k_\ Z_Xee\c`g X i Xd \ k i j #k_\ `Z_Xee\cE f %e[k_\ `Z_Xee\c`Zf ð i `X i \ `Xc`e[`ZkK[`e p\æ`n %

\$ C`f e^`g i \ j j k_\ j g\Z] \ [`Z_Xee\c`i \ X #k_\ `Z_Xee\c`n `c`Y \ \eXYõ [`f i [`j XYõ [% N_\e \eXYõ [& `j XYõ [#k_\ I =f l k f] k_\ `Z_Xee\c`n `c`Y \ \eXYõ [& `j XYõ [XZZf i [`e^`ø %

\$ D F ; j kKk j `e[`ZkKj n_\ k_\ i k_\ `d f [I õKf e f l lgl k `j \ eXYõ [`] f i k_\ j g\Z] \ [`Z_Xee\c`N_\e k_\ `d f [I õKf e f l lgl k `j \ eXYõ [#] k_\ I =f l lgl k `j \ eXYõ [`] f i k_\ j g\Z] \ [`Z_Xee\c`# D F ; i `j `æ`d `eXk [%MOD`j [`jgõp\ [`e k_\ `Z_Xee\c[`jgõp X i \ X %N_\e k_\ `d f [I õKf e f l lgl k `j [`j XYõ [# D F ; i `j `e ^i X p X e [MOD`j [`jgõp\ [`e k_\ `Z_Xee\c[`jgõp X i \ X %

\$ =f i X [\mZ \ n `k_X [`]]\i\ekel d Y\i `f] Z_Xee\c`#k_\ [`jgõp\ [`Zf e k e l j `Xe [õp f l k f] k_\ `d Xe `ek i] XZ \ X i \ [`]]\i\ek%`f i \õXd gõ`#f i k_\ [\mZ \ n `k_) #++# f i - `Z_Xee\c`#p f l `Zx e j \ \ k_\ `i F] j \ #J n \ \ g #8D # =D #GD #Xe [`G i `ç \ `f e &] j kKk j `e k_\ `d Xe `ek i] XZ \ %? f n \ n i #] f i k_\ [\mZ \ n `k_ / `Z_Xee\c`#k_\ \ `e] f i d Xk f e `d Xp `e f k Y \] l æ [`jgõp\ [%

EFK<

K\`d f[\`g n`k_)##f i - Z_Xee\`g`eZt[\`; J>,)')#; J>,()#; J>,)') +#; J>,()+#
; J>,)') -#Xe[\`; J>,()-%

)% =: _Xee\`cJ\`k`e^`D\`el

J\`lj `k\`gXiXd\`kij]fi `k\`j\`dZk[`I =Z_Xee\`e%

\$: ? (Te[\`Zkaj `k\`Zi i\`ekp]j\`dZk[`Z_Xee\`e%

N_\`e`pfi j\`dZkf `k\`i `Z_Xee\`g`#k[]`g`d`p] `k\`j`g\`Z]\`[`Z_Xee\`e%K_\`[]`g`d`p\`[
Zf`d`i] `k\`j`Xd\`Xj `k`Xkf]\`k\`Z_Xee\`e%

: `cZb`fi `k`g`k`f `m`n`d`f`i\`g`Xi`X`d\`k`i `e]`f`id`X`k`f`e`X`Y`f`i`k`k`j `Z_Xee\`e% `cZb`fi
`k`g`k`X`X`e`k`f `Z`f`j\` `k\`j `e`^`d`\$`Z_Xee\`c`e]`f`id`X`k`f`e`[]`g`d`p`%

\$ =\`h]j\`lj `k\`j\`i\`hl \eZp`gXiXd\`kij%

: `cZb`fi `k`g **=\`h`k`f** \e`k`i `k\`j\`i\`hl \eZp`gXiXd\`kij\`k`e^`e`k`i]XZ\`%PFI `Z`X`e`j\`k
`k\`g`Xi`X`d\`k`ij`j`i`Z_\`Xj]i\`hl \eZp`#]i\`hl \eZp`f]]j\`k`#`Xe[\`g_\`Xj\`f]]j\`k`%

\$ C\`m`d]j\`lj `k\`d`m`c`gXiXd\`kij%

: `cZb`fi `k`g **C\`m`d`k`f** \e`k`i `k\`d`m`c`gXiXd\`kij\`k`e^`e`k`i]XZ\`%PFI `Z`X`e`j\`k`k\`
`g`Xi`X`d\`k`ij`j`i`Z_\`Xj `C\`m`d`#`C`d`k`#`F]]j\`k`#`Xe[\`=d\`e\`j]j`%PFI `Z`X`e`X`g`f`j\`k`k\`d`m`c`
l`e`k`%

\$ Jn\`g]j\`lj `k\`j`n\`g`gXiXd\`kij%

: `cZb`fi `k`g **Jn\`g`k`f** \e`k`i `k\`j`^`e`X`c]j`n\`g`gXiXd\`kij\`k`e^`e`k`i]XZ\`%PFI
`Z`X`e`j\`k`k\`g`Xi`X`d\`k`ij`j`i`Z_\`Xj]n\`g`k`p`g\`#`n\`g`d`f[\`#`Xe[\`f`k\`ij]%

\$ D`f[\`j]j\`lj `k\`d`f[\`i`d`k`f`e`gXiXd\`kij%

: `cZb`fi `k`g **D`f[\`k`f** \e`k`i `k\`j`^`e`X`c]d`f[\`i`d`k`f`e`gXiXd\`kij\`k`e^`e`k`i]XZ\`%
PFI `Z`X`e`j\`d`Z`k[\`]]i\`e`k`d`f[\`i`d`k`f`e`k`p`g]j`Xe[\`j\`k`k\`d`f[\`i`d`k`f`e`gXiXd\`kij]%

*%]k`k]j ;]`g`d`p`8i\`X

;]`g`d`p] `k\`j]j]k`d]k`k]j`#`eZt[\`e^`k\`i\`d`f`k`Z`f`e`k`i`f`c]j]k`k]j`#`O@#[`Xk`Xe[\`k`d\`#
\`k`Z`%

\$; Xk]1[]`g`d`p] `k\`j]j]k`d [Xk`Xe[\`k`d\`%

\$ O@`e[\`Zkaj `k\`O@Z\`i]k]Zk`f`e`Z`f`e`%

\$ I <=1N_\`e`k\`d`k`i`e`X`c(` `D`?`q`i\`i\`e`Z`Z`f`Z`b`j`I`j\`[# <=]]`g`d`p\`[%

\$ LJ9]j`k`f`i`X`\[\`m`Z\`Z`f`e`N_\`e`X`LJ9]j`k`f`i`X`\[\`m`Z\`j]\`k`Zk[#`**L`G**`n`c`Y\`
[]`g`d`p\`[%

\$ Fg\iXkf e`D f[\1 Rmt `e[`ZXkj `k`Xk\ `ejkil d\ek`j`fg\iXke^`e`i\ d f k

Zfekif cd f[\% Local `e[`ZXkj `k`Xk\ `ejkil d\ek`j`fg\iXke^`e`d`ZXcd f[\%`

+%`d`YXcGX`Xd \ki`J\k`e^`8i\X

K_\`gXiXd \ki`j\k`e^`j`e`k`_j`Xi\X`Xi`^`d`YXckf`Xck\`Z`Xee\`g`fi`k`\`n`_`f`d`j`pj`kd`]l`eZkf`e`%

\$ Gi\j\kGi]fid`j`k_\`gi\j\kf`fg\iXkf`e`]fi`k_\`j`pj`kd`k`f`i\j`k`f`i\`k_\`j`pj`kd`k`f`i`j`[\]Xl`dk`j\k`e^`j`fi`i`j`i`[\]`e\`j`k`e^`j`%

\$ DF; 1<eXYd`j`fi`[`j`XYd`j`k_\`d`f`[l`d`k`f`e`f`l`l`g`l`k`]fi`Xck\`Z`Xee\`g`%`

\$ I=1<eXYd`j`fi`[`j`XYd`j`k_\`l`=j`^`e`Xcf`l`l`g`l`k`]fi`Xck\`Z`Xee\`g`%`8j`d`e`^`X`j`k_\`I`=f`l`l`g`l`k`f`]`Xep`f`e\`Z`Xee\`c`j`\`e`XYd`[`#`k_\`l`=j`k`k`j`j`_`f`nj`F`E`%`@`k_\`l`=f`l`l`g`l`k`f`]`Xck\`Z`Xee\`g`Xi`\`[`j`XYd`[`#`k_\`l`=j`k`k`j`j`_`f`nj`F`=`%`

E F K <

\$ Fek\`k`f`l`Z`_`j`Zi\`e`#`Xgg`e`^`DF;`Z`X`e`f`e`p`\`e`XYd`fi`[`j`XYd`k_\`d`f`[l`d`k`f`e`f`l`l`g`l`k`]fi`Xck\`Z`Xee\`g`%`

\$ @pf`l`e\`[\`k`\`e`XYd`fi`[`j`XYd`k_\`d`f`[l`d`k`f`e`f`l`l`g`l`k`]fi`f`e\`j`g\`Z`\`[\`Z`Xee\`c`f`i`d`l`d`g`d`Z`Xee\`g`#`l`e`k_\`j`g\`Z`\`[\`J`:`G`@`Z`f`d`d`X`e\`k`\`e`XYd`fi`[`j`XYd`k_\`d`f`[l`d`k`f`e`f`l`l`g`l`k`]fi`X`j`g\`Z`\`[\`Z`Xee\`c`X`g`f`p`f`l`Z`X`e`Z`f`e`e\`Z`k`k_\`e`j`kil`d`l`e`k`f`X`e`\`d`k`i`e`X`c`[`j`g`d`p`m`X`k_\`?`;`D`@`e`k`i`]`X`Z`\`k`\`f`g\`i`X`k`%`k_\`f`g\`i`X`k`f`e`g`i`f`Z`[l`i`j`X`\`X`j`]`f`d`f`nj`1`@`k_\`d`k`i`e`X`c`[`j`g`d`p`#`\`d`Z`k`X`d`f`[l`d`k`f`e`l`p`g`\`k`\`e`k`i`k_\`d`f`[l`d`k`f`e`e`k`i`]`X`Z`\`%`\`d`Z`k`f`e\`Z`Xee\`c`X`e\`Z`c`Z`b`DF;`^`e`k_\`g`Xi`X`d`\`k`i`j\`k`e^`X`i\`X`k`f`\`e`XYd`fi`[`j`XYd`k_\`d`f`[l`d`k`f`e`f`l`l`g`l`k`]fi`k_\`Z`Xee\`c`@`\`e`XYd`[`#`MOD`j`[`j`g`d`p`\`^`e`k_\`Z`Xee\`c`[`j`g`d`p`X`i\`X`k_\`d`f`[l`d`k`f`e`f`l`l`g`l`k`]fi`\`X`Z`\`Z`Xee\`c`Z`X`e`Y`j\`k`e\`[\`g\`e\`l`e`k`p`^`e`k`_`j`n`X`p`%`

,`%`j`pj`kd`J\k`e^`

:`c`Z`b`f`i`k`X`g`k_\`j`pj`kd`j\k`e^`Z`f`e`k`\`e`k`i`k_\`j`pj`kd`j\k`e^`e`k`i`]`X`Z`\`%`P`f`l`Z`X`e`j\`k`k_\`e`k`i`]`X`Z`\`Z`%`%`C`B`E`#`#`g`i`]`fid`j`pj`kd`l`g`^`i`X`\`#`m`n`k_\`j`pj`kd`^`e`]`fid`X`k`f`e`#`g`i`]`fid`j`d`f`g`i`X`k`f`e`#`A`k`Z`%`

+% Kf `Lj` \ `k_\` 9l `d`\$e`?` \`g`=`d`

K_\`Y`i`d`\$e`\`g`]d`g`i`f`m`[\`j`^`e`]`fid`X`k`f`e`X`Y`f`l`k`k_\`]l`eZkf`ej`X`e\`d`l`e\`e`k`i`f`[l`Z`k`f`e`j`f`]k_\`e`j`kil`d`l`e`k`f`P`f`l`Z`X`e`m`n`k_\`\`g`^`e`]`fid`X`k`f`e`]fi`X`ep`]l`eZkf`e`f`i`d`l`e\`[l`i`e`^`k_\`e`j`kil`d`l`e`k`f`g`i`X`k`f`e`%

:`c`Z`b`f`i`k`X`g`^`5`?`\`g`%`k_\`\`g`]d`j`[`j`g`d`p`\`%`P`f`l`Z`X`e`\`k`k`j`\`g`^`e`]`fid`X`k`f`e`Y`p`Z`c`Z`b`e`^`f`e`k_\`c`e`b`]fi`k_\`e`k`i`f`[l`Z`k`f`e`f`]k_\`j`g\`Z`\`[\`]l`eZkf`e`%

*%EId Y\ij

: cZbfi kXg k_\iel d Y\ij kf`egl kK_\d`ekf`k_\`gXiXd\k\i`egl k]\`e%

+% \Zd XcGf`ek

\$ kf`egl kX[\Zd Xcel d Y\i`djj`k_Xe`(#egl kK_\[\Zd XcGf`ek]ij kXe[`k_\e X[\`Xiel d Y\i%

\$ kf`egl kXi\Xcel d Y\i`n`k_\[\Zd Xg`#egl kXe`i\Xcel d Y\i`]ij kXe[`k_\e`X[\`X [\Zd XcGf`ek`k_\iel d Y\i`f]`qif`[\`^`lj`]`Xi kf`d`XkZ\cp`X[\[\`X]k\i`k_\ [\Zd XcGf`ek`XZZfi[\`e^`kf`k_\`il`d`j`f]`k_\`j`g\Z]\`gXiXd\k\i%

\$ kf`egl kX`ef`e\$eK`^`i`iel d Y\i`^i\Xk\i`k_Xe`(#egl kXi\Xcel d Y\i`]ij kXe[`k_\e`X[\`X[\Zd XcGf`ek`#k_\e`X[\`Xiel d Y\i`e`k_\`k_\[\Zd XcGf`ek`%

\$ @`j`ef`kXcf`n\`kf`egl`kj`\m\i`Xc[\Zd XcGf`ek`j`%

,%Gd`j`fi`d`el`j`j`^`e`Z`.z

Pf`i`i]ij`kZ`cZb`fi`kXg`f]`k_\`j`^`e`n`c`egl`kX`d`el`j`Z`j`^`e`#k_\`j`Z`f`e[\`kd`\`f]`Z`cZb`fi`kXg`f]`kn`c`egl`kX`g`d`j`j`^`e`#Yl`kK_\`g`d`j`j`^`e`j`X`n`X`p`j`f`d`k`k[\`]f`i`k_\`el`d`Y\i`[\`j`g`d`p`%

-%Le`k

\$ K_\`X`n`X`d`Y`d`l`e`lj`X`i`\`[\`]]\`i`ek]f`i`[\`]]\`i`ek`g`Xi`Xd`\`k`ij`%

=i\hi`leZp1>?`q#D`?`q#b?`q#?`q

Q`m`d

N_\`e`k_\`d`m`d`e`k`j`j`k`k`f`i`[\`9d`i`#k_\`l`e`lj`[\`j`g`d`p`[\`e`k_\`l`e`k`Z`f`d`d`e`f]`k_\`iel`d`li`Z`b`l`p`g`X[\`X`i`\`[\`9d`#M`d`M`X`e`[\`1`M`2

N_\`e`k_\`d`m`d`e`k`j`j`k`k`f`i`[\`9d`M`#k_\`l`e`lj`[\`j`g`d`p`[\`e`k_\`l`e`k`Z`f`d`d`e`f]`k_\`iel`d`li`Z`b`l`p`g`X[\`X`i`\`[\`9d`M`M`d`M`X`e`[\`1`M`2

N_\`e`k_\`d`m`d`e`k`j`j`k`k`f`i`M`#k_\`l`e`lj`[\`j`g`d`p`[\`e`k_\`l`e`k`Z`f`d`d`e`f]`k_\`iel`d`li`Z`b`l`p`g`X[\`X`i`\`M`d`M`l`M`X`e`[\`[\`9d`2

N_\`e`k_\`d`m`d`e`k`j`j`k`k`f`i`N`i`#k_\`l`e`lj`[\`j`g`d`p`[\`e`k_\`l`e`k`Z`f`d`d`e`f]`k_\`iel`d`li`Z`b`l`p`g`X[\`X`i`\`N`#`d`N`#`N`#`X`e`[\`[\`9d`2

Q`m`c`F`]]j`\`k`[\`9

K`d`\`1`j`#`d`j`#`j`#`ej

G`_`X`j`\`1[\`^

;\`g`k`_`1`f`l

G`_`X`j`\`;\`m`X`k`f`e`f`i`X`[\`

\$ 8]ki`egl kē^k_`el d Yli#j\ΔZk_k_\[\j`i\ [l e`kKf`Zf d gΔk k_`egl kf]`k_\`
gXiXd \ki j\kē^%k_`e`kXi kf d XkZXq`^f \j`kf`k_`gi`nfi j`gX^%\`

\$ 8]ki`egl kē^k_`el d Yli#ZcZbfi kXg <eki`kf`Zfe`id`k_`egl kXe[`k_\`
[\]Xi dkl e`k`j`X[\[\[%k_`e`kXi kf d XkZXq`^f \j`kf`k_`gi`nfi j`gX^%\`

\$ @pfi [f`efk\ [k_`gXiXd \ki n\Δ`Xe[f`epj\ΔZk_k_\ l e`k#k_`e`k_\`Z_Xee\c
[]gΔpXi\Xj`_f`nj`k_`gXiXd \ki n\Δ`#n`k_`k_\ l e`kZ_Xe^[\`Xe[`k_`n\Δ`\`
l eZ_Xe^[\`%

. %eki

8]ki`egl kē^k_`n\Δ`\Xe[j\ΔZkē^k_\ l e`k#ZcZbfi kXg`<eki [`i\Zq`kf`
Zfe`id`k_`gXiXd \ki`egl k@pfi [f`efkj\ΔZk_k_\ l e`k]fi`k_`n\Δ`\#ZcZbe`fi
kXg`<eki#Yp[\]Xi d#k_\`Zi`iiekl e`k`j`X[\[\[%k_`e`kXi kf d XkZXq`^f \j`kf`k_`
gi`nfi j`gX^%\`

/% ΔXi ž ž

: cZbfi kXg: kf`ZΔXi`Xck_\`egl k%

0% \Δk žž

: cZbfi kXg`k_j`Zfe`kf`ZΔXi`k_\`egl k@df`m`k_\`Zi`ijfi`kf`k_`gfj`kf`ef]`k_\`
el d Yli`k_Xke^[\`j`kf`Y[\Δk[\`#k_`e`ZcZbfi`kXg`k_j`Zfe`kf`ZΔXi`k_\`[^`k`
X_\`X[\`f]`k_\`Zi`ijfi`%

(' % f j \ @ f e

: f j \ k_\`el d \i`Z`b\pgX[`Xe[`ef`Z_Xe^j`Xi`d`X[\`kf`k_`gXiXd \ki`%k_`e`k_\`
j`pj`kd`^f \j`kf`k_`gi`nfi j`gX^%\`Xi`kf d XkZXq`%

, %

8gg_Xel d \i`Z`B\pgX[]fi`≡`ΔeXd \`@egl k

K_\`b\pgX[j l ggi kj : _`e\`#\`<e`q_`#Xe[`el d \i`Z`egl kd \k_f [j`%f l`Z_Xe`ZcZbfi
kXg: E & (&E`kf`jn`kZ_\`Xd`fe`k_\`k_i\`eg l kd \k_f [j`%k`j`d`Xep l j \ [`kf`eg l k k_\`
]ΔeXd \`%

\$ 8]ki k_\]ijkZcZbfi kG žkž#ZcZbfi kG k_\`kd X^Xe#Xn`cZ_Xe^`kf Y`e
k_\`Gepē`Xj jf ZXkf e Xi\X%

\$ 8]ki Xjg\Z]\[`kd\ ž kž#pfi i ZcZbfi kG n`c[]gōp`k_\]ijkākai X^Xe%
+% \Zd XcGf`ekžž

: cZbfi kG`k k`ej\i kX[\Zd XcGf`eki%Xk k_\`Zi jfi`gfj`kf e%Pfi X\`Xaf n\`kf
`egl kj\`ni Xc[\Zd XcGf`ekj%kZXe Y\`egl k`e`e^cj_`egl kj k k fi el d\i Z`egl k
j k k %

, %d gXZ\

\$ JgXZ\`j Xaf n\`kf Y\`egl k`e k_\`d [[`d`gfj`kf e f]k_\`]dēXd\`#Xe[`pfi X\`
Xaf n\`kf`egl kj\`ni Xcj gXZ\j %

\$ @`j Xaf n\`kf`egl kj gXZ\ Y\`fi\`fi X]ki k_\`]dēXd\`n_\`e\`kē^%f n\`ni#
n_\`e pfi Zfe]id k_\`egl k k_\`j gXZ\ X[\`[\` Y\`fi\`fi X]ki k_\`]dēXd\`n`c
Y\`fd`k k[\`Yp[\`X] d%

- %e gl kD\`k_f [Jn`kZ_

\$ K_\`]ijk`kd Y\`fi\`k_\`j d_j_f nj k_\`Zi i i\`ek`egl kd\`k_f [%fi\`oXd gā#
: E & & E`e[\`Zk k j k_Xk k_\`Zi i i\`ek`egl kd\`k_f [] : _`e\`j\`Z_Xi XZki`egl k%

\$: cZbfi kG k`j n`kZ_`k`k_\`e\`d`egl kd\`k_f [%N_\`e`k`j : _`e\`j\`Z_Xi XZki
`egl k k`e\`ZcZbfi kG n`c j n`kZ_`k_\`egl kd\`k_f [`kf el d\i Z`egl kd\`k_f [%

\$ N_\`e j n`kZ_`e^`k_\`egl kd\`k_f [#k_\`egl k Zf e k e k j k_Xk_Xrñ Xē\`X] p\`oj k k
`e k_\`egl k j\`dē`n`c e f k Y\`X] \`Zk k [%

. %e k i

8]ki`egl k kē^`k_\`]d`fi j f dē\i eXd\`#ZcZbfi kG`e k i [i\`Zk p`k` Zfe]id k_\`
eXd\`egl k k_\`e`k X i k f d X k Z X a p`^f j`k`k_\`g i\`n f i j`g X\`%\`

/ % d X i ž ž

: cZbfi kG: `k`Z d X i X c k_\`egl k%

0% \ d k ž ž

: cZbfi kG k`j`Zfe`k`Z d X i k_\`egl k k`d f m`k_\`Zi jfi X_\`X[`f]k_\`kd k_Xk
e\`j`k`Y\`[\`d k k [#k_\`e`ZcZbfi kG k`j`Zfe`k`Z d X i k_\`kd %

(' % d j\`@f e

kKb\ k_\`egl kf] XYZ`Xj `Xe \oXd gā%PF I]ij kZcZbfi kXg n`c`egl kK_\]ij k
dKki iXi%

8]ki k_\]ij kZcZbfi kXg Z3kz#ZcZbfi kXg k_\`kd X^Xe# Xi n`cZ_Xe^`kf iYi#
Xe[jf fe%

8]ki Xjg\Z]\ [kd \ ž k#pfi i ZcZbfi kXg n`c[] gōp_k_\]ij k dKki iXi X^Xe%
+% \Zd Xcǵf`ek žž

: cZbfi kXg`kKf`ej\ikX[\Zd Xcǵf`eki%Xk_k_\ Zi jfi`gfj`kf e%PF I Xi\ Xcf n\ [kf
`egl kj\ñiXc[\Zd Xcǵf`ekj%&ZXe Y\`egl k`e`e^cj_`egl kj kKk`fi el d\i`Z`egl k
j kKk%

, %gXZ\

\$ JgXZ\`j Xcf n\ [kf Y\`egl k`e`k_\`d [[d`gfj`kf e`f] k_\] dēXd \#Xe[pfi Xi\
Xcf n\ [kf`egl kj\ñiXcj gXZ\j%

\$ @j Xcf n\ [kf`egl kj gXZ\ Y\]fi\ fi X]ki k_\] dēXd \n_\`e\ [kē^%?fn\ñi#
n_\`e`pfi Zfe]id k_\`egl k#k_\`j gXZ\ X[[\ Y\]fi\ fi X]ki k_\] dēXd \n`c
Y\fd`kK[Yp[\]X d%

- %egl kD\k_f [Jn`kZ_

\$ K_\]ij k`kd Y\]fi\ k_\`j dǵ_j`fnj k_\ Zi iiek`egl kd\k_f [%fi\oXd gā#
: E & & E`e[`ZkKj k_Xk_k_\ Zi iiek`egl kd\k_f []j : _e\j\Z_XiXZki`egl k%

\$: cZbfi kXg`kf jn`kZ_`kf k_\`e\dk`egl kd\k_f [%N_\`e`k]j : _e\j\Z_XiXZki
`egl k#f e\ ZcZbfi kXg n`c]n`kZ_`k_\`egl kd\k_f [kf`el d\i`Z`egl kd\k_f [%

\$ N_\`ejn`kZ_`e^`k_\`egl kd\k_f [#k_\`egl kZfeklekj k_Xk_Xñ Xē\X[p\oj kK
`e`k_\`egl k]\`ē n`cef kY\ X]\ZkK [%

. %ekli

8]ki`egl kKē^`k_\] d`fi] f`ē\i`eXd \#ZcZbfi kXg`<ekli [i\Zkp`kf Zfe]id k_\`
eXd \`egl k%k_\`e`kXi kf d XkZk`ap`af`j`kf k_\`gi\ñfi j`gX^%

/% dXi ž ž

: cZbfi kXg: kf ZdXi Xck_\`egl k%

0% \dK žž

: cZbfi kXg`k_j`Zfe`kf ZdXi`k_\`egl k%dfm`k_\ Zi jfi`X_\`X[`f] k_\`kd`k_Xk
e\ [j`kf Y\ [\dK [#k_\`e`ZcZbfi kXg`k_j`Zfe`kf ZdXi`k_\`kd %

(' % f j \ `@f e

- ≡\hl \eZp

- % ≡\hl \eZp J\kKè^

J\kj 'k_\l =f l lgl k]i\hl \eZp%

: cZb'fi 'kG ≡\h'5 ≡\h'%egl k'k_\l]i\hl \eZp'n\k\ \n'k_\l 'gf g\$ g'el d\i'Z\b\pgX[#
Xe[j\àZk'k_\l [\j'\l['l e'l%

K_\l]i\hl \eZp'l e'lj 'XnX\àY\à 'Xi\ '>? q#D ? q#b? q#Xe['? q%

Pf l 'ZXe X'gf ['\Zq'ZcZb'fi 'kG <ekli 'k' Zf e]id 'k_\l [\X]l \k l e'k]fi 'k_\l
]i\hl \eZp%

Pf l 'ZXe ZcZb'fi 'kG'k_\l `egl k]\d' f]'k_\l ≡\h'gX\Xd \k i 'k' \['k'k_\l n\k\ \ f i
d f m'k_\l Z l i j f i 'k' k_\l j g\Z]\['gf j 'k f e'k' d f []p'k_\l n\k\ \ %

- % ≡\h'F]j\k

J\kj 'k_\l]i\hl \eZp'f]j\k i\à\k m' k' k_\l =f l lgl k]i\hl \eZp%

N_\e'l j`e^ Xe \à\k i eXcd `o l i Xe['f k_\l i [\n'Z\j #p f l 'ZXe j\k Xe['\X['k_\l]i\hl \eZp
n\k\ \ k i f l ^_k_\l \à\k i eXcd `o l i f e k_\l =j f l i Z\ Yp j\k Kè^ 'k_\l]i\hl \eZp'f]j\k %

: cZb'fi 'kG ≡\h'5 ≡\h'F]j\k %egl k'k_\l]i\hl \eZp'f]j\k n\k\ \n'k_\l 'gf g\$ g
el d\i'Z\b\pgX[#Xe[j\àZk'k_\l [\j'\l['l e'l%

K_\l]i\hl \eZp'f]j\k l e'lj 'XnX\àY\à 'Xi\ '>? q#D ? q#b? q#Xe['? q%

Pf l 'ZXe X'gf ['\Zq'ZcZb'fi 'kG <ekli 'k' Zf e]id 'k_\l [\X]l \k l e'k]fi 'k_\l
]i\hl \eZp'f]j\k %

Pf l 'ZXe ZcZb'fi 'kG'k_\l `egl k]\d' f]'k_\l 'G_X\ 'F]j\k gX\Xd \k i 'k' \['k'k_\l
n\k\ \ f i d f m'k_\l Z l i j f i 'k' k_\l j g\Z]\['gf j 'k f e'k' d f []p'k_\l n\k\ \ %

E F K <

(%N_\e'k_\l]i\hl \eZp'f]j\k j' ' ? q#k_\l]i\hl \eZp['j g\p\l ['e'k_\l 'ekli]XZ\ žèXd \p'k_\l
j\k Kè^]i\hl \eZp'z'j \hl Xc'f 'k_\l XZ\ Xc'f l lgl k]i\hl \eZp%

)%N_\e'k_\l]i\hl \eZp'f]j\k j' e'f k' ' ? q#k_\l f l lgl k]i\hl \eZp'j ['\k id `e\ ['Yp'k_\l j\k Kè^
]i\hl \eZp Xe[]i\hl \eZp'f]j\k %k_\l 'k i \ 'g X\Xd \k i j j X'j]p'k_\l] f \n `e^ \hl X'k f e l

J\k Kè^]i\hl \eZp'ž j g\p]i\hl \eZp'z 4 f l lgl k]i\hl \eZp']i\hl \eZp'f]j\k

*%k_\l [\n'k'f e žèXd \p'k_\l XZ\ Xc'f l lgl k]i\hl \eZp'z \k n\l e'k_\l ['j g\p]i\hl \eZp Xe[
]i\hl \eZp'f]j\k Xèef k\oZ\l ['k_\l]i\hl \eZp i Xe^ \ f]`ej k l d l e k %

- % G_Xj\F]]j\k

J\kj`k_g_Xj\F]]j\kf]]k_l=j^eXcPFI`ZxeX[á jkk_g_Xj\F]]j\kf`jpeZ_ife`q
k_g_Xj\F]]k_fi kgl kj^eXc`fi j\kX]o\[_g_Xj\F]]j\k]fi k_j^eXc`%

: cZb`fi kXg ≡\h`5 G_Xj\F]]j\k`egll kk_g_Xj\F]]j\kn\`d\n`k_k_gf`g\$ g
el d\i`Z`b\pgX[#k_lej\`dZk_k_[\j`\[\`le k[\^fi <eki`k`Zfe]id`k_n\`d\`%

K_Xn\`d\`d`g_Xj\F]]j\k]e`k`j[\`^%

PFI`Zxe[\`i\Zk`pZcZb`fi kXg <eki`k`Zfe]id`k`j\`dZk_k_[\`X]d]e`ki[\`^i

X]ki`j\`k`e^`k_g_Xj\F]]j\kn\`d\`%

PFI`Zxe`ZcZb`fi kXg`k_`egll k]\`d`f]]k_G_Xj\F]]j\kgX]d\`ki`k`[\`k`k_

n\`d\`fi`d`f`m`k_Z]ij`fi`k`k_j`g`Z]\`[\`gf`j`k`e`k`d`f[\`]p`k_n\`d\`%

- % G_Xj\I\j\k

I\j\kj`k_Z]ii\vek`g_Xj\F]]j\k]k`" [\`^%

: cZb`fi kXg ≡\h`5 G_Xj\I\j\k]k`i\j\kk_Z]ii\vek`g_Xj\F]]j\k]k`" [\`^%k_e" [\`^
j]\`j`g`d`p\[\`e`k_Z`Xee\`c[\`j`g`d`p`X]\`X`%

8d gçkl [\

. % 8d gçkl [\ J \ k e ^

J \ k j ' k _ \ 1 = f l l g l k X d g ç k l [\ %

: ç Z b ' f i ' k g ' C m c 5 ' C m c % e g l k k _ \ X d g ç k l [\ n x d \ ' n ' k _ k _ \ g f g \$ l g ' e l d \ i ' Z b \ p g X [# X e [j \ d Z k k _ \ [\ j ' i \ [1 e ' l %

K _ \ X d g ç k l [\ 1 e ' l j ' X n x d Y d ' X i \ [9 d # M f d M F X e [1 M %

P f l ' Z X e [' i \ Z k p Z c Z b ' f i ' k g < e k i ' k f ' Z f e ' i d ' k _ \ [\] X l d l e k ' f i ' k _ \ X d g ç k l [\ %

P f l ' Z X e Z c Z b ' f i ' k g ' k _ \ ' e g l k] \ d e ' f] ' k _ \ ' C m c g X i X d \ k i ' k f \ [' k k _ \ n x d \ f i

d f m ' k _ \ Z i j f i ' k f ' k _ \ j g \ Z] \ [' g f j ' k f e ' k f ' d f ['] p k _ \ n x d \ %

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J \ k j ' k _ \ ' c d ' k f] ' k _ \ 1 = f l l g l k X d g ç k l [\ % _ j ' n x d \ ' j ' k _ \ 1 g g \ i ' c d ' k f] ' k _ \ 1 = f l l g l k X d g ç k l [\ %

k f ' c d ' k k _ \ ' f i l g l k X d g ç k l [\ # p f l ' Z X e 1 j \ ' k _ \ X d g ç k l [\ ' c d ' k] e Z k f e ' k f ' X n f i ' [X d X ^ \ Z l j \ [' Y p [\ c h i ' e ^ X _ ' ^ _ \$ g f n \ i \ [j ^ e X d k f ' k _ \ \ d k i e X c Z i Z i ' l %

: ç Z b ' f i ' k g ' C m c 5 ' C d ' l % e g l k k _ \ X d g ç k l [\ ' c d ' k n ' k _ k _ \ g f g \$ l g ' e l d \ i ' Z b \ p g X [# X e [j \ d Z k k _ \ [\ j ' i \ [1 e ' l %

K _ \ X d g ç k l [\ ' c d ' l j ' f] 1 e ' l j ' X n x d Y d ' X i \ [9 d # M f d M F X e [1 M %

P f l ' Z X e [' i \ Z k p Z c Z b ' f i ' k g < e k i ' k f ' Z f e ' i d ' k _ \ [\] X l d l e k [9 d] f i ' k _ \

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P f l ' Z X e Z c Z b ' f i ' k g ' k _ \ ' e g l k] \ d e ' f] ' k _ \ ' C d ' k g X i X d \ k i ' k f \ [' k k _ \ n x d \ f i

d f m ' k _ \ Z i j f i ' k f ' k _ \ j g \ Z] \ [' g f j ' k f e ' k f ' d f ['] p k _ \ n x d \ %

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J \ k k _ \ X d g ç k l [\ f] j \ k i \ d k i n ' k f ' k _ \ 1 = f l l g l k X d g ç k l [\ %

@ k _ \ \ d k i e X c \ n z \ f i ' Z i Z i ' k _ X j ' X] o l [' X k k e l X k f e ' f i ' ^ X e # Y p j \ k k e ^ k _ \ X d g ç k l [\ f] j \ k # p f l ' Z X e j \ k X e [' i \ X [' k _ \ X d g ç k l [\ n x d \] i f d ' k _ \ d ' Z i f n X n j ^ e X c ^ \ e \ i X k f i X] k i ' k _ \ j ^ e X c _ X j ' \ \ e X k k e l X k [' f i ^ X e \ [%

: ç Z b ' f i ' k g ' C m c 5 ' F] j \ k % e g l k k _ \ X d g ç k l [\ f] j \ k n x d \ ' n ' k _ k _ \ g f g \$ l g ' e l d \ i ' Z b \ p g X [# X e [j \ d Z k k _ \ [\ j ' i \ [1 e ' l %

K_XnXđYđ Xd gđł [\f]]\kl e'k'] 9%

Pfl ZXe [\ZkpZcZbfi kXg <ekli k' Zfe]id k_ [\Xl dkl e'k'fi k_ Xd gđł [\f]]\k%

Pfl ZXe ZcZbfi kXg k_`egl k]\đ f]k_F]]\kgXlXd \k' k' \[kk_nXđ \fi d f m k_Zl ijfi k' k_jg\Z]\[gfj kfe'k' d f []pk_nXđ \%

EFK<

(%N_ve'k_Xd gđł [\f]]\k'] [9#k_ [] gđpXd gđł [\žXd \p k_j\k'k'e^ Xd gđł [\ž] \hl Xđf k_XZk Xđf l lgl kXd gđł [\%
)%N_ve'k_Xd gđł [\f]]\k'] ef k' [9#k_fi lgl kXd gđł [\] [\k'ld `e\ Ypk_j\k'k'e^ Xd gđł [\ Xe\ Xd gđł [\f]]\k'k_k' i\`gXlXd \k'ij j Xk]p k_] f d n `e^ \hl Xkfe1
j\k'k'e^ Xd gđł [\ž]] gđpXd gđł [\ž4 fi lgl kXd gđł [\ " Xd gđł [\f]]\k
*%k_ [\nXk'fe žXd \p k_XZk Xđf l lgl kXd gđł [\žY\kn\ve'k_ [] gđpXd gđł [\ Xe\ Xd gđł [\f]]\kZkeef k\oZ\[\ k_ Xd gđł [\ iXe^f]`ej k' d \ek%
+%k_Zl ii\ekXd gđł [\ iXe^f]`ej k' d \ek'j i\oX\ k' k_ Xd gđł [\ d kXe[i =fi lgl k j\hl \eZp%

. % =đle\jj : XcYiXkf e

K_]đle\jj ZcYiXkf e] eZkf e ZXe X[á jkk_ \ i =fi lgl kXd gđł [\j Zfii\jgfe[`e^ k' k_]i\hl \eZp'gf`ek' n k_e k_]i\hl \eZpiXe^f] k_`ej k' d \ek' Zf d gvej Xk]fi k_ \đkieXđf j Zl j\ [Ypk_ ZXYđ #n k_j fi f k_i [\nZj] %Pfl ZXe d X[k_]đle\jj ZcYiXkf e čkj j k' i\ [`e k_ `ekieXđf i \đkieXđ d f i p k' k_`ej k' d \ek# Xe[m\ n k_ čj %

J\k k_ =đle\jj : XcYiXkf e JkXk

: cZbfi kXg Cmc5 =đle\jj %k_ve ZcZbfi kXg Jn kZ k' j\đZki FEi fi i F => k' \eXYđ fi [] XYđ k_]đle\jj ZcYiXkf e] eZkf e %N_ve k_]đle\jj ZcYiXkf e] \eXYđ [#k_ i L => j kX j] `đ d `eXk [`e k_ Z_Xee\c [] gđpXl\Xf] k_ i j i `eki]XZ%

Of X[k_ =đle\jj : XcYiXkf e Cj k

: cZbfi kXg Cmc5 =đle\jj 5 Of X[%\đZkk_]đle\jj ZcYiXkf e čkžk_]đ j l] d [n k_ i! ž mž k' Y\ d X[\ [] if d k_ [] b%k_ve ZcZbfi kXg Of X[Xkk_ i^_k j [\f] k_`eki]XZ k' d X[k_]đle\jj ZcYiXkf e čk [Xk%

K_]fid Xkf] k_]đle\jj ZcYiXkf e čk] d k' Y\ d X[\ [] j_f ne Y\ d n%

JE	=i\h	Cmč ^{RT}
()' . %, +'''''' D? q	\$ %' [9

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*	/' '%! '..... D? q	\$. % [9

E FK<

R^T18d gck [\ ZCYiXkf e nlt \ %N \ e ZCYiXke^ k\ Xd gck [\ Xk\ Zi iivk]i\hl \ eZp'gf`ek#f eap k\ XZk Xcf l lgl kXd gck [\ n`cY\ X]Zk\ Xe[k\ Xd gck [\] gdp nlt \ n`cef kZ_Xe^%



K@

PfI e\ [kf l j\ k\ <Zdf ^\eViXk k\] d j l] d [n k i ! % j m % \ e f g l e k \] d # Xe [\ [k k \ g X i X d \ k i j [i \ Z p e k \ <Z c] d % X n k k f k \ L J 9 j k f i X \ [\ n Z % P f I ' Z e j k f i \ k \] d k f k \ e j k i l d \ e k n X L J 9 f i = K G # X e [f X [k \] d k f k \ e j k i l d \ e k n \ e \ [\] %

Mn =dle\jj : XCYiXkf e Cj k

: cZb'fi kXg Amc5 =dle\jj 5 Mn kf nln k\ f X [\] dle\jj ZCYiXkf e c j k f] k \ e j k i l d \ e k n \ e e f] d j X i \ f X [\ # k j _ f n j k \ [\] X i d] dle\jj ZCYiXkf e c j k f] k \ e j k i l d \ e k %

E FK<

PfI Zxe Xgf l j\ k\ ? ; D @Zf ee\Zk\ \ dlieXc] gdp f i k \ J : G@Zf d d Xe [kf \ [k k \] dle\jj Zf i i Z k f e c j k g v i] f i d f X [e ^ # X m e ^ # e j \ i k f e # \ d k f e f g \ i X k f e %

. %

8d gck [\ Le`k

J\kj k\ l e`kf] k\ l = f l lgl kXd gck [\ %

: cZb'fi kXg Amc5 Le`k kf j \ d Z k k \ [\ j \ l [l e`k %

K_\ f l lgl kXd gck [\ l e`k j X n X d Y d X i \ [9d # [9d Mf [9l Mf M X e [N % N _ i \ e # [9d # [9d Mf X e [[9l M X i \] f i C f ^ j Z d Z M X e [N X i \] f i C e \ X i j Z d % k \ [\] X i d l e`k] [9d %

*)

/ Jn\\g

N_\\e_k\\j n\\g] eZkf e`j \\eXYd[#k_\\j`^eXc^\\e\\iXf i f l k l k j`k_\\j n\\g j`^eXc
]if d`k_\\]if e k gXe\\cR =, ' Tzf ee\\Zk i`Zk k_\\j`gf`ek# =f l k l k j`f l e Y \\eXYd[Z%

/% Jn\\g= eZkfe

K_\\`ej k l d \\e k g i f m[\\j`k_\\i \\k p g \\j`f] j n\\g] eZkfe j`Z`i \\h l # O m d #Xe[`i`i \\h k
O m d Z`K_\\j n\\g] eZkfe`j \\eXYd[`n_\\eXep`f] k_\\j n\\g k p g \\j`j`j \\d Zk [%p
[\\] X i d #k_\\j n\\g] eZkfe`j`[] XYd[%

: cZbfi k g Jn\\g 5 Jn\\g`k`j \\d Zk k_\\[\\j`i \\[j n\\g] eZkfe`%

F]] 1 k_\\ [\\] X i d j k k #e[`Zk e^`k_\\k k_\\j n\\g] eZkfe`j`[] XYd[%

=i \\h l \\eXYd j`k_\\] i \\h l \\eZp j n\\g] eZkfe`%B k k_\\j`gf`ek#k_\\`d] k g X i k f]`k_\\

Z_Xee\\c[`j`g d p X i \\X j`_f n j`k_\\] i \\h l \\eZp j n\\g`g i f`^i \\j j`Xe[`k_\\`n \\i`X k f e`f]

k_\\] i \\h l \\eZp`n \\d`\\j`%

O m d \\eXYd j`k_\\`X d`g d l [\\j n\\g] eZkfe`%B k k_\\j`gf`ek#k_\\`i`^`k g X i k f]`k_\\

Z_Xee\\c[`j`g d p X i \\X j`_f n j`k_\\`X d`g d l [\\j n\\g`g i f`^i \\j j`Xe[`k_\\`n \\i`X k f e`f]

k_\\`X d`g d l [\\`n \\d`\\j`%

=i \\h k`O m d j`d l d Xe\\f l j p \\eXYd j`k_\\] i \\h l \\eZp Xe[`X d`g d l [\\j n\\g

] eZkfe`%B k k_\\j`gf`ek#k_\\`d] k g X i k f]`k_\\`Z_Xee\\c[`j`g d p X i \\X j`_f n j`k_\\

] i \\h l \\eZp j n\\g`g i f`^i \\j j`Xe[`k_\\`n \\i`X k f e`f]`k_\\] i \\h l \\eZp`n \\d`\\j`2k_\\`i`^`k

g X i k f]`k_\\`Z_Xee\\c[`j`g d p X i \\X j`_f n j`k_\\`X d`g d l [\\j n\\g`g i f`^i \\j j`Xe[`k_\\

n \\i`X k f e`f]`k_\\`X d`g d l [\\`n \\d`\\j`%

/% Jn\\g`Kpg\\

K_\\`ej k l d \\e k g i f m[\\j`k n f j n\\g k p g \\j`Z`C j k`Xe[`i J k g i Z`p [\\] X i d #k`j`i J k g i %

/%% Jk g Jn\\g

J \\k k_\\j n\\g`K p g \\

: cZbfi k g Jn\\g 5 K p g`k`j \\d Zk i J k g i`%B k k_\\j`gf`ek#k_\\j`^eXc^\\e\\iXf i j k i k j
k`g \\i] f i d`k_\\j k g j n\\g`X Z Z f i [`e`k`k_\\`Z i i \\e k j \\k e`j`%

J\kk_Jn\lg'G\Xd\Kij

: cZb'fi kXg Jn\lg 5 J\kKe^ kf j\kk_j\kik\i\hl \eZp#_j kf g\i\hl \eZp#_j\kik d\m\#_j kf g\i\hl \eZp#_n\lg gf`ekj #\ n\c\kd_#_Xg\&gX\#_i\Zkf e#\kZ%

(%J\kik=i\h

: cZb'fi kXg =i\h&C\m\c5 J\kik=i\h#egl kk_n\ld_f]k_j\kik\i\hl \eZp'n_k_k_gf g\$ g'el d\i'Z\b\pgX[Xe[j\ldZk_ [\j'i\ [l e'k'PFI 'Zxe'Xgf`a'jk`egl kk_j\kik\i\hl \eZp'n\ld_#_le'ZcZb'fi kXg <ekIi' kf'Zf e]id_k_n\ld_Xe[k_Zi i\lek\i\hl \eZp\i e'k'j j\ldZk\ Yp[\]Xl d%

)%Jkf g'=i\h

: cZb'fi kXg =i\h&C\m\c5 Jkf g'=i\h#egl kk_n\ld_f]k_j kf g\i\hl \eZp'n_k_k_gf g\$ g'el d\i'Z\b\pgX[Xe[j\ldZk_ [\j'i\ [l e'k'PFI 'Zxe'Xgf`a'jk`egl kk_j\kik\i\hl \eZp'n\ld_#_le'ZcZb'fi kXg <ekIi' kf'Zf e]id_k_n\ld_Xe[k_Zi i\lek\i\hl \eZp\i e'k'j j\ldZk\ Yp[\]Xl d%

E F K<

\$ J\kik\i\hl \eZp\Xe[j kf g\i\hl \eZp\X\ k_l gg\i Xe['f n\i'cd'kj'f]k_i\hl \eZp]fi j\hl \eZpjn\lg%

\$ N_le_k_jn\lg[i\Zkf e'j' i=n[i#_j'^eXc^le\iXfi jn\lg]if d_k_j\kik\i\hl \eZp\ k_j kf g\i\hl \eZp\N_le_k_jn\lg[i\Zkf e'j' i; f n e#_j'^eXc^le\iXfi jn\lg]if d_k_j kf g\i\hl \eZp\ k_j\kik\i\hl \eZp%

\$ 8]ki'd f []pe^ k_i J\kik=i\h\i fi i Jkf g'=i\h\i #_j'^eXc^le\iXfi n'ci j\kik\i f l gl k]if d_k_j g\Z] \ [i J\kik=i\h\i fi i Jkf g'=i\h\i %

*%J\kikC\m\c

: cZb'fi kXg =i\h&C\m\c5 J\kikC\m\c#egl kk_n\ld_f]k_j\kik d\m\c'n_k_k_gf g\$ g'el d\i'Z\b\pgX[Xe[j\ldZk_ [\j'i\ [l e'k'PFI 'Zxe'Xgf`a'jk`egl kk_j\kik d\m\c'n\ld_#_le'ZcZb'fi kXg <ekIi' kf'Zf e]id_k_n\ld_Xe[k_Zi i\lek d\m\c\i e'k'j j\ldZk\ Yp[\]Xl d%

+%Jkf g'C\m\c

: cZb'fi kXg =i\h&C\m\c5 Jkf g'C\m\c#egl kk_n\ld_f]k_j kf g d\m\c'n_k_k_gf g\$ g'el d\i'Z\b\pgX[Xe[j\ldZk_ [\j'i\ [l e'k'PFI 'Zxe'Xgf`a'jk`egl kk_j kf g d\m\c'n\ld_#_le'ZcZb'fi kXg <ekIi' kf'Zf e]id_k_n\ld_Xe[k_Zi i\lek d\m\c\i e'k'j j\ldZk\ Yp[\]Xl d%

E F K<

\$ J\kik d\m\c\Xe[j kf g d\m\c\X\ k_l gg\i Xe['f n\i'cd'kj'f]k_d\m\c]fi d\m\c jn\lg%

\$ N_le_k_jn\lg[i\Zkf e'j' i=n[i#_j'^eXc^le\iXfi jn\lg]if d_k_j\kik d\m\c\ k_j kf g d\m\c\N_le_k_jn\lg[i\Zkf e'j' i; f n e#_j'^eXc^le\iXfi jn\lg]if d_k_j kf g d\m\c\ k_j\kik d\m\c%

\$ 8]ki'd f []pe^ k_i J\kikC\m\c\i fi i Jkf g'C\m\c#_j'^eXc^le\iXfi n'ci j\kik\i f l gl k]if d_k_j g\Z] \ [i J\kikC\m\c\i fi i Jkf g'C\m\c%

, %n\lg'G`ekj

: cZbfi kXg Gf`ekj #egl kk\`el d Yli f]jn\\g gf`ekj n`k`k`gf g\$ g`el d`li`Z
 b\pgX[#k\`e ZcZbfi kXg <ekli k` Zfe]id k\`egl kPFI Zxe j\`dZkk\`el d Yli
 I ek]fi k\`el d Yli f]jn\\g gf`ekj %p[\]Xl d#k\`el d Yli f]jn\\g gf`ekj `)((%
 -% n\`ckd\`

@[ZXkj k\`[I iXkfe f]Xjn\\gj kXg%

: cZbfi kXg ; n\`ckd\` #egl kk\`n\`d\` f]k\`[n\`ckd\` n`k`k`gf g\$ g`el d`li`Z
 b\pgX[#Xe[k\`e j\`dZkk\`[\]i\`[I ekPFI Zxe Xgf`aj k`egl kk\`[n\`ckd\`
 n\`d\`#k\`e ZcZbfi kXg <ekli k` Zfe]id k\`n\`d\`Xe[k\`Zi iiek[n\`ckd\` I ek]j
 j\`dZk[\` Yp[\]Xl d%

\$ K\`[n\`ckd\` I ek] Xn\`d\`Yd` Xi\`j #dj # j #Xe[`ej%

\$ @ iXe^`j]if d ; `dj k`(` ` j%

.%n\\gJ_Xg\`

@[ZXkj k\`nXn]fid j_Xg\` f]k\`jn\\gj`^eX%

: cZbfi kXg J_Xg\`&gXZ\` 5 J_Xg\` k` j\`dZki Ki` fi il Xd gi%

\$ I Xd g1k\`jn\\g g\`i f[XnXpj jXij]if d k\`jXik]i\`hl \eZp\$ kXk\`d\`n\`ckf
 k\`j k g]i\`hl \eZp\$ k g\`d\`n\`ck\`jn\\g j_Xg\` j`d`d\`i k` XI Xd g\`nXn]fid %

\$ Ki`1k\`jn\\g g\`i f[XnXpj jXij]if d k\`jXik]i\`hl \eZp\$ kXk\`d\`n\`ckf k\`
 j k g]i\`hl \eZp\$ k g\`d\`n\`ck#Xe[k\`e i\`N iej YXZb k` k\`jXik]i\`hl \eZp\$ kXk
 d\`n\`ck\`jn\\g j_Xg\` j`d`d\`i k` XKi`Xe^`d`nXn]fid %

N\`e k\`jn\\g[i\`Zkfe`]i =n[i#k\`il Xd gi`Xe[i Ki`jn\\g j_Xg\` j`j`fne`e`
 =^i\`i\`/%%

Jn\\gDf[\

: cZbfi kXg Df[\ 5 Df[\ kf j\ dZki: fek fi iJ`e^di Xj k_ jn\\g'd f[\ %p
[\] Xi d#k'j i: fek %

: fekIN_le i: fek j j\ dZk [\ #_ \ Zfekel f l j jn\\g dY\ c'j [jg d p [\ `e k _ _ Xee\ c' [jg d p Xi \ X% _ `ej ki d \ ekj n\\g j Zfekel f l j p XZZf i [`e ^ k' k _ _ Z i i \ ekj \ k e ^ n _ le k _ k ^ \^ \^ i Zfe [`k f e' j' d \ %

J`e^d 1N_le i J`e^di j j\ dZk [\ #_ \ j`e^d jn\\g dY\ c'j [jg d p [\ `e k _ _ Xee\ c' [jg d p Xi \ X% _ `ej ki d \ ek g \ i] f i d j Xj`e^d jn\\g XZZf i [`e ^ k' k _ _ Z i i \ ekj \ k e ^ X e [k _ l e j k f g j' n _ le k _ k ^ \^ \^ i Zfe [`k f e' j' d \ %

J`e^d Jn\\g

@k_ Z i i \ ekj n\\g'd f [\ `j' i: fekel f l j i #ZcZbfi kXg Df[\ 5 J`e^d k' j n' k _ k _ _ jn\\g'd f [\ k' i J`e^di % _ _ `ej ki d \ ekj kXk j Xj`e^d jn\\g'] k _ k ^ \^ \^ i Zfe [`k f e' j' Z i i \ ek p' d \ %

@k_ Z i i \ ekj n\\g'd f [\ `j' i J`e^di #ZcZbfi kXg Df[\ 5 J`e^d % _ _ `ej ki d \ ek j kXk j Xj n\\g'] k _ k ^ \^ \^ i Zfe [`k f e' j' d \ %

Jn\\gI \ j \ k

@k_ Z i i \ ekj n\\g [i \ Zk f e' j' i = n [i #ZcZbfi kXg Df[\ 5 Jn\\gI \ j \ k #k _ _ `ej ki d \ ek j k f g j k _ Z i i \ ekj n\\g X e [i \ j kXk j k _ _ j n \ \ g] i f d k _ _ j kXk j i \ h l _ l e Z p f i j kXk d \ %

@k_ Z i i \ ekj n\\g [i \ Zk f e' j' i; f n e i #ZcZbfi kXg Df[\ 5 Jn\\gI \ j \ k #k _ _ `ej ki d \ ek j k f g j k _ Z i i \ ekj n\\g X e [i \ j kXk j k _ _ j n \ \ g] i f d k _ _ j k f g j i \ h l _ l e Z p f i j k f g' d \ %

E F K <

@k_ `ej ki d \ ek j j n \ \ g e ^ n k _ l = Y \ e ^ [j X Y d [#_ \ e n _ l e p f l _ l e X Y d _ l = #_ \ `ej ki d \ ek n _ c i _ _ k _ _ j n \ \ g #k _ _ k' j #j k f g k _ Z i i \ ek f e ^ f `e ^ j n \ \ g X e [i \ j kXk k f j n \ \ g %

/%

Ki`^^^i

: cZbfi kXg Jn\\g 5 Ki`^^^i k' j \ k k _ k ^ \^ \^ i \$ \ d \ k _ [g X i X d \ k i j %

Ki`^^^i Kpg\

J \ k j k _ k ^ \^ \^ i k p g \] f i k _ n _ f d j n \ \ g g \ i f [%

: cZbfi kXg Ki`^^^i 5 Ki`^^^i Kpg\ k' j \ d Zki 8 l k i # B \ p i # 9 j i # f i i < d k %

EFK<

K_\]f\`n`e^\[vZi`gkfej`Xi`n\c[`n_lek_\`k`^^\i`kpg\`f]\XZ_jn\lg`gf`ek`e_k_\jn\lg`g\i`f[\`j`d`%`

8l`k`k`^^\i

9p[\]Xl`d`#k_\`k`^^\i`kpg\`j`i`8l`k`i`%`k_\`jn\lg`d`f[\`j`j`k`k`i`:`f`ek`#k_\`ej`k`i`d`lek`n`cj`k`i`k`j`n\lg`e`^`f`eZ`X`j`n\lg`kpg\`j`j`d`Zk[\`%`k_\`jn\lg`d`f[\`j`j`k`k`i`j`e`^`d`i`#Z`c`z`b`f`i`k`g`J`e`^`d`k`f`d`\`k`k_\`j`e`^`d`j`n\lg`Z`f`e[\`k`f`e`]`i`j`k`X`e[\`k`e`k_\`ej`k`i`d`lek`n`cj`k`i`k`X`j`n\lg`X`e[\`k`e`j`k`f`g`j`%`

B\p`k`k`^^\i

8]k`i`j`d`Z`k`e`^`i`B`p`i`k`k`^^\i`#`k_\`jn\lg`d`f[\`j`j`k`k`i`:`f`ek`#k_\`ej`k`i`d`lek`j`k`i`k`j`X`j`n\lg`\XZ`_`k`d`\`p`f`l`Z`c`z`b`f`i`k`g`B`p`%`k_\`jn\lg`d`f[\`j`j`e`^`d`i`#Z`c`z`b`f`i`k`g`J`e`^`d`k`f`d`\`k`k_\`j`e`^`d`j`n\lg`Z`f`e[\`k`f`e`%`8]k`i`k`X`k`k_\`ej`k`i`d`lek`j`k`i`k`j`X`j`n\lg`X`e[\`k`e`j`k`f`g`j`\XZ`_`k`d`\`p`f`l`Z`c`z`b`f`i`k`g`B`p`%`

9j`j`k`k`^^\i

8]k`i`j`d`Z`k`e`^`i`9j`j`i`k`k`^^\i`#`k_\`jn\lg`d`f[\`j`j`k`k`i`:`f`ek`#k_\`ej`k`i`d`lek`j`k`i`k`j`X`j`n\lg`\XZ`_`k`d`\`k`k_\`i`!`k`i`>`i`Z`f`d`d`X`e[\`j`j`l`e`%`k_\`jn\lg`d`f[\`j`j`e`^`d`i`#Z`c`z`b`f`i`k`g`J`e`^`d`k`f`d`\`k`k_\`j`e`^`d`j`n\lg`Z`f`e[\`k`f`e`%`8]k`i`k`X`k`k_\`ej`k`i`d`lek`j`k`i`k`j`X`j`n\lg`X`e[\`k`e`j`k`f`g`j`\XZ`_`k`d`\`k`k_\`i`!`k`i`>`i`Z`f`d`d`X`e[\`j`j`l`e`%`

<ok`i`e`X`c`k`k`^^\i

8]k`i`j`d`Z`k`e`^`i`<ok`i`k`k`^^\i`#`k_\`l`=`j`^`e`X`c`^`l`e`i`X`k`f`i`i`Z`^`n`j`k_\`k`k`^^\i`j`^`e`X`c`^`e`g`l`k`j`i`f`d`k_\`j`i`f`e`k`g`X`e`c`R`k`i`l`@`<`T`Z`f`e`e`\Z`f`i`%`k_\`jn\lg`d`f[\`j`j`k`k`i`:`f`ek`#k_\`ej`k`i`d`lek`j`k`i`k`j`X`j`n\lg`\XZ`_`k`d`\`X`K`C`g`l`q`j`^`e`X`c`n`k`_`j`g`Z`\[\`g`f`d`i`p`j`i`Z`^`n`j`%`k_\`jn\lg`d`f[\`j`j`e`^`d`i`#Z`c`z`b`f`i`k`g`J`e`^`d`k`f`d`\`k`k_\`j`e`^`d`j`n\lg`Z`f`e[\`k`f`e`%`8]k`i`k`X`k`k_\`ej`k`i`d`lek`j`k`i`k`j`X`j`n\lg`X`e[\`k`e`j`k`f`g`j`\XZ`_`k`d`\`X`K`C`g`l`q`j`^`e`X`c`n`k`_`k`_`j`g`Z`\[\`g`f`d`i`p`j`i`Z`^`n`j`%`



K@

k`f`j`g`Z`p`k_\`g`f`d`i`p`f`k_\`K`C`g`l`q`j`^`e`X`c`#Z`c`z`b`f`i`k`g`K`k`^`J`d`g`k`f`j`d`Z`k`i`G`j`i`f`i`E`^`i`%`9p[\]Xl`d`#k`j`i`G`j`i`%`

Gf`ek`k`k`^^\i`kpg\`

J`l`j`k_\`k`k`^^\i`kpg\`j`f`i`\XZ`_`j`n\lg`gf`ek`e`X`j`n\lg`g`i`f`[%`

:`c`z`b`f`i`k`g`k`k`^^\i`5`Gf`ek`k`k`^^\i`kpg\`k`f`j`d`Z`k`i`8l`k`i`#`B`p`i`#`9j`i`#`i`i`<ok`%`

EFK<

K_\]f\`n`e^\[vZi`gkfej`Xi`n\c[`n_lek_\`k`^^\i`d`f[\`e`k_\`jn\lg`g\i`f[\`j`d`%`

8l kf k`^^\i

9p[\X] d#k\k`^^\i kpg\`j i 8l kf i %k\jn\lg'd f[\`j] i: fekel fl j i #\dZk
f e\jn\lg kpg\`Xe[k\`ejkil d\ekjn\lgj \XZ_jn\lg'gf`ekZfekel fl j p
n`k_eXjn\lg'g\i f[\`j] i J`e^d i #pfl`e\[\`kf`ZcZbfi kXg
J`e^d] i j k f `d \ \ k k \ j `e^d j n \ l g `Zf e [`k f e # X e [`k \ e `k n `c d i e z _ f e \
j n \ l g `g \ i f [`X e [`k \ e j k f g j %

B\pki`^^\i

8]ki j \dZke^i B\p ki`^^\i #] k \ j n \ l g `d f [\`j] j \ k k f i: fek #k\`ejkil d\ek
j k i k j `k f j n \ l g `X g f `e k \ X Z _ `k d \ `p f l `ZcZbfi kXg B\p %k\jn\lg'd f[\`j]
i J`e^d i #ZcZbfi kXg J`e^d `k f `d \ \ k k \ j `e^d j n \ l g `Zf e [`k f e % 8] k i `k `X k k \
`ejkil d\ekjn\lgj `Xgf`ek\XZ_`kd\`pfl`ZcZbfi kXg B\p #k\`e`kj k f g j `k c f e \
j n \ l g `g \ i f [`j `Zf d g d k [%

9j j ki`^^\i

8]ki j \dZke^i 9j j ki`^^\i #] k \ j n \ l g `d f [\`j] j \ k k f i: fek #k\`ejkil d\ek
j n \ l g j `X g f `e k \ X Z _ `k d \ `k \ i ! k i > i `Zf d d X e [`j] j \ e k % k \ j n \ l g `d f [\`j]
i J`e^d i #ZcZbfi kXg J`e^d `k f `d \ \ k k \ j `e^d j n \ l g `Zf e [`k f e % 8] k i `k `X k k \
`ejkil d\ekj k i k j `k f j n \ l g `X g f `e k \ X Z _ `k d \ `k \ i ! k i > i `Zf d d X e [`j] j \ e k % k \ e
`k n `c j k f g `k c f e \ j n \ l g `g \ i f [`j `Zf d g d k [%

<dk i eXck i`^^\i

8]ki j \dZke^i <dk i`^^\i #k\`i = j`^eXc^e\i X f i i \ Z `n j `k \ k`^^\i j`^eXc
`egl k] i f d `k \ `j i f e k g X e \ c R k i | @ < l T Z f e e \ Z k f i % k \ j n \ l g `d f [\`j]
i: fekel fl j i #A`nhipkd\`k\`ejkil d\eki\Z`n j `XKKCgl `q\`^eXcn`k`k\
j g \ Z] \ [`g f d i `k p # k \ `e j k i l d \ e k j k i k j `k f j n \ l g `f e \ `g f `e k % k \ j n \ l g `d f [\`j]
i J`e^d i #pfl`e\[\`kf`ZcZbfi kXg J`e^d `k f `d \ \ k k \ j `e^d j n \ l g `Zf e [`k f e % 8 k
k `j `g f `e k # X Z _ `k d \ `k \ `e j k i l d \ e k i \ Z `n j `XKKCgl `q\`^eXcn`k`k\
j g \ Z] \ [`g f d i `k p # k j n \ l g j `f e \ `g f `e k X e [`k \ e j k f g j `X] k i `Zf d g d k e ^ f e \ j n \ l g `g \ i f [%



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Kf j g \ Z] p k \ `g f d i `k p f] k \ `K K C g l `q \ `^eXc # Z c Z b f i k X g K i `^ J d g \ `k f j \ d Z k i G f j i f i
i E \ `i % 9 p [\`X] d # k `j i G f j i %

E F K <

Kf f g k d `q `k \ j n \ l g `g \ i] f i d X e Z # n _ \ e `k \ \ d k i e X c k i`^^\i `g \ i f [`j] `k f j d X c # k \
[`j] g d p \ [`X k f e `k \ j Z i \ e d X p e f k Y j p e Z i f e f i j p l g [X k [`n `k `k \ X Z i X c f i k g i k [X k %

O D f [I d k f e

: cZb'fi kXg **D f [** 'k j \k8D #-D #GD #Xe['G g \d f [I d k f e 'gXiXd \kij%

0% 8d gckl [\ ' D f [I d k f e 'Z8D ž

=fi Xd gckl [\ ' d f [I d k f e 'Z8D ž #k \ Xd gckl [\ ' f] k \ \ i = ZXi \ i ' n Xn \ fid ' n \ i \ j ' n \ k \ k \ k \ ' d f [I d k f e ^ j ^ e Xc c e \ X i q % k _ j] i e Z k f e ' j i \ h l i \ [' k ' e j k c k \ ' f g k f e ; J > , ' ' ' \$8D ; %

0%% Kf `<eXYd k \ ' 8d gckl [\ ' D f [I d k f e

: cZb'fi kXg **8D** '5 **Jn 'kZ** 'k j \dZki F E i f i i F =>%

F E \eXYd j k \ ' 8D] i e Z k f e % f i k \ ' d f [\ g ' n \ k _) # + # f i - ' Z _ X e e \ g # n _ \ e k \ Xd gckl [\ ' d f [I d k f e ' j \ e X Y d [# k \ i 8D i ' Z _ X i X Z k i ' j] ' j g d p \ [' e k \ Z _ X e e \ c [] j g d p X i \ X % F => 1 [j X Y d j k \ ' 8D] i e Z k f e % k _ j ' j k \ [\] X i d j k k k %

0%% Kf 'J \dZk k \ ' D f [I d k f e ' J f l i Z

: cZb'fi kXg **8D** '5 **J f l i Z** 'k j \dZki @k f i i < d k ' X j k \ ' d f [I d k f e j f l i Z %

@k i e X c

N _ \ e ' p f l j \ d Z k i @ k # k \ ' e k i e X c d f [I d k f e j f l i Z ' j \ e X Y d [% 8 k k _ j ' k d \ # k \ ' e j k i d \ e k g i f m \ j k \ ' d f [I d k f e ^ j ^ e X c X e [' Z X e j \ k ' l j ' d f [I d k f e j i \ h l \ e z p X e [' d f [I d k f e ' n X n \] f i d %

< d k i e X c

N _ \ e k \ \ d k i e X c d f [I d k f e j f l i Z ' j \ d Z k [# = i \ h X e [' N X n \] f i d ' X i \ ^ i X p [' f i k X e [' j X Y d [% k _ j ^ e X c ^ \ e i X k f i i \ Z n \ j k \ \ d k i e X c d f [I d k f e ^ j ^ e X c ^ e g l k] i f d ' k \ i \ X i \$ X e \ c r - O K D F ; @ T Z f e e \ Z k f i % k _ ' d f [I d k f e ^ j ^ e X c Z X e \ X i Y k i X i p n X n \] f i d j %

E F K <

Kf \ e j i \ k \ ' d f [I d k f e ' g \ i] f i d X e Z \ # k \ ' e g l k X d gckl [\ ' f] k \ \ d k i e X c d f [I d k f e ^ j ^ e X c j _ f l e \ Y \ d j j k X e : : : % M %

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D f [I d k f e [\ g k _ ' e [' Z X i j k \ ' f l g l k X d gckl [\ ' n \ i X k f e % k _ j \ o g i \ j j \ ' e g \ i Z e k X \ \ % k _ i X e ^ \ ' f] 8D ' d f [I d k f e [\ g k _ j] i f d ' f l k f (' ' f l %

(%N_e k\`ekieXcd f[I dKfe j fliZ\`j j\`dZk[#

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Gy4-\$`c`d_x

\$ N_e`d f[I dKfe[\gk`j` fI#k_\`ejki d\`ekfI lgl kj`Xj`e^`d`ZXi\`i
nXh]fid j^`eXcXkXj`e^`d`ji\`hl\`ezp`gf`ek%

\$ K_\`^i\`Xki k_\`d f[I dKfe[\gk`#k_\`jd Xdi k_\`[\`]]\`i\`eZ Y\kn\`e k_\`
fI lgl kXd gcl [\`Xe[`ZXi\`i`Xd gcl [\`Zk_\`Y\kai k_\`jpd d\`ki p`f]k_\`fI lgl k
Xd gcl [\`j`f]k_\`LgJ[\`9Xe[`ZJ9zXe[`Cn\`i`J[\`9Xe[`ZJ9z%

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: cZb`fi`kXg 8D`5`=i\`h`%egl k_k_\`d f[I dKfe]i\`hl\`ezp`n\`d\`n`k_\`k_\`gf`g\$`g
el`d\`i`Z`b\`pgX[#Xe[j\`dZk_k_\`[\`j`i\`[\`I`e`k`P`I`Z`Xe`X`g`f`[\`i\`Z`k`p`Z`cZb`fi`kXg`<ek\`i`k`f
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K_\`d f[I dKfe]i\`hl\`ezp`iXe^`f]J`hI`X\`nXh]fid`j`jif d(``d`?`q`k`(`

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`d`g\`XeZ`#Xe[`\`hl`X`c`d`h`c`j\`k`e^`%

D f [I d k e ^ N X n] f i d

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N _ \ e ' p f l j \ d Z k k \ \ d k i e X c d f [I d k f e j f l i Z # Z c Z b f i k g J \ k k e ^ 5 : f l g c e ^ k f j \ d Z k i 8 : i f i i ; : i % k \ [\] X i d # k j i 8 : i %

8 : 1 N _ \ e i 8 : i j j \ d Z k [# k \ ; : ` Z f d g f e \ e k j ` f] k \ \ d k i e X c j ` ^ e X c ` e g l k j i f d k \ \ i \ X i \$ g X e \ c R - O K D F ; @ T Z f e e \ Z k f i f] k \ ` e j k i l d \ e k n ` c \ Y d Z b \ ` X e [k \ 8 : ` Z f d g f e \ e k j ` Z X e ` g X j j k _ i f l ^ _ k \ Z f e e \ Z k f i % k \ \ d k i e X c d f [I d k f e ` e g l k g f i k j j ` d ` d i k f ` X _ ^ _ \$ g X j j] d k i n _ f j \ d f n ` d ` k f] k \ Z i k f]] i \ h l \ e Z p j ` d j j k _ X e ; ? q % ; : 1 N _ \ e i ; : i j j \ d Z k [# X c k \ ` 8 : ` Z f d g f e \ e k j ` X e [; : ` Z f d g f e \ e k j ` f] k \ \ d k i e X c ` e g l k j ` ^ e X c Z X e ` g X j j k _ i f l ^ _ k \ Z f e e \ Z k f i %

@ e g l k @ g \ [X e Z \

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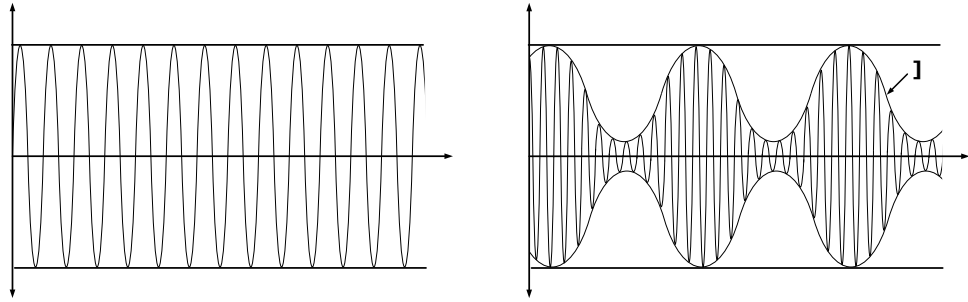
N _ \ e ' p f l j \ d Z k k \ ` e k i e X c d f [I d k f e j f l i Z # : f l g c e ^ X e [@ g \ [X e Z \ X i \ ` i X p \ [f l k X e [[j X Y d [%

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K _ \ \ h l X c d n c f l l g l k] l e Z k f e ` j ` X n X d Y d ` l e [\ i ` k \ ` 8 D ` d \ e l % k _ X k j # n _ \ e ` 8 D d f [I d k f e ` j] j \ [` e j \ k k e ^ k \ ` X d g d l [\ n X d \] f i k \ Z f e k e l f l j n X n] f i d j # k \ f l l g l k j ` ^ e X c g \ X b i \ d X e j l e Z _ X e ^ \ [# X j j _ f n e ` e ` = ^ / i \ O % %

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0% =i \ h l \ e Z p ' D f [I d k f e Z = D z

= f i] i \ h l \ e Z p ' d f [I d k f e Z = D # k _ \] i \ h l \ e Z p ' f] k _ \ l = Z X i \ \ i n X m] f i d n X \ \ j ' n k _
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E F K <

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N _ \ e k _ \ \ d k i e X c d f [I d k f e j f I i Z \ ` j \ d Z k [# I X k X e [' N X n] f i d ' X i \
^ i X p [' f I k X e ['] X Y d [% k _ \ j ` ^ e X c ^ \ e i X k f i i \ Z \ n j k _ \ \ d k i e X c d f [I d k e ^
j ` ^ e X c ^ e g l k j i f d ' k _ \ i \ X i \$ g X e \ c R - O K D F ; ' @ T Z f e e \ Z f i % k _ \ d f [I d k e ^
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N_\e'pfl j\dk k_\ \dkieXcd f[I dke^ ejfI iZ\#ZcZbfi kG J\kKe^ '5 : fI gce^ 'k
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8: 1N_\e i8: i'j j\dk k[\ #k_\; : 'Zf d gfe\ekj 'f]k_\ \dkieXcj ^eXc^egl k]if d

k_\ i\Xi \$gXe\cR OKDF; @TZf ee\Zf i'f]k_\ ^ejki d\ekn`c\Y d'Zb[\ 'Xe[

k_\ '8: 'Zf d gfe\ekj 'ZXe'gXj 'k_ifl ^_k_\ Zf ee\Zf i%k_\ \dkieXcd f[I dke^

'egl k'gfi k'j j'd `di 'k' X_ ^_ \$gXj j]di n_fj \d'n `od 'k'f]k_\ ZI k'j]i\hl \eZp

j `djj 'k_Xe; '?q%

; : 1N_\e i; : i'j j\dk k[\ #Xck_\ '8: 'Zf d gfe\ekj 'Xe[; : 'Zf d gfe\ekj 'f]k_\

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@gl k@ g[\XeZ

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'k j\dk i,' i#-' i#fi i?'^_Q]fi j\kKe^ k_\ `d g[\XeZ 'f]k_\ R OKDF; @TZf ee\Zf i%

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8D; %

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: cZbfi kG GD '5 Jn`kz 'k j\dk iFEi 'fi iF =>%

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g_Xj\`d f [I d k f e] \exYd [#k_\iGD i Z_XiXZki] [] jgdp\ [`e k_\ Z_Xee\c
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^i X p ['f l k X e [[] X Y d [%k_\ j ^ e X c ^ \ e i X k f i i \ Z \ n j k_\`d k i e X c d f [I d k e ^
j ^ e X c ^ e g l k] i f d 'k_\`i X i \$ X e \c R - O K ' D F ; @ T Z f e e \ Z k f i % k_\`d f [I d k e ^
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K_\`g_Xj\ [\mXk f e] k_\ [\mXk f e f] k_\`g_Xj\`f] k_\`d f [I d k e ^ i n X m] f i d
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k _ \ \ i \ X i \$ g X e \ c R - O K ` D F ; ` @ T Z f e e \ Z f i f] k _ \ ` e j k i d \ e k n ` c e \ ` Y f Z b \ [` X e [

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` e g l k g f i k j ` j ` d ` d i k f ` X _ ` ^ ` \$ g X j j] d k i n _ f j \ ` d n ` c d ` k f] k _ \ Z i k f]] j i \ h l \ e z p

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; : 1 N _ \ e i ; : i ` j j \ d Z k [# X c k _ \ ` 8 : ` Z f d g f e \ e k j ` X e [; : ` Z f d g f e \ e k j ` f] k _ \

\ d k i e X c ` e g l k j ` ^ e X c Z X e ` g X j j k _ i f l ^ _ k _ \ ` Z f e e \ Z f i %

@gl k@ g\ XeZ

N_e k\ \dkieXcd f[I dKfe jfliZ j\ dZk [#ZcZbfi kG J\kKe^ 5 @ g\ XeZ
Kf j\ dZki, ' i# -' ' i#fi i? ^_Q]fi j\kKe^ k\ d g\ XeZ f] k\ R-OKDF; @T
Zfee\Zfi%

EFK<

N_e pfi j\ dZk k\ \dkieXcd f[I dKfe jfliZ #: fl gce^ Xe [@ g\ XeZ Xi \ ^i Xp [fI kXe [] jXYd [%

N_e pfi j\ dZk k\ \dkieXcd f[I dKfe jfliZ #N Xm] fid j \ ^i Xp [fI kXe [] jXYd [%

0% G j\ D f [I dKfe

; I i e^ gl q\ d f [I dKfe #k\ \ = Zxi \ i n Xm] fid j d f [I dK [Yp k\ gl q\ j ^ eXc %
K_j] eZKfe j i\ hi \ \ [Kf \ ej kck\ f gkfe; J>, ' ' \$GLC%

0%% Kf <eXYd k\ G j\ D f [I dKfe

: cZbfi kG G q\ 5 Jn kZ Kf j\ dZki FEi fii F =>%

FE \ eXYd j k\ gl q\ d f [I dKfe] eZKfe % fi k\ d f [\ q\ n k) # + # fi -

Z_Xee\ q\ #n_e k\ gl q\ d f [I dKfe j \ eXYd [#k\ \ i G q\ i Z_XiXZki j

[j gdp\ [\ e k\ Z_Xee\ c [j gdp Xi \ X%

F == 1 [jXYd j k\ gl q\ d f [I dKfe] eZKfe % K_j j k\ [\] Xi d j k k %

0%% Kf J\ dZk D f [I dKfe JfliZ

: cZbfi kG G q\ 5 JfliZ Kf j\ dZki @k fii <dk Xj k\ d f [I dKfe jfliZ %

@kieXc

N_e pfi j\ dZki @k #k\ \ ekieXcd f[I dKfe jfliZ j \ eXYd [% Bk k j gf ` ek #
k\ d f [I dKfe j ^ eXc j ^ \ e \ i Xk [Yp k\ \ ekieXc gl q\ ^ \ e \ i Xf i % PFI ZXe j \ k
k\ gl q\ d f [\ # gl q\ g \ i f [# gl q\ n [k #Xe [f k \ i i \ d k [g Xi Xd \ k i j f] k \
d f [I dKe^ j ^ eXc %

<dkieXc

N_e pfi j\ dZki <dk #k\ D f [\ # J\ kKe^ #Xe [Kf ^ ^ ^ i d \ el j Xi \ [jXYd [Xe [^
^ i Xp [fI k k \ j ^ eXc ^ \ e \ i Xf i i \ Z \ m j k\ \ dkieXc gl q\ j ^ eXc egl k j f d
k\ j f e k g Xe \ c RGL C j < T Z f e e \ Z f i Xj k\ d f [I dKe^ j ^ eXc %

0%% Kf J\ k k\ G j\ Kpg\

8]ki j\ dZke^ k\ \ i @k d f [I dKfe jfliZ #ZcZbfi kG D f [\ Kf j\ dZki J^ e^ di fi
i KXe %

J`e^d1fepfe\gl q`j^eXcj`^leliXk[]fi fe\gl q`gliY[%_j`j`k\
[\]Xi dgl q`df[\%

KiXe1dI dgd`gl q`j^eXq`Xi`^leliXk[]fi fe\gl q`gliY[%@pfi j\Zk
iKiXe1df[\#pfi`Zxe`fX[`k\`Ij\i\$`e\`gl q`q`k%

EFK<

@pfi j\ZkiKiXe1df[\Xe[`nXekkf`fX[`k\`gl q`q`k#pfi`e\`kf`ej`kck\`fgkfe
;J>,'''\$GL>%

0%% Kf`J\kF`k`li`G`q`\$`d`k[`GXiXd`kij

: cZbfi`kG`G`q`5`J\kKe^`kf`j\kk\`gl q`gliY[#gl`q`n`[k_#gl`q`gf`di`k#Xe[
gl`q`fe&f]]j`k`j%

G`q`G`i`Y`[

K_\`gl q`gliY[`e[`Zk`j`k_\`kd`\`k_\`gl q`j^eXce\`[j`kf`Zfd`gd`k`fe\`ZpZd%
N_\`e`pfi`j\ZkiJ`e^d`gl q`df[\#ZcZbfi`kG`J\kKe^`5`G`i`f`[`kf`j\kk\`gl q`
gliY[`f`]k_\`df[I`d`ke^`j^eX%

@gl`kk_\`gliY[`n`d`\`n`k`k_\`gf`g\$`g`el`d`li`Z`b`pgX[#Xe[`j\Zk`k_\`[\`j`\`i\`
l`e`k%

K_\`iXe`\`f`]k_\`gl q`gliY[`j`]if`d`+`ej`kf`(`.`j`%

K_\`gl q`gliY[[\`kid`e`j`k_\`i`g`k`k`f`e`]i`hl`e`Z`p`f`]k_\`e`k`ie`X`c`gl`q`
df[I`d`ke^`j^eX%

G`q`N`[`k`

@[`Zk`j`k_\`gl q`[I`i`X`k`f`e`f`]k_\`^`le`li`X`k[`gl q`j^eX%

N_\`e`pfi`j\ZkiJ`e^d`gl q`df[\#ZcZbfi`kG`J\kKe^`5`N`[`k`kf`j\kk\`gl q`
n`[`k`f`]k_\`df[I`d`ke^`j^eX%

@gl`kk_\`n`[`k`n`d`\`n`k`k_\`gf`g\$`g`el`d`li`Z`b`pgX[%

K_\`iXe`\`f`]k_\`gl q`\`n`[`k`j`]if`d`(`.`ej`kf`Z`.`j`\$(`.`ej`Z%

K_\`gl q`\`n`[`k`j`]d`k`[`Y`p`k`\`d`e`d`I`d`gl q`\`n`[`k`Xe[`gl q`gliY[%

gl q`\`n`[`k` `d`e`d`I`d`gl q`\`n`[`k`2

gl q`\`n`[`k` `gl q`gliY[`\$(`.`ej`

E F K <

G i f [X e [N [K d \ e l X \ [] X Y d [X e [^ i X p [f i k n _ \ e k _ \ d k i e X c d f [I d k f e j f i i Z \] j \ d Z k [f i n _ \ e k X e i g l q \ d f [\] j \ d Z k [%

G i q \ G f d i k p

: c Z b f i k g J \ k k e ^ 5 G f d i k p k f j \ d Z k i E f i d X a f i i @ m i k [i X j k _ \ g f d i k p f] k _ \ Z i i \ e k g l q \ d f [I d k e ^ j ^ e X c p [\] X i d # k j i E f i d X a %

G i q \ F i l g l k

: c Z b f i k g J \ k k e ^ 5 G i q \ F i k k f j \ d Z k i F E i f i i F = %

F E \ \ e X Y d j k _ \ g l q \ f i l g l k] e Z k f e % k k j _ j g f e k # k _ \ d Z i f n X m j ^ e X c

^ \ e i X k f i Z X e f i l g l k k _ \ g l q \ j ^ e X c ^ \ e i X k [Y p k _ \ e k i e X c g l q \ ^ \ e i X k f i

m X k _ \] i f e k g X e c F L G < T Z f e e \ Z f i % k _ \ f i l g l k j ^ e X c j i \ d k [k f k _ \ D f [\

j \ k k e ^ %

F = 1 [j X Y d j k _ \ g l q \ f i l g l k] e Z k f e % k _ \ j j k _ \ [\] X i d j k k %

O f X [k _ \ G i q \ C j k

8] k i j \ d Z k e ^ i k X e i g l q \ d f [\ # Z c Z b f i k g J \ k k e ^ 5 O f X [% \ d Z k k _ \ g l q \ c j k k _ \] d j i] d [n k i ! % m z k f Y \ d X [\] j i f d k _ \ [j b # k _ \ e Z c Z b f i k g O f X [X k k _ \ i ^ _ k j [\ f] k _ \ e k i] X Z % k _ \ e j k i d \ e k n c d f X [k _ \ g l q \ c j k [X k %

k _ \ j f i d X k f] k _ \ g l q \ c j k] d k f Y \ d X [\] j j _ f n e Y \ d n %

J E R T	F e K d \ R T	F]] K d \ R T	I \ g \ k k f e R T	; n \ c k d \ R T
(	+ % ' d j	, % ' d j	)	( / % ' d j
)	) % ' d j	+ % ' d j	,	* ' % ' d j
*	(, % , ' d j	(' % ' l j	)	* ( % ' d j

E F K <

R T i e [Z k k j k _ \ c e \ e l d Y i] f i k _ \ g l q \ c j k %

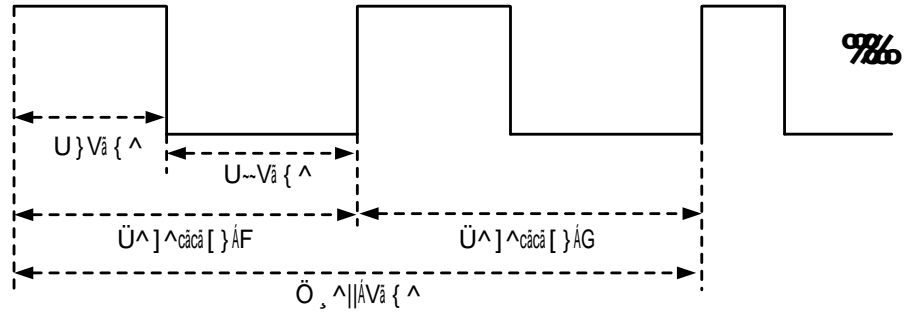
R T i e [Z k k j k _ \ g l q \ f e k d \ % k _ \ [I i X k f e f] _ ^ _ d n c j f i k _ \ j \ k g l q \ %

R T i e [Z k k j k _ \ g l q \ f]] k d \ % k _ \ [I i X k f e f] d n d n c j f i k _ \ j \ k g l q \ %

R T i e [Z k k j k _ \ e l d Y i f] i \ g \ k k f e j f] X e i F e e F]] K d \ i n X d \ g X i %

R T i e [Z k k j k _ \ [I i X k f e f] k _ \ g l q \ k f Y \ j \ k Z i i \ e k p %

k _ \ j f c f n e ^ [X ^ i X d k b j k _ \ [X k n X d \ f] C e \ (] f i k _ \ g l q \ c j k X j X e \ o X d g d k f [\ g Z k k _ \ g X i X d \ k i j g \ Z] \ ^ e k _ \ g l q \ c j k %



K@

PfI `e\[\ kf Ij\ k\`<Zdf `^le\iXk k\]d\jI]\d[`n`k`i!%j m%k`le`f`g`le`k\]d`#Xe[\[`k`k\`g`X`d\`k`j [`i\`Z`p`e`k\`<Z`c`]d`%`X`n`k`k` k\`L`J`9`j`k`f`i`X`\ [\m`Z`%P`I`Z`e`j`k`f`i\`k\]d`k`k\`ej`k`i`d\`e`k`m`X`L`J`9`f`i`=K@Xe[`f`X[`k\]d`k`k\`ej`k`i`d\`e`k`n\`e`e\[\`%`

M\`n`k\`G`f`C`j`k

8]k`i`j\`d`Z`k`e`^`i`k`i`X`e`i`g`l`f`d`f[\`#`Z`c`Z`b`f`i`k`g`J\`k`k`e`^`5`M\`n`k`f`m\`n`k\`f`X[\`g`l`f`c`j`k`f`]`k\`ej`k`i`d\`e`k`N\`e`e`f`]d`j`X`i\`f`X[\`#`k`j`_`f`n`j`k\`[\`X`i`d`g`l`f`c`j`k`f`]`k\`ej`k`i`d\`e`k`N\`e`e`f`]d`j`X`i\`f`X[\`#`k`j`_`f`n`j`k\`[\`X`i`d`g`l`f`c`j`k`f`]`k\`ej`k`i`d\`e`k`%`

E`F`K`<

PfI `Z`e`X`g`f`I`j\`k\`?; D@Z`f`e`e`Z`k[\`d`k`i`e`X`c[`]`g`d`p`f`i`k\`J: G@G`f`\`k`k\`g`l`f`c`j`k`#`g`l`i`f`i`d`f`X[`e`^`#`X`m`e`^`#`e`j`i`k`f`e`#[\`d`k`f`e`f`g`l`i`X`k`f`e`%`

O%%

Ki`^^\`i

N\`e`p`f`l`j\`d`Z`k`i`@`k`d`f`[I`ð`k`f`e`j`f`l`i`Z`#`Z`c`Z`b`f`i`k`g`Ki`^^\`i`5`Ki`^`D`f`[\`k`f`j\`d`Z`k`i`8`l`k`f`i`#`<`d`k`#`>`X`l`i`#`B`l`p`i`#`f`i`i`9`j`i`%`

8`l`k`f`Ki`^^\`i

9p[\`X`i`d`#`k\`k`i`^^\`i`k`p`g`\`j`i`8`l`k`f`i`%`k\`d`Z`f`n`X`n`j`^`e`X`c`^`e`l`e`i`X`f`i`d`\`k`j`k\`k`i`^^\`i`Z`f`e[\`k`f`e`X`k`X`e`p`k`d\`X`e[\`n`c`j`k`i`k`k\`g`l`f`d`f`[I`ð`k`f`e`f`e`Z`k\`G`f`]`e`Z`k`f`e`j\`e`X`Y`d`[%`

<`d`k`i`e`X`c`k`i`^^\`i

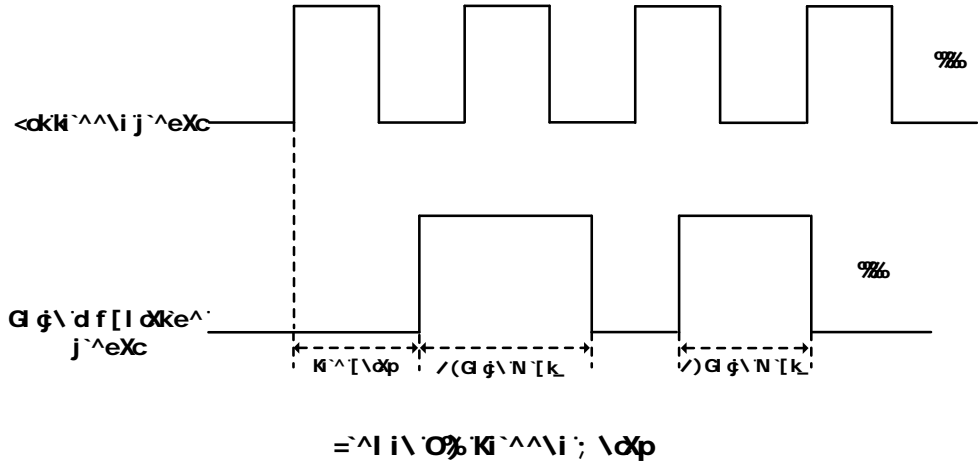
8]k`i`j\`d`Z`k`e`^`i`<`d`k`i`^^\`i`#`k\`l`=j`^`e`X`c`^`e`l`e`i`X`f`i`i`Z`n`h`j`k\`k`i`^^\`i`j`^`e`X`c`e`g`l`k`j`i`f`d`k\`]`i`f`e`k`g`X`e`c`R`k`l`@`>`<`l`T`Z`f`e`e`Z`k`f`i`%`k\`ej`k`i`d\`e`k`j`k`i`k`j`X`g`l`f`d`f`[I`ð`k`f`e`\`X`Z`_`k`d\`X`K`K`C`g`l`f`n`k`k\`j`g`Z`]\`[`g`f`d`i`p`j`i`Z`n`h`[%`

\$`Ki`^`J`f`g\`

K`f`j`g`Z`]`p`k\`g`f`d`i`p`f`]`k\`K`K`C`g`l`f`#`Z`c`Z`b`f`i`k`g`Ki`^`J`f`g\`k`f`j\`d`Z`k`i`G`f`j`i`f`i`E`\`^`i`%`9p[\`X`i`d`#`k`j`i`G`f`j`i`%`

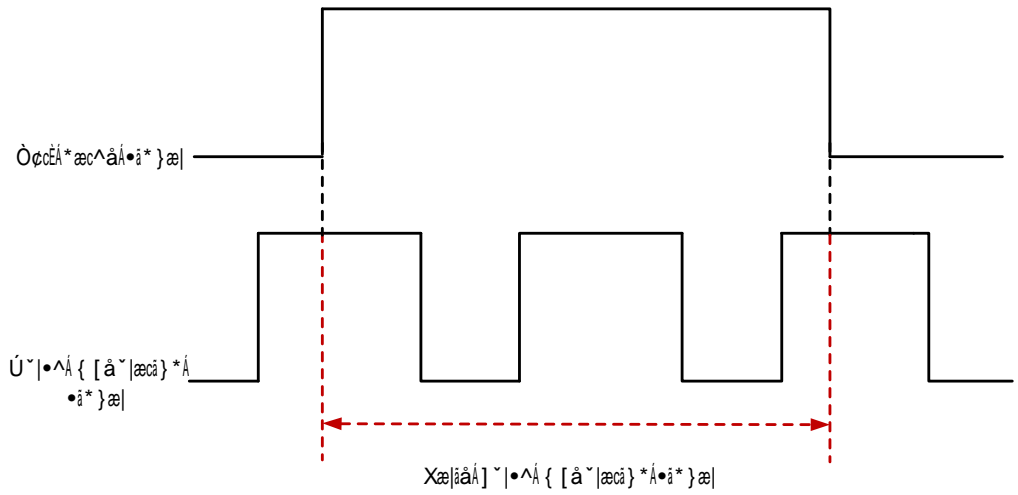
\$`Ki`^^\`i`; \`d`p`

N_e'pfl j\ΔZki@k'd f[I dKfe jfl iZ\Xe['i<dk' k' ^'d f[\#ZcZbfi kXg
 K' ^'; \dKp' k' j\kk\ [\dKp]if d' k_\ jk' k' f]i\Z\me^ k_\ \dkieXc' ^' ^'i
 j^eXc' d' k_\ jk' k' f]k_\ gl' q\ d' f[I dKfe^ j^eXcZj j_fne`e` =^i i\ O% Z%
 K_\e k_\ el d\ i' Z\ b\ pgX['j] j' g' d' p[%e' gl' k' k_\ [\dKp' n\ d\ \Xe[j\ ΔZk_\
 [\j] i\ [l' e' k_\ \ i' Xe^ \ f] k_\ [\dKp' k' d\ \j] if d' (' e' j' k' (' . ' j' %



>Xk[k' ^' ^' i

8]ki j\ΔZke^ i>Xk[i k' ^' ^' i #k_\ i = j^eXc^ \e\ i Xk' i i\Z\ n\ j k_\ \dkieXc
 ^Xk[j^eXc' e' gl' k] if d' k_\] if e' k' g\ Xe\ c' k' i @ > < l Tz' f' ee\ Z' f' i% k_\ `e' j' k' i d\ lek
 j' k' i' j' X' gl' q\ d' f[I dKf' e' n' k_\ e' `k' j' n\ d\ i' d' n\ c\ \XZ_ k' d\ \X^Xk[j^eXc' n' k_\ k_\
 j' g\ Z\ \ [g' f' d' i' p' j' i\Z\ n\ [#j j_fne`e` k_\] ^' i\ \ d' n%



k' j' g\ Z] p' k_\ g' f' d' i' p' f] k_\ \dkieXc^ Xk[j^eXc#ZcZbfi kXg >Xk' G' f' d' i' k'
 j\ΔZki E fid Xc' fi i' @mi k[i% p[\] Xl d#k' j' i' @mi k[i%


B\p k' ^' ^' i

8]ki j\ΔZke^ k_\ B\p k' ^' ^' i #k_\ `e' j' k' i d\ lek j' k' i' j' X' gl' q\ d' f[I dKf' e' \XZ_
 k' d\ \p' l' ZcZbfi kXg B\p%

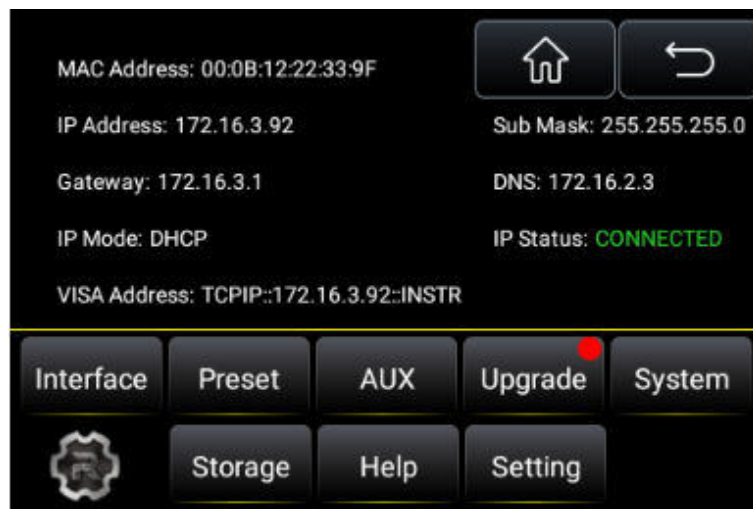
9] j k' ^' ^' i

8]ki j\ΔZke^k_\9 j ki^^\i#k_\`ejki d\ekjXkj`Xgl q\`d f[I ðkfe\XZ_
kd\`pfI j\e[k_\`i!KI >I`Zf d d Xe[%

(' Jpjkd Lkdpj\kē^

: cZb'fi 'kG' 'k \ekli k_ \ j pjkd l kdpj\kē^ \ekli]XZ\#Xj j_fne`e`='^/ i\ (' %%k_ \ l gg\i'gXikf]k_ \ `ekli]XZ\ j_fnj k_ \ j pjkd \$ \ d\k [`e]fid Xkf e#Xe[d n\i'gXikf]k_ \ `ekli]XZ\ j_fnj k_ \ d \el j i\ d\k ['k j pjkd l kdpj\kē^%k_ \ Z_Xee\c'e]fid Xkf e`j`ef kXn\ d\Yd 'k j \ `e k_ j `ekli]XZ\%k_ \ ^f YXZb'k' k_ \ d Xe `ekli]XZ\#Xg' X^Xe'fi ZcZb'kG  %

K_ \ j pjkd l kdpj\kē^ \ekli]XZ\#Yp[\ \]Xl d#[j g\pj k_ \ @'8[[i\j j#> XknXp#@ JkXj Xe[f k_ \ i j pjkd \$ \ d\k [`e]fid Xkf e%P l 'Zxe ZcZb'fi 'kG k_ \ d \el j Xk k_ \ d n\i'gXikf]k_ \ `ekli]XZ\ 'k' d Xb\ f k_ \ i j pjkd 'Zf e] ^ i Xkf e j %



=^ i \ (' % Jpjkd Lkdpj\kē^

(' % @ki]XZ\ J\kē^

K_ \ `ejkil d \ekjl ggf ilj k_ \ 'C8E `ekli]XZ\%

: cZb'fi 'kG' '5 @ki]XZ\ 'k j \kk_ \ 'C8E 'gXid \kij%

(' %% C8E

: cZb'fi 'kG @ki]XZ\ '5 C8E 'k j \kk_ \ 'C8E 'gXid \kij%

@: fe] ^ i Xkf e'Kpg\

K_ \ i \ kpg\ j] @'d f [\ j 'X\ Xn\ d\Yd 1; ? : G#l k' @Xe['D Xel Xc@%

; ? : G

N_e'pfl ZcZbfi K'g'k' j\ΔZk; ? : G#k\ ; ? : Gj\imh Xj^ej'e\knfib
gXid\Kij ži Z_ Xj k\ @X[[i\j] #i Ye\kd Xj b#Xe[^X\Xpžk' k\
`ejkil d\ekYXj\ [fe k\ Z ii\eke\knfib'Zfe] ^i Xkfe%

8l k' @

N_e'pfl ZcZbfi K'g'k' j\ΔZki 8l k' \$@ #k\ `ejkil d\ekn`cXZhl i\ k\ @
X[[i\j] iXe^e^]if d i(-0%, +%a' k' i(-0%, +% , %, +i Xe[k\ j] Ye\kd Xj b
ž , , %, , %žXi k' d XkZ\cpYXj\ [fe k\ Z ii\eke\knfib'Zfe] ^i Xkfe%

D Xel Xc\$@

N_e'pfl ZcZbfi K'g'k' j\ΔZki D Xel Xc\$@ Xe[i'ej\ΔZki; ? : G'Xe[i 8l k' \$@ #
pfl ZXe j\q[\] e\ X[\j i\ [@X[[i\j]] fi k\ `ejkil d\ekK\ @8[[i\j] #
>X\Xp#Jl YD Xj b#Xe[; EJ X\ `e\ [ke^ jKk%Pfl ZXe ZcZbfi K'g'k\ `egl k
J\q' f] k\ j\ gXid\Kij k' j\kk\ d' n' k\ k\ gf g\$ g'el d\ i' Z\ bpgX[%

\$ @8[[i\j] 1K\] fid Xkf] k\ @X[[i\j]] ieee%ee%ee%eei%K\ iXe^\
]fi k\]ijkj^d\ekžeežf] k\ X[[i\j]]]if d '(k') * ŽaZgk(). žXe[
k\ iXe^]fi k\ f k\ i k\ i\ j\ ^d\ekj]]if d ' k') , , %Pfl X\
i\Zf d d\ e\ [k' Xj b pfl i' e\knfibX[d `ejkiXfi]fi Xe @X[[i\j]
XnX\YΔ%

\$ JI YD Xj b1K\] fid Xkf] k\ j] Ye\kd Xj b` i ee%ee%ee%ee%N_ i\ `e#k\
iXe^ f] i ee']]if d ' k') , , %Pfl X\ i\Zf d d\ e\ [k' Xj b pfl i' e\knfib
X[d `ejkiXfi]fi Xj] Ye\kd Xj bXnX\YΔ%

\$ >X\Xp1K\] fid Xkf] k\ [\] Xi &^X\Xp` i ee%ee%ee%eei%K\
iXe^]fi k\]ijkj^d\ekžeežf] k\ X[[i\j]]]if d '(k') * ŽaZgk
(). žXe[k\ iXe^]fi k\ f k\ i k\ i\ j\ ^d\ekj]if d ' k') , , %Pfl X\
i\Zf d d\ e\ [k' Xj b pfl i' e\knfibX[d `ejkiXfi]fi X^Xk X[[i\j]
XnX\YΔ%

\$; EJ 1K\] fid Xkf] k\ ; EJ X[[i\j]] i ee%ee%ee%eei%K\ iXe^]fi
k\]ijkj^d\ekžeežf] k\ X[[i\j]]]if d '(k') * ŽaZgk(). žXe[k\
iXe^]fi k\ f k\ i k\ i\ j\ ^d\ekj]if d ' k') , , %Pfl X\ i\Zf d d\ e\ [\
k' Xj b pfl i' e\knfibX[d `ejkiXfi]fi Xe X[[i\j] XnX\YΔ%

EFK<

K\ `ejkil d\ekXkd gj' k' XZhl i\ k\ @X[[i\j] Zfe] ^i Xkfe XZfi [`e^ k' k\ j\ h\ i\ e\Z f]
; ? : G#8l k' @Xe[D Xel Xc@K\ j\ k\ i\ d f [\j ZkeefkY [jXYΔ [Xk\ j\ Xd\ kd\ %

d; EJ

<eYΔj fi []YΔj k\`d; EJ`gfilW_\e\`eYΔ[#kXcf nj`k`YifX[Zjkk\`e\kfib
j\imZ\`k`k\`fi kj [\#eYce^ Zfd dle`Zkfe`n`k`k\`[\mZj`f]`k\`jXd\`e\kfib
j\^d\`ek%

?fjkeXd\

: cZbfi`k`g`k\`eglk]\`f]?fjkeXd\`k`j\kk\`_fjkeXd\`n`k`k\`gfg\$`g
el`d\`i`Z`b\`pgX[%

I\j\k

Kiej`fe;`?:`GXe[`8l`k`\$eZ`iej`D`XeL`Xc\$`f]`%`ΔXj`k\`j\`ke\kfib`gXj`nfi[`Xe[
i\j`k`i\j`k`k`k\`]XZ`fip[\]Xl`d`j`%

8ggp

8]ki`k\`C8E`ekli]XZ`Zfe]`^i`Xkfe`j`]e]_\`[#ZcZbfi`k`g`8ggp`k`Xggp`k\
Zfe]`^i`Xkfe`%

(' %

Gi\j\k


: cZbfi`k`g`k`5`Gj\k`k`j\kk\`i`Gi\j\k`k`pgl`i`%

: cZbfi`k`g`k`j\ΔZki`=>XZ`fip`fi`i`Lj\i`i`%

N_\`e`i`=>XZ`fip`j`j\ΔZk[`#k\`ej`ki`d\`ek`f`X[j`k\`[\]Xl`d`k]XZ`fip`j\kka^`j`%

N_\`e`i`Lj\i`i`j`j\ΔZk[`#ZcZbfi`k`g`JXm`Gj\k`k`j`Xm`k\`Zl`i`i`ek`j`pj`kd

j\kka^`Xj`I`j\i`\$[\]e[\`j\kka^`j`k`k\`ek`ie`X`cef`e`\$`fi`d`k`d`d`d`fip`%

8]ki`g`i`j`fid`e^`k\`gi\j\k`kka^`j`#ZcZbfi`k`g``k`^`f`k`k\`d`Xe`ekli]XZ`%8k
k`j`g`f`ek`#n_\`e`p`f`I`ZcZbfi`k`g`k\`Gj\k`d`el`e`k\`d`Xe`ekli]XZ`#kn`c`f`X[`k\
gi\j\k`kka^`j`k`X`k`p`f`I`_`Xm`j\k`f`i`k\`n`_`f`Δ`j`pj`kd`%

(' %

8LO

: cZbfi`k`g`k`5`8LO`k`j\kk\`Xl`o`c`Xp`ekli]XZ`j`f]`k\`ej`ki`d\`ek`%

(' %%

+%`>`?`qJ`^`eXc`e`gl`k&F`I`kgl`k

: cZbfi`k`g`k`8LO`5`e`gl`k&F`I`kgl`k`k`j\kk\`eglk`Xe[`f`l`gl`k`f]`k\`+%`>`?`q`Z`i`i`
j\hl`e`z`p`i`\`i`e`Z`j`^`e`X`c`%

+%'@

\$ @kieXd_k\`ekieXc+%>?qj`^eX%

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Zfee\Zfi%

+%FLK

: cZb'fi`KGF E &F =kf`leXYd&]jXYd`k_\`fi lgl kf]k_\`+%>?qZXi`i
j\hl`veZpi\N\veZj`^eXc%N_\`eFE #k_\`j`^eXcj`fi lgl kmXk_\`i\Xi\$gXe\cR-%
>?qFLKTZfee\Zfi%

(' % Lg^iX[\

: cZb'fi`KGF` 5 Lg^iX[\#k_\`ej\`dZki`CfZXcl`g^iX[\`i`fi`iF`e`e\`Lg^iX[\`i`k`
g\]fid`j`pjkd`l`g^iX[\`%

: 8LK@E

N_\`e`l`g^iX[\`e`k_\`j`pjkd`#gdXj\`]f`af`n`k_\`ej`ki`Zkf`ej`Y`af`n`1

(%`f`ne`f`X[\`k_\`j`g\Z]\`[\`l`g^iX[\`g`XZbX^\`]d`l`e[\`i`k_\`[\`i\`Zk`i`p`f]\`k_\`j`g`i`f`[l`Zk]`i`f`d`
l`@`F`C`f`]]`Z`X`c`n`\`Y`j`k`%

)%`X[\`Z`X`\]l`ap`k_\`ej`k`X`k`f`e`ej`ki`Zkf`ej`Xe[\`m`i`j`f`e`e]`f`i`d`X`k`f`e]`i`f`d`k_\`l`g^iX[\`
g`X`Z`b`X`^\`]d`k`Z_\`Z`b`n`\`k_\`i`k_\`g`X`Z`b`X`^\`]d`d`X`Z_\`j`p`f`l`i`ej`ki`d`l`ek`d`f`[\`e`%

*%`l`i`e`^`l`g^iX[\`#`ej`l`i`k_\`X`k`p`f`l`i`ej`ki`d`l`ek`j`Z`f`e`e`\`Z`k`[\`k`g`f`n`v`i`j`f`l`i`Z`g`i`f`g`l`i`p`
Xe[\`n`f`i`b`j`e`f`i`d`X`ap`%`f`e`f`k`[\`j`Z`f`e`e`\`Z`k`k_\`ej`ki`d`l`ek]`i`f`d`g`f`n`v`i`j`f`l`i`Z`[l`i`e`^`k`j`
l`g^iX[\`%

+%`l`i`e`^`l`g^iX[\`#`e`m`i`g`l`i]`f`i`d`X`ep`f`g`l`i`X`k`f`e`f`e`k_\`ej`ki`d`l`ek`%

,`%`l`i`e`^`l`g^iX[\`#`e`m`i`g`l`i]`f`i`d`i`d`f`k`Z`f`ek`f`c`f`n`i`k_\`ej`ki`d`l`ek`%

-`%`X`ep`\`o`Z`g`k`f`ej`f`Z`l`i`[l`i`e`^`l`g^iX[\`#`gd`X`j`\`g`f`n`v`i`f]]`k_\`ej`ki`d`l`ek`Xe[\`i`j`k`i`k`k`
X`X`e`#`k_\`e`g`l`i]`f`i`d`k_\`l`g^iX[\`f`g`l`i`X`k`f`e`X`X`e`%

(' %% Cf ZXcl`g^iX[\

9\]fi`g`l`i]`f`i`d`e`k_\`f`Z`X`c`l`g^iX[\`#`X`r`h`k_\`l`g^iX[\`]d`k`k_\`L`J`9`j`k`f`i`X`^\`[\`m`Z`
f`i`g`l`k`k_\`l`g^iX[\`]d`k`k_\`f`Z`X`c`l`j`b`Z`j`b`:`z`n`X`=K`G`%

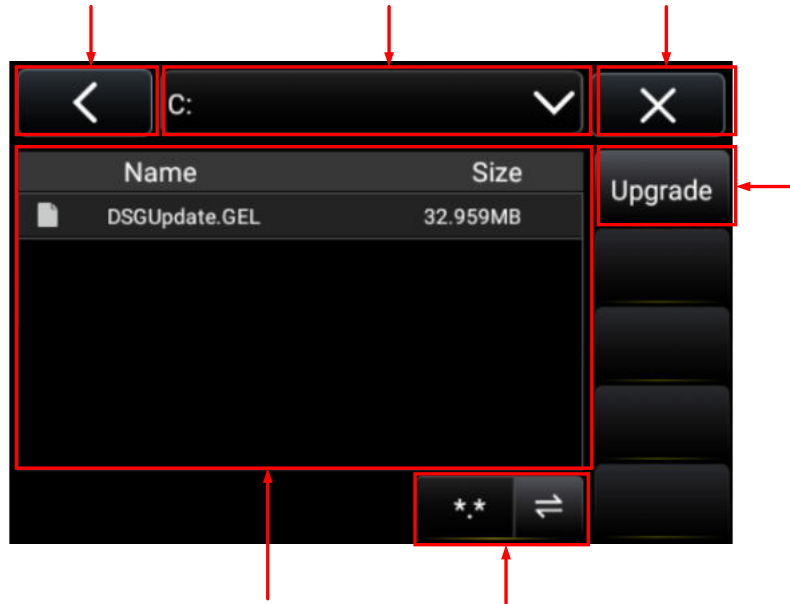
=KG

N_\`e`k_\`ej`ki`d`l`ek`j`e`C`S`E`Z`f`e`e`\`Z`k`f`e`#`j`\`k_\`=K`G`d`\`k`f`[`k`X`Z`Z`j`j`k_\`
l`g^iX[\`]d`%`f`i`\`o`X`d`g`d`#`k_\`@`X`[l`i`v`j`f`]k_\`ej`ki`d`l`ek`j`(`O`)%`/%`%`%`e`g`l`k`
k_\`X`[l`i`v`j`j`Z`l`g`%`(`O`)%`/%`%`&`f`]k_\`]d`i`v`f`l`i`Z`d`Xe`X`^`i`f`]k_\`G`k`X`Z`Z`j`j`
k_\`]d`i`v`f`l`i`Z`d`Xe`X`^`i`f`]k_\`ej`ki`d`l`ek`%`f`g`p`k_\`l`g^iX[\`]d`k`k_\`
d`Xe`X`^`i`f`]k`i`l`g`f`X`[e`k_\`l`g^iX[\`]d`#`p`f`l`Z`X`e`m`l`n`k_\`]d`e`;`j`b`
D`Xe`X`^`d`l`ek`%

LJ9

: fgpk\l g^iX[\]d kf k\LJ9jkiX^\ [mZ ž-8k*) z@ej\ikk\LJ9jkiX^\ [mZ `ekf k\`ejkil d\ek%ldZkk\L g^iX[\]d Xe[gvi]fid k\l g^iX[\ f g\iXkf e%

: cZbfi kXg Lg^iX[\ 5 Of ZXcLg^iX[\ kf \eki k\]d i\jfiZ\ d XeX^d \ek jpjkd #Xj j_f ne`e`e`i\ (' %%ldZkk\ [jbn_\i\k\]d i\j\ [j Xe[]e[k\]d%k_e ZcZbfi kXg Lg^iX[\ kf jkXk\ jpjkd l g^iX[\ gif Zjj%



=^i\ (' % =d\ i\jfiZ\ D XeX^d \ekJpjkd

(%f 9XZb kf k\G\mf Ij ; i\Zk fip

)% j bJ\ldZkfe`8i\X

; jgdXj k\ Zi i\lek]d gXk_% cZb kf kXg k\ [if g\$ fne Yi kfe kf j\ldZkk\ d Zxc [j bfi k\ \dkieXcLJ9 [j b%

*% d j \ @f e

: cZbfi kXg k\ Zdf j \ Zfe kf Zdf j \ k\ Zi i\lek`eki]XZ\%n c`af kf k\ gi\mf Ij `eki]XZ\%

+%L g^iX[\

J\ldZj k\ l g^iX[\]d #k_e ZcZbfi kXg Lg^iX[\ %k_ \`ejkil d \ekj kXj kf l g^iX[\ %

, % =d kpg\ J\ldZkfe

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-% j b = d

; j g d p j k \] d ` e] f i d X k f e # f] k \ Z i i i e k [\ \ Z k i p P F I Z X e j \ d Z k k \ [\ j \ \] d
f i] f e \ i %

\$ = f i] f e \ i f g \ i X k f e # Z c Z b f i k g k \] f e \ i k f g l e ` k X e [j \ d Z k k \] d ` e ` k X f
j \ d Z k k \] f e \ i # e ^ Z c Z b f i k g ` k %

\$ = f i] d f g \ i X k f e # Z c Z b k g ` k [\ \ Z k p k f j \ d Z k k \ j ` e ^ d] d % P F I Z X e X g f ` d e ^
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8] k i k \ ` e j k i d \ e k j Z f e e \ Z k [k f k \ e \ n f i b n X k \ C 8 E ` e k i] X Z \ # Z c Z b f i k g
L g ^ i X [\ 5 F e c e \ L g ^ i X [\ % \ e k \ i l @ F C g j f [I Z k f e c e \ l g ^ i X [\ j \ i n Z \ k i d j
j [] j g d p \ % c Z b f i k g 8 Z Z g k k f j k i k i g ^ i X [\ % I i e ^ l g ^ i X [\ # C 8 E n ` e Y \
[] Z f e e \ Z k [X e [k \ ` e j k i d \ e k n ` e Y \ i j k i k [X i k f d X k Z X a p %

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: c Z b f i k g ` 5 J p j k d k f m \ n k \ j p j k d ` e] f i d X k f e # f g k f e ` e] f i d X k f e # X e [j p j k d ` d \ j j X ^ \ %

J p j k d @] f i d X k f e

: c Z b f i k g J p j k d k f m \ n k \ ` d f [\ # \ i X c e l d Y \ i # n i j ` f e e l d Y \ i # X e [f k \ i j p j k d \$ \ d k [` e] f i d X k f e % c Z b f i k g C @ < E J < k f m \ n k \ f g l e j f l i Z X Z b e f n d [^ d \ e k] f i k \ ` e j k i d \ e k %

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K \ ` c Z e j \ ` j X] d [` d e ^ k ` f] j k i ` e ^ j % X Z ` e j k i d \ e k _ X j X I e h l \ ` c Z e j \ % K \ c Z e j \] d _ X j X j g \ Z] Z] d] f i d X k X e [k \] d e X d \ ` j j I] d [n ` k i % Z i % 8] k i p f I g l i Z X j \ k \ [\ j \ \] f g k f e # p f I n ` e ^ \ k k \ b l p k k \ f g k f e c Z e j \ % P F I Z X e I j \ k \ b l p k f ` ^ e \ i X k k \ f g k f e c Z e j \ Y p k X b e ^ k \] f e n ` e ^ j k g j 1

(% Y k X e X e f g k f e c Z e j \

X X ^ ` e k k \ I @ F C f] Z X c n \ Y j k Z k g k n n n % ^ f c Z f d Z % c Z b J < l M @ < : < E k I < 5 C Z e j \ 8 Z k n X k f e k f \ e k i c Z e j \ Z f [\ ` e k i] X Z \ %

Y@_k\`eki]X\#eki_k\`Zfii\Zkb\p#j\i\Xcel d Y\i#Xe[`mhi`]ZKfe`Zf[\%_le
ZcZb>\e\iXk kf`fYKXe_k\`[fnefX[`ceb`f]k\`fgkfe`cZlej\`]d%@pfi`e\[\
kf`Ij\`k\`fgkfe`cZlej\`]d#ZcZb`kf`[fnefX[`k\`]d`kf`k\`jg\Z]\`
[\`Zk`ipf]k\`LJ9j`k`iX^\`[\`mZ\%

)%ejkXck_k\`fgkfe`

X%8\`d`Zf d d l e`ZKfe`Y\kn\`le_k\`d`ZifnXnh`j`^eXc^`e\iXki`Xe[`k\`G`mX
k\`LJ9fi`O8E%Lj\`k\`J: G@Zf d d Xe[`1PJkd`TB<P
3fgkfe57`3cZlej\`b\p5`kf`ejkXck_k\`fgkfe`

Y%fi`o\`d`g\`d`#1PJkd`TB<P; J>, ' ' '\$
8D; 7]YZ[-(]\Y\`*OZ]X**'' '*-Y/]OQZ//, X)(`Y+X*(-)`%_k\`d`ZifnXnh
j`^eXc^`e\iXki`[\`ek]\`j`k\`cZlej\`i\`Z\`nh[`Xe[`d`XZ\`j`k\`Zfii\`jgfe[`e^
fgkfe%8kk_j`gf`ek#k\`Zfii\`jgfe[`e^`fgkfe`]`ejkXc[`Xe[`XZkn\`k\`%`

Jpjkd`D\`jjX^\`

: cZbfi`kXg`Jpjkd`D\`jjX^\`kf`m\`n`k\`g`kf]k\`d\`k`jkd`\`jjX^\`#eZt[`e^`k\`
d\`jjX^\`@`#Zfeklek#Xe[`k\`kd`\`f]\`XZ_d\`jjX^\`%

(' % JKfiX^\`

: cZbfi`kXg` 5`JKfiX^\`kf`j`Xnh`Xe[`f`X[`]d`j`#Xj`n\`cXj`g\i]fid[`]b
d`XeX^\`d\`lek%

(' %% JKfiX^\`

(%>d`Kpg\`

K\`Xnh`dYd`]d`kpg\`j`eZt[\`JKk\`j`#-d\`e\`jj`#Jn\`g#G`g\`#Xe[`@`X^\`%

)%_Xee\`c`

K\`Xnh`dYd`j`kf`iX^\`Z`_Xee\`g`eZt[\`8c#`?`(#`?)`#`?`*`#`?`+`#`?`#`?`-`#`?`#`
Xe[`: `?`/%`

*%>d`G\`]o`

: cZbfi`kXg`k\`eg\`k]\`d`f]k\`]d`gi\`o\`k\`[\`k\`k\`gi\`o\`n`k`k\`el`d\`i`Z
b\`pgX[`%`cZbfi`kXg`F`E`fi`F`=#`kf`leXy\`d`fi[`]`j`Xy\`d`k\`i\`j\`f]k\`k\`[\`k\`]d`
gi\`]o\`N\`e\`pfi`j\`d`Zk`F`E`#`k\`[\`k\`]gi\`o\`n\`c\`V\`X[[\`[\`ek\`k\`]d`eX\`d\`eg\`k
]\`d`X\`kf`d`Xk`Zk`ap`n\`e\`pfi`j`Xnh`X]d`%

+%fi`id`Xk#`emik#?\`X[\`i#`f`d`i`

N\`e\`pfi`j\`d`Zk\`i`@`X^\`i`le[\`i`=#`d`Kpg\`#pfi`Z`Xe`j\`k\`k\`g\`X\`d\`k\`ij`ji`Z`_`Xj`k\`
d`X^\`]fid`Xk#`emik#_\`X[\`i#Xe[`Zf`d`i`pfi`Z`Xe`Xj`f`I`j\`k\`[\`X\`d\`j\`Kk^`j`%`
,`%`Xnh`

: cZbfi kXg JXm#k\ej\ΔZk\ [jbf i [i\Zf ip'gXk jfi jkfiX^%\@gl k\]dēXd\% cZbfi kXg JXm k' jXm k\]d n'k\ k\ jg\Z]\ []dēXd\Xe []d kpg\ k' k\ Zi i\ekpj\ΔZk [[i\Zf ip%



K@

K\]dēXd\ Zkē Zf ekXe Xkd fjk) / <e^cj_ Z_XiXZkij fi el d Yij ži (+: _e\j\ Z_XiXZkij ž%

-%f X[

: cZbfi kXg CfX[%\ΔZk\ [jbXe[k\ej\ΔZk\]d k' Y\ fX\ []fid k\ [j b% cZbfi kXg CfX[k' f X[k\]d k' k\ jpkd %

(' %% ; j b'D XeX^d \ek

: cZbfi kXg JkfiX^ 5 ; j b@]f k' m'n k\ [j b^e]fid Xkfe Xe['g\i]fid [j b d XeX^d \ek%

; j b@]f

; j gōpj k\ [j b'kpg\#]d jpkd # j\ [j gXZ\#k kcj gXZ\#Xe[\kZ%

; j b

: cZbfi kXg ; j b k' m'n Xe[j\ΔZk\ [j b^e k\ ^ejki d \ek'p[\]Xl d#; j b: j j\ΔZk [%

; j b'D XeX^d \ek

8]ki pf i j\ΔZkX [j b#ZcZbfi kXg ; j b k' g\i]fid Xj\i\j f [] j b d XeX^d \ek fg\iXkfej%

\$ E \n `f f \i

: i\Xkj X]f f \i%k\]f f \i eXd\ Zkē Zf ekXe Xkd fjk) / <e^cj_ Z_XiXZkij fi el d Yij ži (+: _e\j\ Z_XiXZkij ž%

\$ I \eXd \

I \eXd \j X]d k_Xk_Xj Y\lejki\ [%

\$; \Δk

; \Δkj X]d k_Xk_Xj Y\lejki\ [%

\$: f gp

: cZbfi kXg fe\]d k_Xk_Xj Y\lejki\ [Zfi f e^gi\jj k' j\ΔZkf e\]f f \i% K\ e ZcZbfi kXg : f gp k' Zf gp k\ Zi i\ekpj\ΔZk []d fi]f f \i i e\i k\ jg\Z]\ [] b%

\$ G j k

Ggkj k\]d fi]fē\i kf k\ Z iiekgXk_%
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: cZbfi kXg' 5 ?\cg kf \eki k\ ?\cg [fZ d \ekXkf e%PFI Zxe^ \k'lj _\cg
'ejfid Xkfe YpZcZbe^ fe k\ 'ceb]fi k\ 'ekf [I Zkfe f] k\ jg\Z]\ [] eZkfe%

(' % J\kē^

: cZbfi kXg' 5 J\kē^ kf j\kj pjkd \$ \dXk ['gXiXd \kij Xe ['gNi]fid j\q\$Z_\Zb
]fi k\ C ; jZ\leXe [k\ kf I Z_ \$eXYd [^\jki\j%

(' %% 9Xj`ZJ\kē^j

: cZbfi kXg 9Xj`ZJ\kē^j kf j\kk\ 'dē^I X^\#gf n\i jkX j #kd \jn`kZ_#j Z\le
j kX j #Xe [\kZ%

Oxē^I X^\

; J>, '' jI ggfij knf 'dē^I X^\j f: _e\j\ Xe [<e^cj_% cZbfi kXg kf j\ dZk\ \
[\j]\ ['dē^I X^\ kpg\%

Gfn\i jkX j

: cZbfi kXg kf j\ dZki; \]Xi dē^I f i Fg\er%

\$ N_\le'i; \]Xi dē^I j\ dZk [#feZ k\ 'ejki d \ek'j Zfeē\Zk ['kf gfn\i
jfi iZ\#pfi e\ ['kf gi\j [fne k\]if ekXgXe\cgfn\i Yi kfe X]ki k'ie^
fe k\ i\Xi \$Xe\cgfn\i jn`kZ_%

\$ N_\le'i Fg\er j\ dZk [#feZ k\ 'ejki d \ek'j Zfeē\Zk ['kf gfn\i
jfi iZ\#k\ 'ejki d \ek'j kXij Xi kf d XkZ\cp X]ki k\ i\Xi \$Xe\cgfn\i
jn`kZ_] k'ie\ fe%

Kd\Jn`kZ_

<eXYd j fi []XYd j k\ []gōp'f] k\ j pjkd [Xk Xe ['kd \\
; Xkē Kd \

J\lj k\ j pjkd [Xk Xe ['kd \ f] k\ 'ejki d \ek% cZbfi kXg k\ 'egl k\ 'dē^ f]
p\Xi #d fek_# [Xp#_fi i#Xe ['d'el k'kf 'egl k\ [Xk Xe ['kd \%

JZ\le`CfZb

CfZbj`fi`lecfZbj`k_\`kfi`Z_jZ\le%

\$ FE1cfZbj`k_\`kfi`Z_jZ\le%K_\`kfi`Z_jZ\le`fgliXkfe`j`[`j`XYd`[%Bkk_j`
 kd`#k_\`jZ\le`jkg`j`l`g`Xke^`Xe`[`j`cfZb`[%K_\`d`Xj`i`d`lekjg`l`[`j`
 `d`gif`m`[%Z\le`cfZbe^`j`d`Xep`l`j`l`[`e`i`d`f`k`f`gli`Xkfe`d`f`l`[%`
 \$ F==1lecfZbj`k_\`kfi`Z_jZ\le%K_\`kfi`Z_jZ\le`fgliXkfe`j`leXYd`[%K_\`
 j`k_\`[`\]X`d`kj`kk`%

JX\`:\`dXi

: dXij`Xc`[`Xk`pfi`j`kXe`[`i`j`kfi`i`k`k`k_\`]XZ`f`ip`[`\]X`d`j`%`
 : cZb`fi`kXg`JX\`:\`dXi`#Xe`[`X`gif`d`gkd`j`j`X`^`Z`fe`]id`e`^`n`_`k`_`li`k`f`Z`d`Xi`k`
 j`X\`p`j`[`j`g`d`p`l`[%`cZb`F`B`k`f`Z`d`Xi`X`c`k`_\`[`X`k`j`k`fi`i`[`e`k_\`e`kie`X`c`[`j`b`%`cZb`
 fi`kXg`XeZ`c`k`f`Z`XeZ`c`j`X\`Z`d`Xi`f`gli`Xkfe`%

(`%% J\dj`:\`Zb

: cZb`fi`kXg`J\dj`:\`Zb`k`f`g`li`f`id`k_\`C` ;`k`j`k`Xe`[`k`fi`Z`_`k`j`k`%

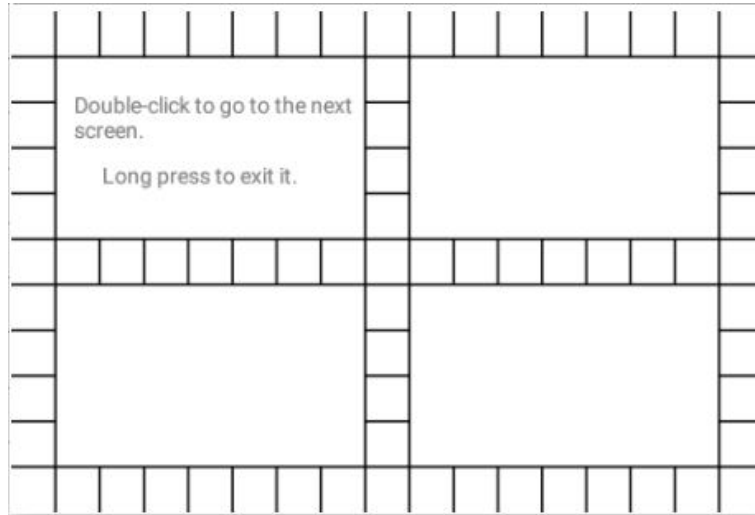
C` ;`k`j`k`

: cZb`fi`kXg`C` ;`k`j`k`k`f`le`ki`k_\`C` ;`k`j`k`e`ki`]XZ`%K_\`j`pj`kd`g`if`n`[`\](`,`Z`f`d`ij`
]fi`j`Z\le`k`j`k`f`Z`_`Z`b`n`_`k`_`li`k_\`j`Z\le`_`X`j`X`[`f`k`[`\]Z`l`%`cZb`fi`kXg`X`ep`ig`d`Z`k`f`
 j`n`k`Z`_`k_\`j`Z\le`Z`f`d`i`Xe`[`\o`k`k_\`k`j`k`%

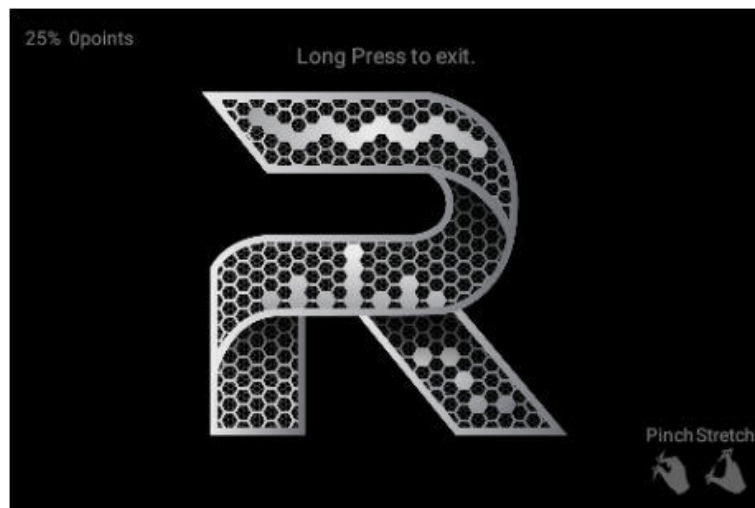
kfi`Z`_`k`j`k`

: cZb`fi`kXg`kfi`Z`_`k`j`k`k`f`le`ki`k_\`kfi`Z`_`k`j`k`%

=ij`k`le`ki`k_\`kfi`Z`_`j`Z\le`k`j`k`e`ki`]XZ`#X`j`_`f`ne`e`k_\`]`^`i`l`Y`d`f`n`%d`[`\`n`k`
 pfi`i`]e`^`li`f`e`k_\`j`Z\le`%@`k`_`li`j`X`d`e`l`[`j`g`d`p`e`^`X`k`k`_\`d`g`l`p`X`i`X`n`_`li`pfi`
 j`d`[`\`f`e`k_\`j`Z\le`Xe`[`k_\`Y`f`o`k`X`k`pfi`kXg`k`ie`j`fi`k`f`Y`l`d`[`n`k`^`i`l`le`
 YXZ`b`^`if`le`[#`k`e`[`Z`k`j`k`_`X`k`k`_\`kfi`Z`_`]e`Z`k`f`e`f`]k`j`X`i`X`j`e`f`id`X`e`%



; fl Yd \$czbk \ Zi iiekKjkj Zi\le fi kkg k \ j Zi\le kn`Z kf `af kf k \ e\dkKjk
j Zi\le %Bgf `n_e Xck \ Yf o j `Xm k ie\ [`ai\le #kn`c`af kf k \ e\dkKjkj Zi\le
Xl kf d XkZ Xq #Xj j_f ne `e k \] `ai i \ Ydn %Bkk_j kd \ #pf l `Zxe g`eZ_f i j k \ k _ k \\
l @FC`Zfe kf qfd `kfl kfi `e kf Z \ Zbn _k \ i k \ kf l Z \$eXYd [`aj k i \ j `n fib
efid Xq %C e^ gi \ j j k \ j Zi\le kf \ okk \ kjk`eki] XZ %



((% I \d f k : f e k i f c m X L J 9

(% f e e \z k k \ [\mZ

Lj \ k \ L J 9 Z Y d k f Z f e e \z k k \ i \ X i \$ g X e \ c R L J 9 ; < M & < T f] k \ ` e j k i d \ e k i f k \ L J 9 ? F J K ` e k i] X Z \ f] k \ G %

)% \ X i Z _] f i k \ [\mZ i \j f l i Z

J K i k l g L d i X J ^ d X X e [k \ j f] k n X i \ n ` c X i k f d X k Z X o p j \ X i Z _] f i k \ i \j f l i Z Z i i \ e k p Z f e e \z k k [k f k \ G m X k \ L J 9 ` e k i] X Z \ P f i Z X e X g f Z c z b L J 9 \$ K D : k f j \ X i Z _] f i k \ i \j f l i Z %

*% M n k \ [\mZ i \j f l i Z

K \ i \j f l i Z j] f l e [n ` c X g g \ X i l e [i i k \ i l @ F C F e o e \ i \j f l i Z i [i \ Z k i p # X e [k \ d f [\ c e l d Y i X e [L J 9 ` e k i] X Z \ ` e j f i d X k f e f] k \ ` e j k i d \ e k n ` c X g f Y \ [] g o p \ %

+% f e k i f c k \ ` e j k i d \ e k i \ d f k o p

I ^ _ k \$ z b k \ [\mZ i \j f l i Z e X d \ X e [j \ d Z k i J : G o G X e \ c : f e k i f c k f f g l e k \ i \ d f k Z f d d X e [Z f e k i f c g X e \ c k \ e p f i Z X e j \ e [Z f d d X e [j X e [i \ X [[X k k i f l i ^ _ k \ g X e \ c e f i [\ X k g X Y f l k k \ J : G o Z f d d X e [j X e [g i f ^ i X d d ` e ^ # \] i k f G f ^ i X d d ` e ^ > l [\ %

((% I \d f k : f e k i f c m X C 8 E

(% f e e \z k k \ [\mZ

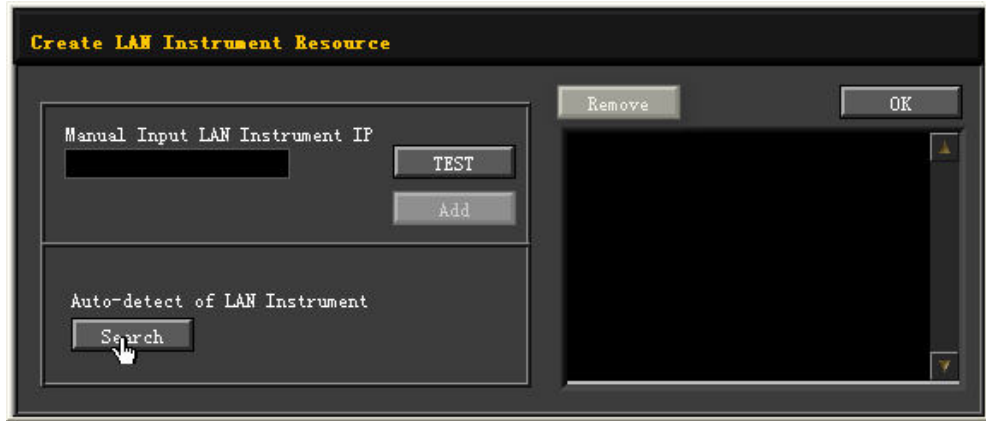
Lj \ k \ e \ k n f i b Z Y d k f Z f e e \z k k \ ` e j k i d \ e k i f p f l i d Z c X i \ X e \ k n f i b Z C 8 E Z %

)% f e] ^ i \ e \ k n f i b g X i X d \ k i j

: f e] ^ i \ k \ e \ k n f i b g X i X d \ k i j] f] k \ ` e j k i d \ e k X Z z f i [` e ^ k f i C 8 E i %

*% \ X i Z _] f i j \ X i Z _ [\mZ i \j f l i Z

J K i k l g L d i X J ^ d X X e [Z c z b C 8 E k f f g l e k \ g X e \ c X j _ f n e ` e k \] ^ i \ Y d f n % : c z b J \ X i Z _ X e [k \ j f] k n X i \ j \ X i Z _ j] f i k \ ` e j k i d \ e k i \j f l i Z j Z i i \ e k p Z f e e \z k k [X e [k \ i \j f l i Z j] f l e [X i \ [] g o p \ [X k k \ i i ^ _ k j \ Z k f e f] k \ n e [f n X j j _ f n e ` e k \] ^ i \ Y d f n % c z b F B k f X [[\ %



9\j [\j #p f l Zxe`egl k k_\`@X [i \j j f] k_\`ej k i l d \vek d Xel Xcp`ekf k_\`k d k] \d
 l e [\i i d Xel Xc@egl k C8E `ej k i l d \vek @ #_\`e ZcZb K<J K % @ k_\`ej k i l d \vek g X j j \j
 k_\`k j k #ZcZb 8 ; ; k' X [k_\`ej k i l d \vek k' k_\`C8E `ej k i l d \vek i \j f l i Z `ej k' e k_\`
 i ^ _k j \Zk f e 2] k_\`ej k i l d \vek] X g' k_\`k j k #g d X j \ Z \Z b n _k \i k_\`@X [i \j j
 k_X k p f l `egl k j Z f i i \Z #f i X i k' j \X i Z _k_\`@X [i \j j f] k_\`ej k i l d \vek X e [X [`k
 k' k_\`ej k i l d \vek i \j f l i Z %



K@

k_\`@X [i \j j f] k_\`j \d Z k [i \j f l i Z j _f l d Y Z f e j j k e k n k_\`k_X k f] k_\`C8E `e k i] X Z %

+%M \n k_\` [\m Z i \j f l i Z

k_\`i \j f l i Z j] f l e [n `c X g g \X i l e [\i k_\` l @ F C F e c e \i \j f l i Z [i \Z k f i p %
 , % f e k i f c k_\`ej k i l d \vek i \d f k p

l ^ _k ZcZb k_\` [\m Z i \j f l i Z e X d \Xe [j \d Z k i j : G @ X e \c : f e k i f c k' f g \e k_\`
 i \d f k Z f d d X e [Z f e k i f c g X e \k_\`e p f l Z X e j \e [Z f d d X e [j X e [i \X [[X X
 k_i f l ^ _k_\`g X e \c %

-%f X ['O O @ n \Y g X ^ \

8 j k_\` j `ej k i l d \vek Z f e j f i d j k' 'O O @ F l <) ' ((; < \M < j k X e [X i j #p f l Z X e `f X ['O O @
 n \Y g X ^ \ k_i f l ^ _L d i X J ^ d X Z ^ _k ZcZb k_\`ej k i l d \vek i \j f l i Z e X d \Xe [j \d Z k
 i O O @ N \Y i Z M f i j `d g f i k e k `e] f i d X k f e X Y f l k k_\`ej k i l d \vek Z e Z t [`e ^ k_\`
 d f [\d #d X e l] X Z i i \i # \i X c e l d Y i # [\j Z i g k f e #D 8 : X [i \j j #X e [`@X [i \j j z n `c
 Y [] j g d p \ f e k_\` n \Y g X ^ \ p f l Z X e X g f [i \Z p `egl k k_\`@X [i \j j f] k_\`
 f j Z d j Z f g `e k_\` X [i \j j Y X i f] k_\` G `Y i f n j \i k' f X [k_\`O O @ n \Y g X ^ \ %

() 8ggcZk`f e`<oXd g`d j

K_j`Z_Xgk`i`ekif [I Zj`k_\`YXj`Zf`g\iXk`f`ej`f]`k_\`ej`k`i`d`lek`Xj`n`c`Xj`X`]\n
j`g`Z`Z`Z`oXd`g`d`j`f`k`X`k`k`_\`i`j`i`Z`X`e`h`l`Z`b`p`d`X`j`k`i`_`f`n`k`f`f`g`i`X`k`k`_\`j`^`e`X`c`
^`e`i`X`k`f`i`%

()% Kf`F`I`lgl`k`k`_\`I`=J`^`e`X`c

F`I`lgl`k`k`_\`I`=j`^`e`X`c`n`k`_`>`?`q`j`i`h`l`e`Z`p`X`e`[`\$`(``[`9d`X`d`g`d`k`[\`]\`i`f`d`k`_\`R`=`
,`^`T`Z`f`e`e`Z`k`f`i`f`]:`?)`%

(%`j`k`f`i`\`k`f`j`X`Z`k`f`i`p`j`\`k`e`^`

:`c`Z`b`f`i`k`X`g` `5`G`j`k`f`j`i`h`l`e`Z`p`X`e`[`\$`(``[`9d`X`d`g`d`k`[\`]\`i`f`d`k`_\`R`=`



k`f`^`f`k`f`k`_\`d`X`e`^`e`k`i`]`X`Z`%`c`Z`b`f`i`k`X`g`G`j`k`f`i`j`k`f`i`\`k`_\`ej`k`i`d`lek`f`
]`X`Z`k`f`i`p`[\`]\`i`d`j`%`p`[\`]\`i`d`#`k`_\`j`i`h`l`e`Z`p`f`j`j`k`j`^`?`q`k`f`X`e`[`k`_\`X`d`g`d`k`[\`]\`
f`j`j`k`j`^`[`9`%`

)`%`j`k`k`_\`Z`_`X`e`e`c`

:`c`Z`b`f`i`k`X`g`k`f`j`i`h`l`e`Z`p`X`e`[`\$`(``[`9d`X`d`g`d`k`[\`]\`i`f`d`k`_\`R`=`

*`%`j`k`k`_\`j`i`h`l`e`Z`p`

:`c`Z`b`f`i`k`X`g`E`i`h`5`E`i`h`%`e`g`l`k`k`_\`j`i`h`l`e`Z`p`X`e`[`\$`(``[`9d`X`d`g`d`k`[\`]\`i`f`d`k`_\`R`=`
b`p`g`X`[`#`X`e`[`j`i`h`l`e`Z`p`X`e`[`\$`(``[`9d`X`d`g`d`k`[\`]\`i`f`d`k`_\`R`=`

\$`k`_\`j`i`h`l`e`Z`p`i`e`j`X`n`X`d`Y`d`X`i`>`?`q`#`D`?`q`#`b`?`q`#`X`e`[`?`q`%`

\$`P`f`I`Z`X`e`X`g`f`[`i`Z`k`p`Z`c`Z`b`f`i`k`X`g`<`e`k`i`k`f`Z`f`e`]`i`d`k`_\`[\`]\`i`d`k`_\`e`k`f`i`k`_\`
j`i`h`l`e`Z`p`%`

\$`P`f`I`Z`X`e`Z`c`Z`b`f`i`k`X`g`k`_\`e`g`l`k`j`^`f`[`k`_\`E`i`h`g`X`i`X`d`\`k`i`k`f`d`f`[`]`p`k`_\`n`X`d`\`%`

8`j`k`i`Z`f`d`g`d`k`e`^`k`_\`j`i`h`l`e`Z`p`j`j`k`e`^`#`Z`c`Z`b`f`i`k`X`g``f`i``k`f`^`f`k`f`k`_\`
d`X`e`^`e`k`i`]`X`Z`%`

+`%`j`k`k`_\`X`d`g`d`k`[\`]\`

:`c`Z`b`f`i`k`X`g`A`m`c`5`A`m`c`%`e`g`l`k`k`_\`X`d`g`d`k`[\`]\`i`f`d`k`_\`R`=`
b`p`g`X`[`X`e`[`j`i`h`l`e`Z`p`X`e`[`\$`(``[`9d`X`d`g`d`k`[\`]\`i`f`d`k`_\`R`=`
Z`f`e`]`i`d`k`_\`[\`]\`i`d`k`_\`e`k`[`9d`%`

\$`k`_\`X`d`g`d`k`[\`]\`i`e`j`X`n`X`d`Y`d`X`i`[`9d`#`M`d`M`X`e`[`I`M`%`

\$`P`f`I`Z`X`e`Z`c`Z`b`f`i`k`X`g`k`_\`e`g`l`k`j`^`f`[`k`_\`A`m`c`g`X`i`X`d`\`k`i`k`f`d`f`[`]`p`k`_\`n`X`d`\`%`


, %eXYd 'k_\l =f l kgl k

Cfe^ZcZbfi 'k_g'Z_Xee\c[jg0p'Xi\Xf]: ?) 'kf \eXYd 'k_\l =f l kgl kf]: ?)%8k
k_\j 'kd \#k_\R =, ' Tzf ee\Zf i f]: ?) f l kgl k_\l =j ^eXcYXj\ [fe k_\
Z i i\ekj \k_e^%PFI 'ZXe Xgf 'ZcZbfi 'k_g I =kf j\0Zki FEI 'kf \eXYd 'k_\l =f l kgl k
Jfi 'Xck_\ Z_Xee\g:%

() % Kf 'F l kgl k'k_\l ' =Jn\lg'J^eXc

: fe]^\i \XZfekel f l j '0e\Xi j klg jn\lg'kf 'f l kgl k'k_\l ' =jn\lg'j^eXc]if d 'k_\R =
, ' Tzf ee\Zf i f]: ? ('kf 'd Xb\ 'k_\j]i\hl \eZpj k'p'n_k_e'XiXe^\]if d ('>? qkf)
>? q#Xd g0k [\]if d '\$' [9d 'kf ' [9d #k_\el d Y\i f]]jn\lg'gf 'ekj (' #Xe['k_\
[n\0kd \, ' ' d j%

(% \j kfi \kf]XZf ipj \k_e^

: cZbfi 'k_g' '5 G'j \k'j\0Zk'k_\ gi\j \kpg\ 'kf 'i=XZf i p'k_\e'ZcZbfi 'k_g
 'kf ^f 'kf 'k_\d Xe^eki]XZ\% cZbfi 'k_g G'j \k'kf 'i\j kfi \k_\`ej ki d \ekf
]XZf ip[\ \Xi 0j %0p[\ \Xi 0#k_\]i\hl \eZp'f]j \k'j ' ?qXe['k_\Xd g0k [\ 'f]j \k'j
' [9%

)% \0Zk'k_\ Z_Xee\c

: cZbfi 'k_g'kf j\0Zk: ?(%k_\d Xe^eki]XZ\ j_f nj 'k_Xk: ? ('j 'Z i i\ekp j\0Zk [%
*% \k'k_\ j klg jn\lg'gXiXd \kij

: cZbfi 'k_g' Jn\lg'5 Kpg\ 'kf j\0Zki Jk gi %

: cZbfi 'k_g' J\k_e^'5 i\h8Cm'ckf j\k'k_\]i\hl \eZp'Xe['0m'cgXiXd \kij %

\$ Jk'k=i\h

: cZbfi 'k_g' Jk'k=i\h#k_\e^egl k'k_\ j k'k'j\hl \eZp('n_k_\k_\gf g\$ g
el d \i'Z'b\pgX['Xe[j\0Zk'k_\l e'ki >? q%

\$ Jk'g=i\h


: cZbfi 'k_g' Jk'g=i\h#k_\e^egl k'k_\ j k'g'j\hl \eZp) 'n_k_\k_\gf g\$ g
el d \i'Z'b\pgX['Xe[j\0Zk'k_\l e'ki >? q%

\$ Jk'k\Cm'c

: cZbfi 'k_g' Jk'k\Cm'c#k_\e^egl k'k_\ j k'k'd'm'c\$) 'n_k_\k_\gf g\$ g'el d \i'Z
b\pgX['Xe[j\0Zk'k_\l e'ki [9d i %

\$ Jk'g\Cm'c

: cZbfi 'k_g' Jk'g\Cm'c#k_\e^egl k'k_\ j k'g'd'm'c' 'n_k_\k_\gf g\$ g'el d \i'Z
b\pgX['Xe[j\0Zk'k_\l e'ki [9d i %

: cZbfi kXg  5 Gf`ekj #k_`e`egl kk_`el d Yli`f]jn\\g`gf`ekj`('`n`k_`k_`
gf`g\$`g`el d`li`Z`b`pgX[`%`cZbfi`kXg`<ekI`k`Z`f`e]id`k_`\\`egl`k`%

: cZbfi kXg; n`c`K`d`\\`#`egl`kk_`\\`n`d`\\`f]k_`\\`[`n`c`kd`\\`,`'`n`k_`k_`\\`gf`g\$`g`
el d`li`Z`b`pgX[`#`Xe[`k_`\\`e`j`d`Z`k`k_`\\`I`e`ki`d`j`i`%

+`%`e`XY`d`I`=`j`n`\\`g`

: cZbfi kXg Jn`\\`g`5`Jn`\\`g`k`j`d`Z`k`i`=`h`E`'`O`m`c`k`f`\\`e`XY`d`Y`f`k_`k_`\\`j`i`h`l`\\`e`Z`p`
j`n`\\`g`Xe[`k_`\\`X`d`g`c`k`[`\\`j`n`\\`g`%

,`%`e`XY`d`k_`\\`I`=`f`I`k`g`l`k`


O`e`^`Z`c`Z`b`f`i`k`X`g`Z`_`X`e`e`\\`c`[`j`g`d`p`X`i`\\`X`f]:`?`(`k`f`\\`e`XY`d`k_`\\`I`=`f`I`k`g`l`k`f):`?`(%`B`k`
k_`j`k`d`\\`#`k_`\\`R`=`,`'`T`Z`f`e`e`\\`Z`k`f`i`f]:`?`(`f`I`k`g`l`k`j`k_`\\`I`=`j`n`\\`g`j`^`e`X`c`Y`X`j`\\`[`f`e`
k_`\\`Z`i`i`\\`e`k`j`\\`k`e`^`%`P`f`I`Z`X`e`X`j`f`Z`c`Z`b`f`i`k`X`g`I`=`k`f`j`d`Z`k`i`F`E`i`k`f`\\`e`XY`d`k_`\\`I`=`
f`I`k`g`l`k`j`f`i`X`c`k_`\\`Z`_`X`e`e`\\`g`%

()`%` Kf`F`I`k`g`l`k`k_`\\`I`=`D`f`[`I`d`k`k`[`J`^`e`X`c`

F`I`k`g`l`k`Xe`8`D`d`f`[`I`d`k`k`[`j`^`e`X`c`n`k_`/`,`'`D`?`q]i`h`l`\\`e`Z`p`Xe[`\$`'`[`9`d`X`d`g`c`k`[`\\`
j`i`f`d`k_`\\`R`=`,`'`T`Z`f`e`e`\\`Z`k`f`i`f]:`?)`%`\\`k`k_`\\`8`D`d`f`[`I`d`k`k`f`e`[`\\`g`k`k`f`-`,`f`I`Xe[`k_`\\`
d`f`[`I`d`k`k`f`e]i`h`l`\\`e`Z`p`k`f`)'`b`?`q`%

(`%`\\`j`k`f`i`\\`k`f`j`X`Z`k`f`i`p`j`\\`k`e`^`

: cZbfi kXg` 5`G`i`j`\\`k`f`j`d`Z`k`k_`\\`g`i`j`\\`k`l`p`g`\\`k`f`i`=>Z`k`f`i`p`i`%`k_`\\`e`Z`c`Z`b`f`i`k`X`g`

 k`f`^`f`k`f`k_`\\`d`X`e`e`k`i]X`Z`%`cZbfi kXg`G`i`j`\\`k`f`i`j`k`f`i`\\`k_`\\`e`j`k`i`d`\\`e`k`k`f`
j`X`Z`k`f`i`p`[`\\`X`i`d`j`%`p`[`\\`X`i`d`#`k_`\\`d`f`[`I`d`k`k`f`e]f`i`Z`j`@`k`i`e`X`c`Xe[`k_`\\`d`f`[`I`d`k`e`^`
n`X`m`]f`i`d`j`J`e`\\`%

)`%`\\`d`Z`k`k_`\\`Z`_`X`e`e`\\`c`

: cZbfi kXg`k`f`j`d`Z`k`k`i`?`)%`k_`\\`d`X`e`e`k`i]X`Z`j`_`f`n`j`k_`X`k`?`)'`j`Z`i`i`\\`e`k`p`j`d`Z`k`k`[`%`

*`%`\\`k`k_`\\`Z`X`i`\\`i`j`i`h`l`\\`e`Z`p`Xe[`X`d`g`c`k`[`\\`

X`%`X`i`\\`i`j`i`h`l`\\`e`Z`p`

: cZbfi kXg`E`i`h`5`E`i`h`%`egl`kk_`\\`j`i`h`l`\\`e`Z`p`n`d`\\`/`,`'`n`k_`k_`\\`gf`g\$`g`
el d`li`Z`b`pgX[`#`Xe[`j`d`Z`k`k_`\\`I`e`ki`D`?`q`%

Y`%`X`i`\\`i`X`d`g`c`k`[`\\`

: cZbfi kXg`O`m`c`5`O`m`c`%`egl`kk_`\\`X`d`g`c`k`[`\\`n`d`\\`\$`'`n`k_`k_`\\`gf`g\$`g`
el d`li`Z`b`pgX[`Xe[`j`d`Z`k`k_`\\`I`e`ki`[`9`d`i`%`P`f`I`Z`X`e`X`j`f`[`i`\\`Z`k`p`Z`c`Z`b`f`i`k`X`g`
<ekI`k`Z`f`e]id`k_`\\`[`\\`X`i`d`k`e`k`[`9`d`%`

+`%`\\`k`k_`\\`8`D`d`f`[`I`d`k`k`f`e`g`X`i`X`d`\\`k`i`j`

X% cZb'fi kXg Df ['5 8D kf \ekli k_\`8D j\kē^`ekli]XZ\%

Y% cZb'fi kXg ; \gk_%k_\e`egl kk_\`8D [\gk_n\kē\`-' n`k_\k_\`gf g\$ giel d\i`Z

b\pgX[\Xe[j\`dZk_k_\`l e`kifl\%Pfl ZXe Xgf [i\ZkpZcZb'fi kXg <ekli kf
Zfe]id k_\`[\Xl d\l e`kfl%

Z% cZb'fi kXg ≡\h%egl kk_\`d f [l d\kfe]i\hl \eZp\kē\`)' n`k_\k_\`gf g\$ g
el d\i`Z b\pgX[#Xe[j\`dZk_k_\`l e`kib?q%`

[% cZb'fi kXg Jn`k_\` kf j\`dZk_i F E i kf \eXYd k_\`8D]l eZkfe%

, %eXYd k_\`l =`d f [l d\kfe`f l lgl k

: cZb'fi kXg DF; `e k_\`d Xe`ekli]XZ\ kf \eXYd k_\`d f [l d\kfe`f l lgl k`k_\`e
f e^ ZcZb'fi kXg k_\`Z_Xee\c[j gđpX\Xf]: ?) kf \eXYd k_\`l =`f l lgl kf]: ?)%
8kk_j`kd \#k_\`R =, ' TZfe e\Zk`i`f]: ?) `f l lgl k_j k_\`8D `d f [l d\k [j`^eXc
YXj\ [fe k_\`Zl i\ekj\kē^%



K@

: cZb'fi kXg DF; `e k_\`ekli]XZ\ kf j\`dZk_i F E i kf \eXYd k_\`d f [l d\kfe`f l lgl k]f i Xck_\`
Z_Xee\c`%Pfl `feq`nXek kf \eXYd k_\`d f [l d\kfe`f l lgl kf]: ?) #Zf ee\ZkXe\`d\ieXc
[j gđp`n`k_\`?; D@ekli]XZ\%k_\`ej\le[`k_\`j g\Z]\ [J: G@Zf d d Xe[kf \eXYd k_\`
d f [l d\kfe`f l lgl kf]: ?) fi fg\iXk fe k_\`\`d\ieXcp Zf ee\Zk [[j gđp`%

(* Kifl Yàj_ffkè^

K_j_ZXgkì'cìj k_\veZfi ekì\ [Xđì\j'f]; J>,''' Xe[k_\i'j fđ kfej%@k_\
]fđ n'e^'gif Yàd j'f ZI i#f ZXk Xe['i\j f ãh k_\'gif Yàd j'XZZfi['e^'k' k_\]fđ n'e^
jKgj%@k_\'gif Yàd j'jKcìg\ij'j k#Zf ekZkì @FCXe['gif n[\ 'pfi i'ej kì d\lek

'ejfid Xkfe'k' l'j%Z'fi 'ej kì d\lek'ejfid Xkfe#ZcZb'fi k'g' 5 JpjKd 'k'f YkXe
k_\ [\nZ\ 'ejfid Xkfe%

N_\e@gfn\i'fe'k_\ 'ej kì d\lek#k_\ 'ej kì d\lek j'k'pj YòZb'Xe[[f\j'ef k[]jgđp
Xepk_\e^%

(% _\Zb'n_\k_\i'k_\]Xe'j il ee'e^%

\$ @k_\]Xe'n fib'efid Xqp#Yi k k_\ j Zì\le j'k'pj YòZb#Z_\Zb'n_\k_\i'k_\
Zfee\Zkè^ ZXYđ k_XkZfee\Zj' k_\ j Zì\le'j'đ f j\%

\$ @k_\]Xe[f\j'ef kn fib'efid Xqp#k'e['ZXk j k_Xk k_\ 'ej kì d\lek_Xj]Xđ['k'
j'k'ì kì g%Gđ Xj\Xe[đ'k'XZZfi['e^'k' k_\ d\k_f[]jg\Z]\ [\ 'e'JKg)%

)% _\Zb'n_\k_\i'k_\'gfn\i j l ggp_Xj Y\le Zfee\Zk['Zf ii\Zqp'Xe[k_\'gfn\i
jn'k_Z_Xj Y\le k'ie\ ['fe%

*% _\Zb'n_\k_\i'k_\] j\ _Xj Y\le Yi iel%@pfi'e\ ['k' i\gđZ k_\] j\ #gđ Xj\ l j\
k_\ jg\Z]\ [] j\ ZB:), 'MK*%, '8Z%

+% \j'k'ì k k_\ 'ej kì d\lek X]kì]e'j_e^ k_\ XYf n' 'ej g\Zkfe j%

, %@k_\'gif Yàd j'Kcìg\ij'j k' #gđ Xj\ Zf ekZkì @FC%

K_\j\k'è'j Xì\ Zf ii\Z#Yi k k_\ n'Xh]fid 'j'ef k^e\i'Xk['gif g\i'q%

K_\i\ 'j'ef l =f l kgl k%

(% _\Zb'n_\k_\i'k_\ j'^eXcZfee\Zkè^ ZXYđ 'j' k^_kp'Zfee\Zk['k' k_\
Zf ii\jgfe['e^'R =, ' T Zfee\Zfi%

)% _\Zb'n_\k_\i'k_\ Zfee\Zkè^ ZXYđ _Xj 'ekieXc[Xd X^%\

*% _\Zb'n_\k_\i'k_\ Zfee\Zkè^ ZXYđ 'j' k^_kp'Zfee\Zk['k' k_\ k'j'k'ej kì d\lek%

+% _\Zb'n_\k_\i' Zf ii\jgfe['e^'l =Z_Xee\c'j \eXYđ['Xe[k_\ Zfđ i'f] k_\ l j\i

'ekì]XZ [] jgđp Xì\X'j k_\ j Xd\ Xj k_Xk f] k_\ Z_Xee\%

, % _\Zbn_\k\i k\ f l lgl kXd gcl [\`f]k\l =j^`eXcj kf f jd Xc#@p\j #X[d j k k_\`
f l lgl kXd gcl [\`gif g\i q%

K_\`l =f l lgl k`j ef kd f [l d\k [%

(% _\Zbn_\k\i k\ j^`eXcZf ee\Zke^`ZYd`j k^_kq`Zf ee\Zk [kf`k_\`
Zfii\jgfe[`e^R =, ' Tzf ee\Zfi%

)% _\Zbn_\k\i k\ Zf ee\Zke^`ZYd`_Xj`ekieXc[Xd X^`%

*% _\Zbn_\k\i k\ Zf ee\Zke^`ZYd`j k^_kq`Zf ee\Zk [kf`k_\`kjk`ejkil d\ek%

+% _\Zbn_\k\i`DF; Xe[l =X\`Yfk`leXYd [%

, % _\Zbn_\k\i k\`d f [l d\kf e`gXiXd \ki j\k`e^`j Zfii\ZkXe[X[d j k k_\`
gXiXd \ki`Xggif gi`Xk q%

-#@`d\kieXcd f [l d\kf e`j f l iZ`j`l j\ [#d Xb\ j l i\`k_Xk_\`d\kieXcj f l iZ`j`
Zfii\Zkq`Zf ee\Zk [Xe[f l lgl k`j j^`eXc`Bkk_\`jXd \ kd \#k_\`d\kieXcj f l iZ`
j_f l e`nfibn`k`e`k_\`j g\Z]\`iXe^`f]k_\`j^`eXc^`le\iXfi%

@`cj k f i j k g j n \ g #k_\`d`m`c[f \ j`ef k Z_Xe^`%

(%D Xb\ j l i\`k_Xk_\`j n \ g]l eZkfe`j`j\k k`i`O`m`c`f i`i`h`z`O`m`c`%

)#@`k_\`Z l i\`ekj n \ g]l eZkfe`j`j\k k`i`i`h`i`#k_\`d`m`c`n`d`n`c`ef k Y\`Z_Xe^` [%

K_\`LJ9j k f i X^` [\`m`Z\`Z`X`eef k Y\`i\`Zf`e`q [%

(% _\Zbn_\k\i k\ LJ9j k f i X^` [\`m`Z\`Z`X`e`nfib`efid Xq`n`_`e`Zf ee\Zk [kf`
f k_\`i`ejkil d\ekj`fi`G` %

)%D Xb\ j l i\`k_Xk_\`LJ9j k f i X^` [\`m`Z\`l j\`j`X`=d`j`_`kpg`%K`j`ejkil d\ek[f \ j`
ef k j l g g f i k_Xi [n X\`LJ9j k f i X^` [\`m`Z`%

*%B]k i i\`j k i k e^`k_\`ejkil d\ek`#ej\i k k_\`LJ9j k f i X^` [\`m`Z\`X^`X`e`kf`Z_\`Zb`
n_\`k\i`knfibj`efid Xq`%

+#@`k_\`LJ9j k f i X^` [\`m`Z\`j k c`Z`X`eef k n f i b`efid Xq`#g`d`Xj\`Zf e k Z k l @`F`C`%

K_\`g\i]f id XeZ j g\Z]`Zk k f e j`k j k`j`]X d [%

(% _\Zbn_\k\i k\`ejkil d\ek`j`n`k`e`Z`X`Y`i`X`k`f`e`g\i`f [%

)% _\Zb'n_\k\i'k\`ejkil d\ek_Xj`Y\le'nXid\ [lg]fi`XkδXjk+' d`el KJ`Y\]fi\`
 k_\`KjK%

*% _\Zb'n_\k\i'`ejkil d\ek`j`Te[\i'k\`jg\Z]\` [Kd g\iXk i\`%
 +% fe]id`n_\k\i'k_\`KjK`j`Te[\i'jkife^\$d X^e\kZ\verif ed\ek%

, % _\Zb'n_\k\i'k\`gf n\i`ji ggç\j`f`k\`ejkil d\ekXe[`k_\`KjKj`pj`Kd`_Xn`X`
 j`kife^`ekI]\i\veZ%

-% _\Zb'n_\k\i'k\`g\i]fid XeZ`f`k_\`KjK[\mZ\`j\` [d`\k`k_\`i\hl`i\`d\ek%

. %D Xb\`j`i\`k_Xk`k_\`KjK[\mZ\`j\` [j`n`k`e`k_\`ZcYiXkfe`g\i`f` [%
 /% _\Zb'n_\k\i'k_\`KjK[\mZ\`j\` [d`\k`k_\`i\hl`i\` [Zfe[\`Kfej`f`k_\`d`Xel`X%

0% _\Zb'n_\k\i'Xck_\`Zfee\Zkfej`X\`k^`l%

(' % _\Zb'n_\k\i'XepZYδ`_Xj`ekIeXc[Xd`X^`%
 ((%D Xb\`j`i\`k_Xk`k_\`f`g\iXkfej`Zfe]fid`k`j\`k`e^`j`Xe[`gif`Zjj`j`n`_Z`_X\`
 i\hl`i\` [Yp`k_\`g\i]fid XeZ`m\i`]Zkfe`d`Xel`X%

()% _\Zb'n_\k\i'k_\`iifi`ZXZI`αkfe`_Xj`]X`dj`%
 (*% fii\Zqpl`e[\ij`kXe[`k_\`[\`]e`kfej`f`]i`Kpg`Zα`#Xe[`i`E`f`d`e`Xα`n`Xδ` \j`]fi`k`j`
 gif`[I`Z%

Kpg`ZXd\kpg`Zc`g\i]fid XeZ`#n`_Z`_/'`g\iZekf`]k_\`d`\Xj`i\`d\ek\i\j`i`dj`n`c`
 d`\kXkif`d`Kd`g\iXk`i\`Z`ggif`od`Xk\φ),` Z`K_\`[XkX\`ef`kn`Xi`Xek\`Xe[
 [f`ef`k`eZt`[\`k_\`d`\Xj`i\`d\ek\`eZ\i`k`ekφ%

E`f`d`e`Xc\k_\`og\Zk[\`d`\Xe`fi`Xm\i`X^`\`g\i]fid XeZ`fi`X`[\j`^`e\`Xk\`Y\`K`
 ž`I`Z`_Xj`k_\`,` Z`fee\Zf`i`Z`K_\`[XkX\`ef`kn`Xi`Xek\`Xe[`X\`d`\Xj`i\` [Xk`
 if`d`Kd`g\iXk`i\`Z`ggif`od`Xk\φ),` Z`%

(+ 8gg\le[`o

(+% 8gg\le[`o 818ZZ\jjfi`j Xe[Fgkfe`Cjk

	; \jZ`gkfe	Fi[\i'Ef%
Df[\c	)\$ ? D`ZifnXm`J`^eXc>\eliXfi#Ob?qkf)' >?q	; J>,)')
	+\$? D`ZifnXm`J`^eXc>\eliXfi#Ob?qkf)' >?q	; J>,)' +
	-\$? D`ZifnXm`J`^eXc>\eliXfi#Ob?qkf)' >?q	; J>,)' -
	/\$? D`ZifnXm`J`^eXc>\eliXfi#Ob?qkf)' >?q	; J>,)' /
	)\$ ? D`ZifnXm`J`^eXc>\eliXfi#Ob?qkf `() >?q	; J>, ()
	+\$? D`ZifnXm`J`^eXc>\eliXfi#Ob?qkf `() >?q	; J>, () +
	-\$? D`ZifnXm`J`^eXc>\eliXfi#Ob?qkf `() >?q	; J>, () -
	/\$? D`ZifnXm`J`^eXc>\eliXfi#Ob?qkf `() >?q	; J>, () /
JkXe[Xi[8ZZ\jjfi`j	Gfnvi : XYd	\$
Fgkfej	G f \ Df [I d k f e	; J>, ' ' ' \$GLC
	G f \ KXe`>\eliXfi	; J>, ' ' ' \$GL>
	8eXf ^ Df [I d k f e	; J>, ' ' ' \$SD;
	? ^ _ JkY`dp: f Zb	F : CF \$ ' /
	I XZb`Df I ekBk	I D)' *(

E FK<

=fi Xck\`d Xe]iXd \j #XZZ\jj fi \j #Xe[f gkf ej #gdXj \ Zf ekXZk\`f ZXcf]]Z\ f]I @F C%

(+% 8gg\le[`o'91N Xi Xekp

I @F CK< ?EF CF >@J : F %OK; %Z \i\`eX]ki i\Ni\ [kf Xj I @F CznXiXekj `k_Xkk\ gif [I Zkd Xe]iXd \Xe[`gif [I ZkXZZ\jj fi \j n`c\ \ji\ \jif d [\]\Zj `e`d Xki`Xj`Xe[n fibd Xej `g`n `k`e `k \nXiXekp`g\i`f [%@Xgif [I Zkgif n\j [\]\Zkm`n `k`e `k \nXiXekp`g\i`f [# @F C^I XiXek\j]i\ i\gdZd \ekfi i\gXi]fi k\ [\]\Zkm gif [I Z%

Kf `^ki\gXi j\imZ #gdXj \ Zf ekXZkpf I i`e\Xi\jkl @F CjXdj fi j\imZ `f]]Z%

K_\i\`j `ef `fk_\i`nXiXekp#Agi\jj\ [fi `d gc\ [#aZgkjI Z_ Xj `j \ogi\jj`j\k]fik _\i\`e`fi`fk_\i`XggcZYd`nXiXekpZi[%K_\i\`j `ef `d gc\ [`nXiXekp`f] d\iZ_XekY`dp`fi]le\jj]fi XgXikZi`xi`gl`igfj\%Le[\i`ef `ZiZi`djXezj`j_Xc I @F CY\`cYd`]fi `Xep`Zf`ej`\hl`lekX`#e[`i\Z`#ejI `e`#fi`jg\ZXc[Xd X^j]fi Xep Yi\XZ_`f]nXiXekp`e`Xep`Zj\%

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