J c`VYhf]YV`XYf`6i g`b]Yb. ?]Y`Yf
J Yf_Y`fg[ YgY`gW UZh`j YfVYggYfh
: U`fd`Ub

8]Y`?]Y`Yf`J Yf\_Y`fg[YgY`gW UZh`Yfk Y]hYfh`UV`GYdhYa VYf`]\f
6i gUb[YVchž`XU`bYi Y` : U`fYf`Y]b[YghY``h`k i fXYb"

8]Y`?]Y`Yf`J Yf\_Y`fg[YgY`gW UZh`f? J ; Ł`[ ]Vh`Y]bYb`VYXYi hYbXYb
GWf]h]b`XYf`J YfVYggYfi b[ ]`fYg`6i gj Yf_Y`fg`VY`Ubbh"5V`XYa
_ca a YbXYb`GYdhYa VYf`k]fX`XUg`i bhYfbY`a Yb`a Y`fYfY`gY]bYf
k]W]h[Yb`6i g`b]Yb`k ]YXYf`]a `j c`Yb`l a ZUb[ `VYhfY]VYb"8]Yg`]gh
Y]bY`YfZfYi `]WY`9bhk ]W`i b[`Z0f`X]Y`Bi hnYf]bbYb`i bX`Bi hnYf`XYf
ÖZZYbh]W]Yb`J Yf\_Y`fga]hhY`ž`XYbb`]b`XYb`Y`hnhYb`nk Y]`š`fYb`k Uf
XYf` : U`fd`Ub`Ui Z[fi bX`Y]bYg`U`i hYb` : U`fYfa Ub[ Y`g`ghUf_
Y]b[YgWf`Äb`h"Bi b`gc`X]Y`@U[ Y`VYggYf`k YfXYb"

⊖`Y]bYf`cZZ]n]Y`Yb`A]hhY]i b[`U`h`X]Y`? J ; `Yf`_`Äfhž`XUgg`X]Y
G]hi Uh]cb`]a `l bhYfbY`a Yb`g]W`j YfVYggYfh`U`h"8Yf
DYfgcbU`a Ub[ Y`ž`XYf`X]Y`? J ; `0VYf`Ub[ Y`NY]h`]\]bk Y[ `VY`UghYh
\Uhž]gh`b]W]h`a Y`f`[Un`gc`Xf0W`YbX"⊖gVYgcbXYfY`X]Y`@]b]Y`%%
k]fX`UV`XYa `YfghYb`GYdhYa VYfk cWYbYbXY`k ]YXYf`]a
fY[Y`a Ä»][ Yb`NY`b!A ]bi hYb!HU`_hj Yf_Y`fYb"8]Yg`[ ]`h]b[ `Y]W]Yf
K Y]gY`Z0f`X]Y`6i g`b]Yb`%&ž`% ž`%( `i bX`%)"

<]bhYf[fi bX`XYf`DYfgcbU`dfcV`Ya Uh]_

8Yf` : U`fYfa Ub[Y`]gh`Y]b`DfcV`Ya ž`XUg`j]Y`Y
J Yf_Y`fg[ YgY`gW UZh`Yb`]b`8Yi hgW`UbX`VYhfcZZYb`U`hž`i bX`X]Y
? J ; `k Uf`XU`\_Y]bY`5i gbU`a Y"⊖`XYf`NY]hž`]b`XYf`bi f`Y]b
fYXi n]YfhYf` : U`fd`Ub`Ub[YVchYb`k YfXYb`_cbbhYž`k UfYb`j]Y`Y
A YbgW]Yb`Ui Z`5`hYfbUh]j Yb`Ub[Yk]YgYbž`XU`X]Y`6i ggY`b]W]h]b
XYf`< Äi Z[ \_Y]h`Z `fYbž`X]Y`Z0f`DYbX`Yf`i bX` : U`f[ÄghY`bchk YbX][

k Uf" A]h'XYf'9]bghY"i b['bYi Yf': U\ fYf]bbYb'i bX': U\ fYf'Yf\À'h'X]Y
?J; 'b]W\h'bi f'bYi Yb'GW\k i b[ž'gcbXYfb'V]YhYh'Ui W\ 'Y]bY '@Øgi b[
ZØf'VYj c fghY\YbXY '<YfUi gZcfXYfi b[Yb']a '6YfY]W\ 'XYf'A cV']h'Àh"

8]Y'5bk YfVi b['bYi Yf': U\ fYf]bbYb'i bX': U\ fYf'k Uf'Y]bY
Xf]b[']W\Y' Bchk YbX][_Y]hž'X]Y'Ui W\ 'X]Y'5i Za Yf_gUa _Y]h'XYf
² ZYb'h]W\ _Y]h'Ui Z'X]Y'5fVY]hgVYX]b[i b[Yb']b'XYf'6fUbW\ Y'Yb_hY"
8Yf'Ub\U'hYbXY': UW\ _f'ÀZhYa Ub[Y'ghY'h'b]W\h'bi f'X]Y'?J; ž
gcbXYfb'X]Y [YgUa hY'6fUbW\ Y'j cf[fc»Y '<YfUi gZcfXYfi b[Yb"
8U\Yf'YfZcfXYfh'Yg']bbcj Uh]j Y'5bg'ÀhnY'i bX'Y]b'gh'Àf_YfYg
5i [Yba Yf'_Ui Z'X]Y'5i gV]'Xi b['i bX'6Y'Ub[Y'XYf'6YgW\ ÀZh][hYb"
8]Yg'_ØbbhY']b'XYf'Ni _i bZi'XUni 'VY]hfU[Ybž'À\ b']W\ Y'9b[d'ÀggY
ni 'j Yfa Y]XYb"

Dcg]h]j Y'9b'hk]W_`i b['ZØf'XYb'ØZZYb'h']W\ Yb
B U\j Yf_Y\ f

F Yhfc[fUXY'A cV']h'Àh]gh]b'XYf'\Yi h][Yb'NY]h'VYgcbXYfg'k]W\h][ž
XU'X]Y'6Øf[Yf]bbYb'i bX'6Øf[Yf'K Yfh'Ui ZY]b'Z'ÀW\YbXYW_YbXYg
i bX' [i h'Zi b_h]cb]YfYbXYg'ØZZYb'h']W\ Yg'J Yf_Y\ fggmghYa 'Y[Yb'"8]Y
F ØW_Y\ f'ni 'Y]bYa 'j c`k Yfh][Yb': U\ fd'Ub'_ØbbhY'a Y\ f
A YbgW\ Yb'XUni 'Yfa i h][Ybž'X]Y'6i ggY'i bX'6U\ bYb'ni 'bi hnYb'"8 U
XUg'6Yk i ggghY]b'ZØf'bUW\ \U'h][Y'A cV']h'Àh'ni b]a a hž'_ØbbhY'X]Y
F Yhi b['XYg': U\ fd'Ubg'Ui W\ 'ja '9]b'_Ub['a]h'XYb'N]Y'Yb'XYf
GhUXhi bX'XYf'FY [ ]cb'ghY\Ybž'X]Y'XYb'ØZZYb'h']W\ Yb'BU\j Yf_Y\ f
U'g'GW\ 'ØggY'ni 'Y]bYf'VYggYfYb '@VYbgei U'h'Àh]b'XYf'GhUXh
ZØfXYfb'a ØW\ hYb"

8Yf'9]bgUhn'j cb'6i g`b]Yb']b'Y]bYf' [i h'[YhU_hYhYb': fYei Ybn
VYXYi hYhž'XUgg'a Y\ f'A YbgW\ Yb'X]Y'A Ø[']W\ _Y]h'\ UVYbž'XYb
ØZZYb'h']W\ Yb'J Yf_Y\ f'Ui g'Y]bYf'J]Y'nU\`j cb'; fØbXYb'ni 'bi hnYb'
gY]'Yg'ni f'5fVY]h'cXYf'i a ': fYi bXY'ni 'VYgi W\ Yb'"J cf'U''Ya 'ZØf
DYfgcbYbž'X]Y'Ui Z'XYb'ØZZYb'h']W\ Yb'J Yf_Y\ f'Ub[Yk]YgYb'g]bXž
ghY''Yb'gc`W\ Y'9b'hk ]W\_`i b[Yb'Y]bY'9f'Y]W\ hYfi b['i bX'Y]b'GW\ f]h
]b'X]Y'f]W\ h][Y'F]W\ hi b['XUf"

8Yf'K Y['ni f'Bcfa U'h'Àh'YfgW\ Y]bh'bUW\ 'XYb'k Y]hfY]W\ YbXYb
J Yf'ÀbXYfi b[Ybž'X]Y'X]Y'?J; 'i bX'X]Y [YgUa hY'6fUbW\ Y']b'XYb

Yhnyb' d\ fYb' Yf'YVh'\ UVYbž'bi b' [fY]ZVUF" A]h'XYf'j c`ghÅbX][Yb
F ØW_ Y\ f'ni a 'VY'YVhYb'6i gZU\fd'Ub'ghY`h'X]Y'?J; 'X]Y'K Y]WXYb
ZØf'Y]bY'VYggYfY'5bV]bXi b['i bX'Y]bY'\ Ø\YfY'Ni Zf]YXYb\Y]h'XYf
: U\ f[ÅghY"

5i W\ ; Y`X`gd]Y`h`Y]bY`F c`Y

9g'V`Y]Vh'UVni k UfhYbž'k ]Y'g]W\`X]Y'J YfÅbXYfi b[Yb'Ui Z'X]Y
: U\ f[UghmU\`Yb'Ui gk ]f\_Yb'k YfXYbž']bgVYgcbXYfY'ja ' < ]bV`]W_`Ui Z
X]Y'Z]bUbn]Y`Yb'F U\ a YbVYX]b[i b[Yb'XYf'?J; 'i bX'X]Y
A Ø[`]W\`Y]hž'X]Y'GYfj]W'g'bUW\`U'h]['YfVf]b[Yb'ni ' _ØbbYb"8i fW
XYb'Xi fW\`7CJ Æ!%-`Ui g[Y'ØghYb'F ØW_[Ub['XYf': U\ f[UghmU\`Yb
gU\`g]W\`X]Y'; YgY`gW\`UZh'a]h'Yf\YV`]W\`Yb'Z]bUbn]Y`Yb
< YfUi gZcfXYfi b[Yb'_cbZfcbh]Yfhž'XcW\`X]Y'U\_hi Y`Y'9bhk]W_`i b[
_ØbbhY`Y]bY'K YbXY'VYXYi hYb"

⇒ XYf'bÅW\ghYb'NY]h'k]fX'X]Y'?J; 'X]Y'G]hi Uh]cb'k Y]hYf
VYcVUW\hYb'i bXž'gcZYfb'YfZcfXYf]W\ž'5bdUggi b[Yb']b']\fYa
5b[YVch'j cfbY\ a Yb"8]Y'F ØW_ Y\ f'XYf'@]b]Yb']b'Y]bYb'fY[i `ÀfYb
6Yhf]YV'k]fX'Ui Z'YXYb': U`U'g'dcg[h]j Yg'G][ bU`[YXYi hYh'k YfXYb
i bX'_ØbbhY'dchYbn]Y`Ui W\`XUni 'ZØ\ fYbž'XUgg'UbXYfY
J Yf_Y\ fgUbV]YhYf'X]YgYa '6Y]gd]Y`Zc`[Yb"

5_hi Y`Y`< YfUi gZcfXYfi b[Yb']a`ØZZYbh`]W\Yb B U\j Yf_Y\ f

8]Y'?]Y`Yf'J Yf\_Y\ fg[ YgY`gW\`UZh'f?J; 'L']gh'b]W\h'XUg'Y]bn][Y
l bhYfbY\ a Ybž'XUg'a]h'DYfgcbU'a Ub[Y`ni ' _Åa dZyb'\Uh"8Yf
ØZZYbh`]W\Y'B U\j Yf\_Y\ f']b'8Yi hgW\`UbX'ghY\h'gY]h' d\ fYb'i bhYf
8fi W_ž'k Ug'cZh'Ui Z'XUg'5'hYf'i bX'X]Y'5fVY]hgVYX]b[i b[Yb'XYf
: U\ fYf'ni fØW_ni ZØ\ fYb']gh"J]Y`Y'6YgW\`ÅZh][hY'n]Y\Yb'Yg'j cfž']b
6fUbW\Yb'ni 'UfVY]hYbž'X]Y'VYggYfY'5fVY]hgnY]hYbž'\ Ø\YfY
; Y\`Å'hYf'cXYf'UhhfU\_h]j YfY'Gcn]U`Y]ghi b[Yb'V]YhYb"8]YgY
DfcV`Ya Uh]\_k ]fX'Xi fW\`XYb'XYa c[fUZ]gW\Yb'K UbXY`j YfghÅf_hž
XU'j]Y`Y'YfZU\ fYbY': U\ fYf']b'XYb'F i \YghUbX'[Y\Yb'i bX'b]W\h
[YbØ[YbX'B UW\k i W\g'bUW\ fØW_h"6Yf]W\hYb'ni Zc`[ Y'\_ØbbhY`XYf
DYfgcbU'a Ub[Y`XUni 'ZØ\ fYbž'XUgg'j ]Y`Y'J Yf_Y\ fgi bhYfbY\ a Yb

]b`8Yi hgW`UbX`]\fY` : U\fd`ÀbY`Y]bgWfÀb`\_Yb`cXYf`gc[ Uf`Y]bnY`bY
@]b]Yb`Y]bghY`Yb`a ØggYb`"E i Y`Yb`k]Y`X]Y`6ØfgYb`!NY]hi b [
Xc_i a Ybh]YfYb`X]YgY`9bhk]W`\_i b[ `fY[Y`a À»]["

F YU_h]cbYb`XYf` : U\ f[ÀghY`i bX`XYf
2 ZZYbh`]W`_Y]h

8]Y`FØW`_Y`f`ni`Y]bYa`j`c`ghÀbX][Yb` : U\fd`Ub`k ]fX`j`cb`j` ]Y`Yb`
: U\ f[ÀghYb`U`g`dcg]h]j`Y`9bhk ]W`_i b[`k U\ f[ Ybca`a`Yb`"?i`bXYb`
VY`\_U[ hYb`Ài`Z][ žXUgg`X]Y`Y]b[ YgWfÀb`_hYb` : U\fd`ÀbY`XYb`
Ni [Ub[`ni`k` ]W`h][Yb`8]YbghY]ghi`b[Yb`VYY]bhfÀW`h][hYb`
I`a`ZfU[YfY[YVb]ggY`nY][ Ybž`XUgg`X]Y`Ni`Zf]YXYb`Y]h`XYf` : U\ f[ÀghY`
ghUf`\_a`]h`XYf`DØb`\_h]W`_Y]hi`bX`XYf`<`Ài`Z][ \_Y]h`XYf`
6i`gj`YfV]bXi`b[ Yb`_cffY`Yfh`"Gc`VYf]W`hYhY`XUg`8Yi`hgW`Y`
=bgh]hi`h`ZØf`B`c`f`a`i`b[`Y`"J`"fB`=B`Łž`XUgg`X]Y`A`Y`f`Y]h`XYf`
: U\ f[ÀghY`]b`Y]bYf`U`_hi`Y`Yb`I`a`ZfU[ Y`Ub[Ya`YggYbY`HU`\_hnY]hYb`
U`g`gY`f`k` ]W`h][`YfUW`hYh`"8]Y`
ZØ`fhYb`b]W`h`bi`f`ni`i`ba`i`hž`gcbXYfb`Ui`W`ni`Y]bYa`F`ØW`_U[Ub[
XYf`Bi`hnYfnU`Yb`ja`ÒZZYbh`]W`Yb`BU`j`Yf`\_Y`f`ž`k`Ug`X]Y`?`J` ;`i`bX`
UbXYfY`J`Yf`\_Y`fgVYhf]YVY`ni`g`Àhn`]W`i`bhYf`8fi`W`\_gY`hnhYž`
@Øgi`b[ Yb`ni`Z]bXYb`"

Ni`\_i`b`ZhgUi`gV`]W`_Y`i`bX`a`Ò[`]W`Y`
9bhk]W`\_i`b[`Yb`

8]Y`?`J` ;` `U`h`Ub[ Y`_ØbX][hž`]\fY` : U\fd`ÀbY`k]YXYf`ni`
bcfa`U`]g]YfYbž`k`Ug`dcg]h]j`]gh`"8YbbcW`V`Y]Vh`X]Y` : fU[ Yž`k` ]Y`
bUW`U`h][`X]YgYf` : cfhgW`f]hh`gY]b`k`]fX`"8]Y`6fUbW`Y`_Øb`bhY`]b`
XYb`\_ca`a`YbXYb`>U`fYb`[Yk`]bbYbž`k`Ybb`a`Y`f`5bfY]nY`ni`f`
J`YfZØ[ i`b[`ghY`Ybž`i`a`XUg`6Yfi`ZgV]`X`XYg`6i`gZU`fYfg`UhhfU`_h]j`ni`
[YghU`hYb`"8Yf`9]bgUhn`a`cXYfbYf`HYW`bc`c[ ]Ybž`VY]gd]Y`gk`Y]gY`
Xi`fW`X]Y`9]bZØ`fi`b[ `j`cb`Ui`hca`Uh]g]YfhYb`6i`ggYbž`\_Øb`bhY`
YVYbZU`g`Y]bY`@Øgi`b[`XUfghY`Ybž`i`a`X]Y`DYfgcbU`bch`ni`i`]bXYfb`"
@Ui`h`K`]ggYb`gW`UZhgnYb`hfi`a`6Yf`]b`ZØf`Gcn]U`Zc`fgW`i`b[
fK`N6Ł`_Øb`bhYb`gc`W`Y`9bhk ]W`_i`b[ Yb`XUni`VY]hfU[ Ybž`gck`c`
X]Y`6Yhf]YVg`_c`ghYb`ni`gYb`_Yb`U`g`Ui`W`X`Yb` : U`f`Y`fa`Ub[ Y`
`Ub[ Zf]gh][ `ni`UXfYgg]YfYb`"

þg[YgUa h]ghX]Y`F ØW\_\_Y\`f`ni a `fY[i `ÅfYb` : U\`fd`Ub`XYf`? J ; `Y]b
GWf]hh`b`X]Y`f]W`h][Y`F ]W`hi b[``8]Y`Ni `i bZh`XYg`ÒZZYbh`]W`Yb
BU\j Yf_Y\`fg`\`Åb[ h`YXcW`j cb`Y]bYf`J]Y`nU`\`j cb` : U`hc`fYb`UVž
Y]bgW`Y`Y»`]W`XYf`5bk YfVi b[ `i bX`6]bXi b[ `ei U`]Z]n]YfhYf
A]hUfVY]hYf`i bX`XYf`5bdUggi b[ `Ub`X]Y`6YXØfZb]ggY`XYf
: U\`f[ `ÅghY`"

8YhU]`g

6Ygi W`Yb`G]Y`i bg`Ui Z.`b!U["XY