

GhY][YbXY '5fVY]hg`cg][_Y]h`]b
BcfXXYi hgWk`UbX. '9]b
Gca a Yfd\`Abca Yb3

⇒ a ' ð '] & \$ & (' gh]Y [' X]Y '5fVY]hg`cgYbnU\`]b`8Yi hgWk`UbX`Ui Z
& ž \$- 'A]`]cbYb" 'I fgUWkY`g]bX`gWk UWkYg
K]fhgWk UZh]k UWkghi a 'i bX`gU]gcbU`Y`9ZY`_hY"

GhUbX. " %"\$+ "&\$&(' %& . \$% ' I \ f`

5i Z`HfYbXg`UWk hYb. '8Yf`9]bZ`i gg`XYf
Gca a Yfa cbUhY`Ui Z`X]Y`5fVY]hg`cg][_Y]h`]b
BcfXXYi hgWk`UbX

8]Y`U`_hi Y`Y`5fVY]hga Uf_hg]hi Uh]cb`]b`BcfXXYi hgWk`UbX`nY][h`Y]bY
VYgcf[b]gYffY[YbXY`9b]k]W`_i b["'8]Y`NU\`XYf`5fVY]hg`cgYb`]gh
]a ' ð '] & \$ & (' XYi h]Wk`Ub[Ygh]Y[Ybž`k Ug`Ui Z`a Y\`fYfY`gU]gcbU`Y
i bX`k]fhgWk UZh]WkY` : U`_hc`fYb`ni fi W`_ni ZØ\`fYb`]gh" K `A\`fYbX`X]Y
5fVY]hg`cgYbei chY`Vi bXYgk Y]h`VY]` * ž\$`DfcnYb`h`]Y[hž`ghY][Yb`X]Y
K YfhY`]b`Y]bnY`bYb`6i bXYg`AbXYfb`i bhYfgWk]YX`]Wk`ghUf`_`Ub"

⇒ [YbXUfVY]hg`cg][_Y]h`i bX`] \ fY
5i gk]f`_i b[Yb`Ui Z`XUg`5i gV]`Xi b[gi a ZY`X

9]b`k]Wk]h[Yf`5gdY`_h`XYf`U`_hi Y`Y`b`GhUh]gh]`_]gh`X]Y`Ni bU\`a Y`XYf
ð [YbXUfVY]hg`cg][_Y]h`" ðbgVYgcbXYfY`]b`B]YXYfgUWk]gYb`i bX
<Ua`Vi f[`nY][h`g]Wk`ž`XUgg`' b[Y`A`YbgWkYbž`X]Y`Y]bY`5i gV]`Xi b[
UV[YgWk`cgYb`\UVYbž`j`cfØVYf[Y\`YbX`]b`XYf`5fVY]hg`cg][_Y]h`
`UbXYb" `8]YgY`9b]k]W`_i b[` _Ubb`bY[Uh]j`Ui Z`X]Y`ni`_ØbZh][Yb
5i gV]`Xi b[gnU\`Yb`Y]b[Y\`Ybž`XU`g]Y`Y]b`G][bU`XUZØf`gYbXYhž
XUgg`]bgVYgcbXYfY`i bhYfbY\`a Yb`]a`Gca a Yf`cZi`_Y]bY`bYi Yb

GhY`Yb`VYgYhnYb"

F Y []cbU`Y`I bhYfgWk]YXY. `9]b`6`]W`Ui Z`X]Y
6i bXYg`AbXYf

⊕`A YW`YbVi f[!J cfdca a Yfbž`B]YXYfgUWk gYbž`<Ua Vi f[`i bX
GWk`Ygk][!<c`ghY]b`nY]Wk bYh`g]Wk`Y]b`YhYfc[YbYg`6]`X`UV" `⊕
<Ua Vi f[`Y] [h`X]Y`5fVY]hg`cgYbei chY`VY]`, ž%`DfcnYbž`k`À`fYbX
GWk`Ygk][!<c`ghY]b`a]h) ž*`DfcnYbh`VYggYf`UVgWk bY]XYh" `K`À`fYbX
X]Y`NU`Yb`]b`GWk`Ygk][!<c`ghY]b`fY`Uh]j`ghUV]`V`Y]VYbž`]gh`XYf
FØW`[Ub[`]b`A YW`YbVi f[!J cfdca a Yfb`i`a` (ž*`DfcnYbh`]a
J Yf[`Y]Wk`ni`a` J cf`U`f`VYgcf[b]gYffY[YbX"

K]fhgWk UZh`]Wk Y`F U`a`YbVYX]b[i b[Yb`i bX
]`fY`F`c``Y

9]b`VYXYi hYbXYf`; fi bX`ZØf`XYb`5bgh]Y[`XYf`5fVY]hg`cg][`_Y]h]gh
XUg`gWk`k`UWk`Y`K`UWk`ghi`a` `XYf`XYi`hgWk`Yb`K`]fhgWk`UZh"
I bhYfbY`a`Yb`g]bX`]b`XYf`U`_hi`Y`Yb`G]hi`Uh]cb`j`Yfi`bg]Wk`Yfhž`k`Ug
X]Y`9]bghY`i`b[`bYi`Yf`A`]hUfVY]hYf`VYhf]Zh" `8`Ug`VYXYi`hYhž`XUgg`X]Y
5fVY]hga`Uf`_hVY`YVi`b[ž`X]Y`ZØf`XYb`:`fØ`]b[`Yfk`UfhYh`k`i`fXYž
Ui`g[YV`]YVYb`]ghž`k`Ug`g]Wk`bi`b`]b`XYb`Gca`a`Yfa`cb`UhYb
VYa`Yf`_VUf`a`UWk`h"

8 Yf`9]bZ`i`gg`Ui`Z`X]Y`; Ya`Y]bXY. `K`Ug
VYXYi hYh`XUg`ZØf`X]Y`; YgY`gWk`UZh3

8]Y`ghY][YbXY`5fVY]hg`cg][`_Y]h`Uh`b]Wk`h`bi`f`k`]fhgWk`UZh`]Wk`Y
⊕`d`]_Uh]cbYbž`gcbXYfb`VYY]bZi`ggh`Ui`Wk`XUg`gcn]U`Y`; YZØ[Y`XYf
VYhfc`ZYbYb`FY[]cbYb" `⊕`<Ua Vi f[`a`UWk`Yb`A`YbgWk`Yb`a`]h
A][fUh]cbg`]bhYf[fi bX`a`]h`Yfk`Y]Y` (\$`DfcnYbh`XYf`9fk`YfVg`cgYb
Ui`g" `8`UXi`fWk`j`YfgWk`ÀfZyb`g]Wk`VYghY`YbXY`DfcV`Ya`Yž`k`]Y`gcn]U`Y
I`b[`Y]Wk`Y]hYb`i`bX`⊕`hY[fUh]cb" : Øf`X]Y`VYhfc`ZYbYb`; Ya`Y]bXYb
_Ubb`X]Yg`ni`Yf`Ø`hY`a` `8`fi`W`_Ui`Z`gcn]U`Y`8]YbghY`ZØ`fYb"

: Un]h. `9]bY`_ca`d`YI`Y`G]hi`Uh]cb`YfZc`fXYfh

`Ub [Zf]gh)[Y `@Øgi b [Yb

8]Y`U_hi`Y`Y`@U[Y`Ui Z`XYa `5fVY]hga Uf_h`b`BcfXXYi hgW`UbX
nY)[hž`XUgg`gU]gcbU`Y`GWk Ub_i b [Yb`b`XYf`5fVY]hg`cg)[_Y]h`j`cb
j`YfgW`j`XYbYb` : U_hcfYb`UV`Åb [Yb`"i`a`Y]bY`bUW`U`h)[Y
J`YfVYggYfi b [`ni`Yfn]Y`Ybž`g]bX`A U» bU`a`Yb`bØh)[ž`X]Y`b]W`h`bi`f
X]Y`_i`fnZf]gh)[Y`5fVY]hga Uf_hg]hi`Uh]cbž`gcbXYfb`Ui`W`Ub [Zf]gh)[Y
k`]fhgW`UZh]W`Y`DYfgdY_h]j`Yb`ZØf`U`Y`5`hYfg[fi`ddYb`i`bX`gcn]U`Y
GW`W`hYb`VYfØW_g]W`h)[Yb`"8]Y`<YfUi`gZcfXYfi b [Yb`XYg
5fVY]hga Uf_hYg`YfZcfXYfb`Y]b` [Ya`Y]bgUa`Yg`J`cf[Y`Yb`j`cb
Dc`h]_ž`K`]fhgW`UZh`i`bX` ; YgY`gW`UZh`

: Øf`Y]bY`j`c`ghÅbX)[Y`9fZUggi b [`XYf`U_hi`Y`Yb
5fVY]hga Uf_hg]hi`Uh]cb`]gh`Yg`k`]W`h)[ž`Ui`W`X]Y`_ca`a`YbXYb
A`cbUhY`ni`VYcVUW`hYb`i`bX` [YY][bYhY`A U» bU`a`Yb`ni`Yf[fY]ZYbž
i`a`X]Y`6YgW`ÅZh][i`b [`ni`ZØfXYfb`i`bX` ž [YbXUfVY]hg`cg)[_Y]h
U_h]j`Yb]h[Y [Ybni`k`]f_Yb`

· · B 5;

8YhU]`g

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