

=a a][fUh]cb
Gh Xn]b[



Gh Xn]b[! i b]j Yfg]hm

7 nWV

F 1%#U'VmW'gy'nUdgU#U'bUj mgc_Á' _c`Y"
GhU]b[`h.Uhmci `k Ubhlc`Ybfc`

J]YhbUa YgY

HÉ]a i b[\]XUb\j 1%a hlf b[í]\ W

F 1%#U'VmW'gy'nUdgU#U'bU'SSSSSSSSSSSS"
GhU]b[`h.Uhmci `k Ubhlc`Udd`mZcf`UVéi fgY

HÉ]a i b í Bb[_É_ \Í U\ WSSSSSSSSSSSSSS"

VU_U 1/2g_Á'gh X]i a
HndY`cZVéi fgY

í]\ W

dcg] fUXi 1/2bÉ'gh X]i a
HndY`cZVéi fgY

h Vg

Xc_hc'fg_Á'gh X]i a
HndY`cZVéi fgY

h] b'g

dfYnYbEbÉ'gh X]i a
HndY`cZVéi fgY

hc'1b'h][]Ub

_ca V]bcj UbÁ'gh X]i a
HndY`cZVéi fgY

V1b'h][]Ub

cb`]bY
HndY`cZVéi fgY

hf Wh mb

F 1%#U'VmW'gh Xcj U#U'bUj U Éj mgc_Á' _c`Y'dc
XcVi `SSSSSSSSSSSS"
GhU]b[`ck `cb[`mci f`Yi WUb[Y'dYf]cX`jg

HÉ]a i b í Wk Wh]'hf b[í]\ WWWUV b
hfcb[SSSSSSSSSSS"

fYXYbÉ'gYa Ygf
@Yb[h `cZghUmihZcfY][b i b]j Yfg]hm

a h_É

W`U`U_UXYa]W`U`fc_
@Yb[h `cZghUmihZcfY][b i b]j Yfg]hm

a hbBa \ W

>U_1/2gci `dfUWéj bÉca YnYbÉdfc`gh XYbhmB
5g_]b[`Uci hik cf_`fYgf]W]cbgZcf`gh XYbhtg

B\ b[\ `b'W `1a j] WWc'gb\ j]45`1/4[É3

=a a][fU]cb Gh Xm]b[



A i gfa`d YX`c]h_cd]Y`Xc_i a Ybh `bWc`hc`a i gf` VUhc]f][]b]bÉXc_i a Ybhm8 5g_]b[]Znci `bYX`hc`dfcj]XY`hY`cf][]bU`XcW`a Yb]g`cf`Vtd]Yg	HÉ]d\]`fÉb\`V`b`g]c`\`Uht]` i [] V8
>U_Á`gci `j`gh`dbÉdc`UXU`_mdfc`gh`X]i`a`3 I`gY`k`\`Yb`Udd`n]b[`Zcf`i`b]j`Yfg]lm	B\`b[`mÉ`Wi`í`i`j`½`WU]f`b[`í`]\`W¼[É3
Dc`YH`a`]`Zcfa`½bÉbUWÉX_i`_Y`gh`X]i`3 5g_]b[]Znci`k`]`fYW]j`Y`U`Zcfa`U`c`ZYf	6`b`W[]`Wc`HÉ]`h`a`]`b\`d\`VWÉb\`h`W_\`Eb[3
NUfi`éi`Y`j`ngc`½`c`U`i`Vntc]`½Édfc`gh`XYbhm8 5g_]b[]Z`h`Y`i`b]j`Yfg]hmdfc]]XYg]UWÉa`a`cXU]cb	Hf`b[`í`]\`W`W`í`a`V`c`W`_`_\`Eb[3
NU]fbi`Y`gh`X]`bÉcVcf`]`dfUW]j`bÉgh]23 5g_]b[]Znci`f`i`b]j`Yfg]lmVÉi`fgY`]b]c`j`Yg`Ub`]b]Yfbg\]d`dYf]cX	?`I`U\`Wb]m]W`VUc[`a`h`]][`Ub`h`Wh`d\`Um_\`Eb[3
A i gfa`U_c]`Úa`-bbU`gh`XYbhd`U]h`_c`bÁ3 5g_]b[]Znci`U`j`Y`hc`d`Uhtc`gh`XmiUg]Ub`Yi`WU]b[`Y`gh`XYbhi`Uhi`Uhi`b]j`Yfg]lm	HÉ]W`d\]`f` \`Wd\É_\`½]b\`j]`b`fUc`í`]`f`b[b]m\`Um_\`Eb[3
>U`a`c]i`g`YXc]`Uhd`V`-a`Á`d`]`\`½`m8 5g_]b[\`ck`nci`Wb]g]Y`h`Y`dfc[`fYgg]cZnci`f`Udd`]W]cb	@%a`g]c`HÉ]W`h`_]`a`fU]`b`f]`b`WU`í`b`l`b]j`]`V8
>U_Á`gci`Uhm_cj`Á`dc`UXU`_m8 -bei`]f]b[`U`ci`h`h`Y`\`Ub[`i`U[`Y`f`Yei`]f`Ya`Yb]hc`V`Y`Z` `Z` `Y`X`]b`c`f`X`Y`f`hc`V`Y`U`W`d`h`X`U`h`i`U`h`i`b]j`Yfg]lm	MÉ`Wi`b[`Eb`b[]`b[`Eb`b[]`Q`¼[É3
>U`U`Y`SSSSSSSSSS`gng]Áa`3 5g_]b[]bZcfa`U]cb`U`ci`h`h`Y`gng]Ya	<`h`b[`SSSSSSSSSS`b\`h`b`½3
_fYX]lm HndY`cZ`gng]Ya	hÉ`W
nb]a`_cj`½É HndY`cZ`gng]Ya	W`a`í`]`a
8cg]ubi`gh`X]`bÉd`Y`\`YX`bU`_cbW]a`Á`j`Úa`-bm8 5g_]b[]Znci`U`j`Y`Ub`UW]Ya`]Wf]Ub]g]V]dh]Uhi`h`Y`YbX`cZnci`f`Yi`WU]b[`Y	HÉ]W`í`Wb\`b`V`b[`í`]`a`W`_]`É\`Wf]Uc`í`]`b]m`_\`Eb[3

⇒ a a][fU]cb Gh Xm]b[



>U_Áj mi écj UŹa YrcXm'gci 'dci Ę ½m3
=bei]f]b['UVci hĤY'ĤUW]b['ghmY

7 ½W[] b['X m 'f b['b\ 'Ĥ 'b'c3

>gci 'Ĥa 'SSSSSSSSSSSS'3
=bei]f]b['UVci hĤY'ĤUW]b['ghmY

7 Ĥ SSSSSSSSS\Um_\Eb[3

d YXb½_m
HmY'cZVUgg

V¼[] b[

gYa]b½Y
HmY'cZVUgg

\]Ĥ c

_cbg 'ĤW
HmY'cZVUgg

\ b['X b'f]Æ[

_cbZYfbW
HmY'cZVUgg

\]b[\

>U_Á'd YXa =hmbUŹÉ'YĤÉ'_c`U3
5g_]b['j]bZcfa U]cb'UVci hĤY'_]bXg'cZVĤi fgYg'cZYfYX'Vm]g a a Yf'gWcc`g

7 Ĥ 'b\ b['_\ĤU\ Wá ŐU\Á'b'c3

? Xmi'gci 'n_ci _n3
5g_]b['k \Yb'ĤY'YI Ua gUfY

B\ b[V¼_] a 'fUí Wh W W_\]b'c3

? XY'a c\i 'bUŹ]bZcfa UW'c'j YW'Xc]i dbUW
d YXa =hW3
5g_]b['k \YfY'mci 'Wb_Z]bX'j]bZcfa U]cb'UVci hĤY'VĤi fgYg

HĤ]W'Ĥ ĤĤ ĤEb[Ĥ]b] W_\ĤU\ W 'í ¾3

B UW½ÉgY'bUj mpc_Á'_c`Y'gdcfĤj bÉWbĤfi a 3
5g_]b['j]ZĤYfY'g'Ui b]j Yfg]m]gdcfĤj'WbĤf

7 Ĥ 'fi b['ĤĤ Ĥ ĤUc'WU'f b['í]\ WUm_\Eb[3

>U_gY'a c\i 'd]dc'Ĥh_Y'gh XYbhg_Ŭa 'cf[Ub]nUŹa 3
5g_]b['\ck 'mci 'Wb'Ĥ]b'gh XYbhgcV]Y]Yg

@%a 'g]c'Ĥ]W'Ĥ ĤUa '[jUW]h W W]b\j]Æ3

>U_Á'gci 'd]V] bÁ']j chÉb½`UXmj 'W]m3
=bei]f]b['UVci hĤY'Yg]a UfYX''j]]b['Vz]g]b'ĤY'V]m

7 \]d\Ég]b\ \c hi 'W]b\ d\ Q¼Uc'b\]Æ3

Gh Xm]b[! @Ub[i U[YVĤi fgYg 7nW

J]YĤUa YgY

⇒ a a][fUh]cb Gh Xm]b[



>U_Á'Uhm_mia i 'gh Xcj UhbUj U É _c`Y3
5g_]b['k \Uh`Ub[i U[Yg]mci `Wb`gh XmiUhiUhgWcc`

B[Éb`b['b½c`HÉ]W`h \ W`f b[3

B UVÉñÉY'fcñ Uhcj UWÉYgž`_hYfÜi féÉÖfcj Y `a Ålc
`Uhm_U3
5g_]b['JZ`h.YfY`g`Ud`UW`a Ybh`Ygh`c`UggYgg]mci f`Y`Y`

7Í _Éh.]_] a `fU`fÉb\`í `HÉ]\Um_\Éb[3

A c\i `VÜhd Y UhYb#U`Xc`'bÅ`g_i d]bnž`Ygh] Y`hUž
_`hYfci `df½÷`bUj` h`j i `ž`bYbÉdfc`a`÷`d`É`] \cXb½3
5g_]b['JZ`mci `Wb`W`Ub[Y`Y`Y`]b`W`bY`mci `UFY`bchigU]gZ]YX`k]h`h`Y`cbY`mci `UFY`UhtYbX]b[

HÉ]W`h`í]`fÉb\`í _`W`b`i`fÉb\`í \`]`b`h`]_\Éb[
d\Ö\`dj]`HÉ]\Um_\Éb[3

B UVÉñÉY`XYHJ]`bÉdc]g`_i fni 3
5g_]b['JZ`h.YfY`g`U`XYHJ]`YX`XYgW]dh]cb`cZ`h.Y`W`i fgY`

6 b`W`W`X`b`W]`h`h`j _`Ä`U` \`W`\Éb[3

>U_Ü`Y`a`U`]a` ½`bÉdcÉYhigi`XYbh`j`Y`hÉX÷3
5g_]b['k \Uh`h`Y`a`U`]a` i` a` `bi` a` VY`f`cZ`gh`XYbh]b`U`W`Ugg]g`

G`g`h`]`í`U`W`U`a` h` d`½`W`b`b\]Æ3

>U_Á`j`mVj`YbÉa` ½`Y`Y`j`U`É`_c`Y3
5g_]b['k \Uh`ZU]`h]Yg`h.YfY`UFY]b`h.Y`g`Wcc`

7`g`j`h`W`h`h`f`b[`W`b\`b[]É3

Dc` ½`½`Y`i`_i` fnY3
5g_]b['JZ`h.Y`g`Wcc` `UffUb[Yg`Ugc`Yi`Wfg]cbg`

`f`b[`W`g`d`i`d`W`W`W`i`m`b`X`i`b[c`b`\Um_\Éb[3

>U_Á`dfc[fUa`mbUVÉñÉ]`U`Y`_c`U3
5g_]b['k \Uhd`fc[fUa`g`UFY`cZ`YfYX`

7Í`b\`b[`W`b[`fÉb\`b½c3

Gh Xm]b[!`GWc`Ufg\]dg

7nW
F`½`#`U`V`m`W`g`y`]bZcfa`cj`U`#`U`c`a`c`bcg`h`W`d`c`½`U`h`
c`g]d`YbX]i`a`"
=bei`]f]b[`U`ci`h`z`bX]b[`c`ddcfh`b]h]Yg`

J`]Y`b`U`a`Y`g`Y`
HÉ]`í`b`í` \`]j` W`W`W` \`]\` W`W`b[

>U_Á`cf[Ub]nUW`a`c\ci`Z]bUbWé]`U`h`a`c`Y`gh`X]U3
5g_]b['k \]W`V`cX]Yg`W`b`z`bX`mci`f`gh`X]Yg`

7`½`h`W`W`b½c`W`h`W`c`HÉ]\`W`W`b[3

DchYWi`]Z]bUbébédcXdcfi`dfc`SSSSSSSSSSSS"
Gh]b[`h.U`h`mci`b`Y`X`Z]bUbV]U`\`Y`d`

HÉ]`W`b\`f`h`½`W`Éb\`W`c`SSSSSSSSSSSSSSSSSSSS"

⇒ a a][fUh]cb
Gh Xn]b[



_c:bÅ
H\]b['h.Uhmcı 'bYYX'Z]bUbV]U`\\Y'd'Zcf

\ Wd\É

]j cfbÉb½`UXm
H\]b['h.Uhmcı 'bYYX'Z]bUbV]U`\\Y'd'Zcf

W]d\Ég]b\`c h

dÅeY'c'XÉh-
H\]b['h.Uhmcı 'bYYX'Z]bUbV]U`\\Y'd'Zcf

W]Ba 'g' Wf 'Ya

>U_Á'Xfi \mg]dYbX]U'gci '_X]gdcn]W]3
5g_]b['k \Uh_]bXg'cZgWc`Ufg\]dg'UFY'Uj U]UW'Y

7Í 'b\ b[`c]\ Ww b['b½c\] b'W]3

**Gh Xn]b[! J U]XUh]b['ZcfY][b'XY[fYYg
7nWw**

J]YhbLa YgY

7\h- 'VnW#W#U'VnW'g]cj ÷]ha ^h]h`j 'W]bYj
nYa =Q

HÉ]a i b'W b['b\ b'V b['Wd'WU'a Éb\ 'W]b'í h
b' W

GhUh]b['h.Uhmcı 'k ci 'X''_Y'hc'j U]XUhY'ncı f'XY[fYY'Wf]Z]W]Y']b'h.UhVdi blfm

A W]gYnbLa 'g'Wf]Z]_cj UbLa]'d Y_'UXUhY']ž_hY É
d Y_'W]UÉj 'W]bYj 'Uhm_UQ
5g_]b[]Z'h.YfY']g'U']g]cZ'Wf]Z]YX'hfUbg'Urcfg]b'h.Y'Ub[i U]Y'h.Uhmcı 'bYYX

6 b'W'XUb\ 'g'W'WU'b\ b['X'W'[] 'W'W b['b\ b]j
W]b[Éb'b['Q_\Éb[3

? XY'a c\i 'Xcg]h'Wf]Z]_½c'fcj bcW]b]bcg]a Ålc
h]h`i 3

HÉ]W]h`m[] m]W b['b\ b'h b['í b['í ¾

5g_]b['k \YfY'ncı 'W]b['YhU'Wf]Z]W]Y'cZ'Yei]j U'YbW]h