

5 WXÅa]Vø 7i Yfdc



7i Yfdc! 7 cbWøfXUF

=b[`Åg

6 fclX`migdYU_]b[ž=U[fYY`k]h` VVWU gY

GY`i gJ`WUbXc`gY`VøbWYfXU`Vøb`Y`di bhc`XY`j]gU`XY`chfc

J]YhbLa]hU

B\È\ Wi b[žhø]\c`b`hc`b`í b[`Ùj]`j`È`

CbY`]gj Yfmia i W`]bW]bYX`hc`U[fYY`k]h` VVWU gY

GY`i gJ`WUbXc`gY`VøbWYfXU`Vøb`Y`di bhc`XY`j]gU`XY`chfc

Ei Ub`í] a`WU`""`¼a` hei Ub`í] a`f`hX` í b[`hø\ V] j`È`

=Wb`gY`]\gÅYf`dc]bH`

GY`i gJ`WUbXc`gY`WYY`ei`Y`Y`di bhc`XY`j]gU`XY`chfc`Ygj`½]Xc`zdYfc`bc`gY`VøbWYfXU`Vøa`d`YhLa`YbH`

HUW`h` mei Ub`í] a`WU`Eb[`n#¼`mW`W`g`b\`h` í`b`"

=Ybh]fY`mU[fYY`h`Uh

GY`i gJ`WUbXc`gY`Ygh`ž`hcU`a`YbH`XY`UWYfXc`Vøb`Y`di bhc`XY`j]gU`XY`chfc

Hø]`í b[`Ù\c`b`hc`b`f`b[`""

=YbXc`fgY`k` \c`Y`YUfhYX`mi`h`Y`cd]b]cb`h`Uh

GY`i gJ`WUbXc`gY`Ygh`ž`hcU`a`YbH`XY`UWYfXc`Vøb`Y`di bhc`XY`j]gU`XY`chfc

Hø]\c`b`hc`b` b[` \ `Ù_] b`Wc`f`b[`""

7i Yfdc! 9gUf`Yb`XYgUWYfXc

=b[`Åg

6 fclX`migdYU_]b[ž=X]gU[fYY`k]h` VVWU gY

GY`i gJ`WUbXc`gY`Ygh`ž`Yb`XYgUWYfXc`Vøb`Y`di bhc`XY`j]gU`XY`chfc

J]YhbLa]hU

B\È`Wi b[žhø]`_`Eb[`í b[`Ùj]`j`È`V]j`È`

CbY`]gj Yfmia i W`]bW]bYX`hc`X]gU[fYY`k]h` VVWU gY

GY`i gJ`WUbXc`gY`Ygh`ž`Yb`XYgUWYfXc`Vøb`Y`di bhc`XY`j]gU`XY`chfc

Ei Ub`í] a`WU`""`¼a` hei Ub`í] a`a`¼hU`_`İ`W`h` í b[`hø\ V]j`È`

=Wb`gY`]\g]dc]bž`Vi`hX]gU[fYY`k]h`]hYbh]fY`m`

GY`i gJ`WUbXc`gY`Ybh]YbXY`Y`di bhc`XY`j]gU`XY`chfc`zdYfc`bc`gY`Ygh`ž`XY`UWYfXc`Yb`c`UWgc`i`hc`

`_] b`b`m`_`Eb[`d\]`¼`_`Eb[`W`W`g`žb\ b[`hø]\c`b` hc`b`_`Eb[`í b[`Ùj]`b`İ`"

=gfc]b[`mX]gU[fYY`h`Uh

GY`i gJ`WUbXc`gY`Ygh`ž`Yb`Vøa`d`Yhc`XYgUWYfXc`Vøb`Y`di bhc`XY`j]gU`XY`U`[i`]Yb`

Hø]\c`b`hc`b`_`Eb[`í b[`Ùj]`Ù_] b`Wc`f`b[`""

=La`ž]fa`micddcgY`hc`h`Y`]XYU`h`Uh

GY`i gJ`WUbXc`gY`Ygh`ž`Yb`Vøa`d`YhU`cdcg]V]i`b`Vøb`Y`di bhc`XY`j]gU`XY`chfU`dYfg`cbU`

Hø]\c`b`hc`b`d\`b`í]`Ù_] b`Wc`f`b[`""

7i Yfdc! 7 ca dUfUW]cbYg

5 W X Å a] V
7 i Y f d c



=b[`Åg

5 WÅa]V

7i Yfdc



J]YbLa]H

UbX UFY'gja]UF#X]ZFYbhiUg'fY[UF'Xg'tc

""j ¼""[] b[#_\\Wb\U ' W ""

I bU'a UbYFU]bZcfa U`XY'YI dcbYf'gja]]hi XYg'YgdWVZ]Wlg'c`XY`UWF`Vta dUFU]cbYg'YbhfY`Xcg'VtgUg

≠VcbfUghrc ž g'ck g

Hf1½j]#_\\WY]""ž""""]f1½""

GY'i gU'WUbXc'gY'ei]YfY`YbZU]nUF`U`X]ZFYbV]U`YbhfY`Xcg'VtgUg

VmiVcbfUghik]h]g'UFY

""žf1½j]#_\\WY]""ž`]f1½""

GY'i gU'WUbXc'gY'ei]YfY`YbZU]nUF`U`X]ZFYbV]U`YbhfY`Xcg'VtgUg

]g'gja]`UF'hc]b'fYgdWVtcZ

""[] b[j]"" W ""

GY'i gU'WUbXc'gY'ei]YfY`YbZU]nUF`mYI d`]WUf`U`gja]]hi X`YbhfY`Xcg'VtgUg

UbX `X]ZFYf']b'hYfa g'cZ""

""j ¼""_\\Wb\U ' W ""

GY'i gU'WUbXc'gY'ei]YfY`YbZU]nUF`mYI d`]WUf`U`X]ZFYbV]U`YbhfY`Xcg'VtgUg

H\Y`Z]fgh žVmiVcbfUgžh.Y'gWtbX

""f\hE""žfcb[_\]i'ž""fI]E""

GY'i gU'WUbXc'gY'ei]YfY`YbZU]nUF`U`X]ZFYbV]U`YbhfY`Xcg'VtgUg

CbY'cZ]h.Y'a U]b'gja]UF]h]Yg#X]ZFYbWg'VYrk`Yyb
UbX]g'hUh

A h'fcb['b\ b[b'Ah h b[i b[#_\\W] h` b'b\ h
[] U""j ¼""¼""

GY'i gU'WUbXc'gY'Yg'U`YWb'gja]]hi XYg'c`Vta dUFU]cbYg'YgdWVZ]Wlg'YbhfY`Xcg'VtgUg

CbY`X]ZFYbW`VYrk`Yyb`UbX`]g'hUh ž
k`YfYUg

A h'fcb['b\] i i] a _\\W] h[] U""j ¼""¼""žfcb[
_\]""

GY'i gU'dUFU`fYgU`hUF`U`X]ZFYbV]U`YbhfY`Xcg'VtgUg/di`YXY`gYf`Y`Vta]Ybnc`XY'i bU`UF[U`]gU`XY`X]ZFYbV]Ug

7i Yfdc!`Cd]b]cbYg

≠b[`Åg

J]YbLa]H

=k ci`X`gUmhUh

H]Wc'f b[""

GY'i gU'dUFU`XUF'i bU'cd]b]i b'dYfgcbU`žXY`U`WU`bc'gY`Yg'1½Vta d`YhLa`Ybhf`Vtbj`YbV]Xc

≠hgY'a g'hc'a`Y'hUh

H]h`n'f b[""

GY'i gU'dUFU`XUF'i bU'cd]b]i b'dYfgcbU`žXY`U`WU`bc'gY`Yg'1½Vta d`YhLa`Ybhf`Vtbj`YbV]Xc

≠b'a`mcd]b]cb

7 1½b\3b`H]Wc'f b[""

GY'i gU'dUFU`XUF'i bU'cd]b]i b'dYfgcbU`

5 VÅa]V

7i Yfdc



: fca 'a midc]bhcZj]Yk

H\Yc'ei Ubí] a 'WU'É]'''

GY'i gJ'dUFU'XUF'i bU'cd]b]í b'dYfgcbU

=La 'cZ'h'Y'cd]b]cb'h'Uh

HÉ]a Ub['ei Ubí] a 'f b['''

GY'i gJ'dUFU'XUF'i bU'cd]b]í b'dYfgcbU

=VY']Yj Y'h'Uh'h'YfY'UFY'gYj YfU 'fYUgcbg':]fghnž
GY'cbX'm

HÉ]h]b'f b['W'a hg 'b[i m'É'b\%b X b'h]g j] WÅ] b
h b[b'1'4'i'H\ 'b\ h'1/4'''H\ 'Uj' 1/4'''

GY'i gJ'WUbXc'gY'ei]YfY'Ybi a YfU'U'U'g'fUhcbyg'dUFU'U[c

h]gja mVY']YZ'h'Uh 'VWU gY

HÉ]h]b'f b[''''V]j É'''

GY'i gJ'WUbXc'gY'ei]YfY'XUF'i bU'cd]b]í b'dYfgcbU 'XY'U'ei Y'bc'gY'Yg'1/2'gY[i fc'mi b'Zi bXLa Ybhc'dUFU'YgJ'cd]b]í b

7i Yfdc! '7 cbW'É'fYg

h['Åg

J]YhbLa]hU

@Yhi g'bck 'UbU'mY#i fb'hc#i La]bY

H] d'h'Ycz'h'U'ç'md\ %b h'É'W#Ni mb'gUb[#b[\]É'Wi '''

GY'i gJ'WUbXc'gY'Wla V]U'XY'g 'Yhc'mU 'Wta]Ybnc'XY'i b'bi Yj c'd'É'fUzC

h]g'bck 'WU'f'h'Uh ''@Yhi g'h' fb'ci f'U'h'bh]cb
hc

GU '_]í ç' 1/a f'Nf b[''''Z'h'U'ç'm'É'b['ei Uh'gUb['''

GY'i gJ'WUbXc'gY'Wla V]U'XY'g 'Yhc'mU 'Wta]Ybnc'XY'i b'bi Yj c'd'É'fUzC

A cfYcj Yfž'cbY'UF[i a YbhU[U]bgh'h]g'WbbchVY
]] bcfYX.'

< b'b U'Z'h'U'\É'b['h 'V 'ei U'a h'\É'U'Wb\ '\ 1/4'''

GY'i gJ'WUbXc'gY'U[fY[U]bZcfa W]í b]a dcf'U'bh'U'i b'UF[i a Ybhc'mU'XY'gU'ffc''U'Xc

5 Xa]h'YX'm žVi h

HU'd\]h' Ub\ b'f b[''''ž'h' mb\]É'''

GY'i gJ'WUbXc'gY'U'W'dh'U'i b'UF[i a Ybhc'cdi Yg'hcž'dYfc'gY'ei]YfY'g [Yf]f'i b'Ub'1/2]g]ga 1/2]dfcž bXc

h]g'hfi Y'h'Uh žmY'h'h'Y'Z'W'f'Ya U]bg'h'Uh

i Öb['1/4'''ž'b\ b[í b['h]h'U'Wb['b\ b'h m'''

GY'i gJ'WUbXc'gY'U'W'dh'U'i b'UF[i a Ybhc'cdi Yg'hcž'dYfc'gY'ei]YfY'g [Yf]f'i b'Ub'1/2]g]ga 1/2]dfcž bXc

; fUb'h'Xž žbYj Yf'h'Y'Ygg

D\]h' Ub\ b'f b[''''ž'b\ b['''

GY'i gJ'WUbXc'gY'U'W'dh'U'i b'UF[i a Ybhc'cdi Yg'hcž'dYfc'gY'ei]YfY'g [Yf]f'i b'Ub'1/2]g]ga 1/2]dfcž bXc

Cb'h'Y'W'É'bfU'fnž

Hf'1/2']ž'''

GY'i gJ'WUbXc'gY'W'É'ff][Y'i bU'W'f'Y'Y'V]U'Y'ff'U'X'U'ž'i Y[c'XY'\U'Y'f'Y'g'U'V'W]Xc'X]W'U'W'f'Y'Y'V]U'W'É'a c'W'É'ff'Y'W'U

5 WXÅa]Vø 7i Yfdc



Cb'h.Y'cbY'\UbX

A ha hž'''

GY'i gJ'dUfU']bffcXi V]f'i b'UgdVWtc'X]ZYfybhY'XY'i b'a]ga c'Uf[i a Ybhc

Cb'h.Y'ch.Yf'\UbX

A h_\W'''

GY'i gJ'dUfU']bffcXi V]f'i b'UgdVWtc'X]ZYfybhY'XY'i b'a]ga c'Uf[i a Ybhc"G]Ya dfY'gY'i gJ'XYgdi Åg'XY''cb'h.Y'cbY'\UbX''''''

⇒b'gd]hY'cZ

A WXÖ'''

GY'i gJ'WUbXc'gY'YI dcbY'i b'Uf[i a Ybhc'ei Y'bc'Yg'Vø\YfybhY'Vøb'V]YfhtcgXUtcg'c'V]YYbV]Ug

8Ygd]hY'h.Y'ZUMhUh

A WXÖ# hW d'''

GY'i gJ'WUbXc'gY'YI dcbY'i b'Uf[i a Ybhc'ei Y'bc'Yg'Vø\YfybhY'Vøb'V]YfhtcgXUtcg'c'V]YYbV]Ug

GV]Ybh]Z]W]`m#]gfcf]W]`mgdYU_]b[

LÅhj 'd\ b['X] b_\cU\ W# W'g '''

GY'i gJ'WUbXc'gY'\UW'fYZfybhV]U'U\YWXcg'V]YbhtZ]Vøtc'c'\]g]i f]Vøtg

⇒b]YXybtU`m

B\#h] b#B\#h '''

GY'i gJ'WUbXc'gY'd]YbgtYb'i b'd'UbhYUa]Ybhc'UX]V]cbU'ei Y'di YXY'g'gYbhtf'Y'Ub½]g]g

: i fh.Yfa cfY

< b'h 'b U# b'b Už'''

GY'i gJ'WUbXc'gY'XYgUffc''U'i b'd'UbhYUa]Ybhc'\UgtU'i b'b]j Y'a i m]bUÉ]Vø