

6Yj 1bXcf`1g 8c_i a Ybh a c_



8c_i a Ybh a c_! š`HJ1bcg
c`Ugn

8cj Y'dcggc'f'fcj UFY]' a cXi `c'dyf'SSSS'3
f'Ud\c`ÄH'ZY' `]'ÄfXY_` XÄg

a U[nbf

< c`HJ1/2ca 'USSSS f`UdchB

E i UbXc Ä'gHc'f]'UgM'Uc']`g c'OXcWa YbhcB
9[mXc_i a Ybh a `_]1/2É1g] X1ä a 1bU_`a Y[_ÄfXYnÄgY

A _cf`1/2Éch1/2_]`UOXc_i a Ybh a chB

8cj Y'Ä'gHc'f]'UgM'Uc']`g c'OXcWa YbhcB
9[mXc_i a Ybh a `_]1/2É1g] \YmÄbY_`a Y[_ÄfXYnÄgY

< c`1/2Éch1/2_]`UOXc_i a Ybh a chB

E i U`Ä`UXUUX]`gWXYbnUXY`Ug U'WfUXfjXybh]hB
GnYa Ä'nj][Uhc'] 1bmi`Y'1bU] X1ä a 1bU_`a Y[_ÄfXYnÄgY

A _cf`1/2É`YUgnYa Ä'nj][Uhc'] 1bmiB

Di Í `Uji hUfa]`U'Vc'a d]'U'FY]'`a cXi `c3
5n' f'Ud_]hÖhÄgÄ`Yn'hÖhÄb `gY[ÉhÄ[_ÄfÄg

Gy[ÉhÄY_]hÖhÄb]`YrhUh' f`UdchB

E i U]`XcWa Ybh] XYj c'dcfU'FY'dyf'SSSS'3
5bbU_`a Y[_ÄfXY_` XÄgYza]`mYb`Xc_i a Ybh a c_fU`Ygn'gnØ_gÄ[

A]`mYb`Xc_i a Ybh a c_Uh\cmU_`a U[Ua a U3

DYf'f]W]YXYFY`U#`OXcWa YbhcQ'XYj Y'Zcfb]fY
Ua YbcSSSSSSS"
A]fY'j Ub'gnØ_gÄ[`U`Y`Ybh_YnÄg\Yn

< c[m`Y`Ybh_Yn\YggYb`UOXc_i a Ybh a Ä'fHÖVY`Y`
a i hUhb]U`Y[U`1/2VSSSSSSS"

è'a]c#@Ua]UOXcWa YbhcOÄ'gHc#U'fi VUhc#U
8c_i a Ybh a `Y`cd1g]1bU_`VY`Y`YbhÄgY

9`cdh1/2`UOXc_i a Ybh a ca UhQ

Ghc`Vc'a d`YhUbXc`ei YgHUXca UbXU'dYf`Vc'bh'X]
SSSS"
J U_U_]`a 1g]fÄgnÄfY'hÖhÄb `Y`Ybh_YnÄg

SSSSsbYj ÄVyb'hÖhÄa `_]`YrhU`Y`Ybh_YnÄg'

@Y]bZcfa Uh]cb]`gcbc`f]gYfj UY"
5n]bZcfa 1/2V] V]nUa UgzÄgbYa `UX'1/2_]`Ufa UX_]`ZÄ`bY_

5n]bZcfa 1/2V] V]nUa Ug'

Di Í `XUfa]i bU'f]W]j i HUX]`Vc'bgY[bUXY`U
Xca UbXU3
©1g]cg][Uhc']1g]_ÄfÄgY`U`Y`Ybh_YnÄg'`

? Ud\UhbÄ_É'1g]VY][Uhc']1g]U`Y`Ybh_YnÄg'`3

8c_i a Ybh a c_!`GnYa Ä'nYgUXUhc_

6Yj 1bXcf`1g
8c_i a Ybh a c_



c`Ugn

6Yj 1bXcf`1/9 8c_i a Ybh a c_



7ca Y'g]`W]Ua U3
BÅj

a U[nbf
< c[m\ ĩ ʹ½3

Di Ĩ `X]fa]]'`g c`i c[c`Y`Ug UXUUX]`bLbVH3
GnØYhÅg`YmY`Åg]XY`Y

A _cf`Åg`c`gØYH3

8cj Y'f]g]YXY3
@U_`Ym

< c` `U_ _3

E i U`Ä`]'`g c`]bX]f]mnc3
7Ēa

A]`U`VĒa Y3

E i U`Ä`U`g U`V]HUX]`bLbnU3
š` `Ua dc` [1/9]1/9

A]`Un`1/2Ua dc` [1/9]1/9 U3

E i UbXc`Ä`Uff]j Urc#J]b`Q]UrcØ
C fgn1/9 VUj UĪ`a Y[Åf`YnÅg]X dcbhU

A _cf`Åf`_YnYh]cfgn1/9 VUØ3

Di Ĩ`a cgfUfa]`U`g U`W]HUX]`]XYbh]H3
GnYa Å`m`][Uhc`j 1/9mVYa i Hh1/9U

? ÅfYa ža i HggU`a Y[`U`gnYa Å`m`][Uhc`j 1/9mVĪ'

8c_i a Ybh a c_!`7gJ1/9]`1/2Udch c`Ugn

≡`a]c`g]Urc`V]j]`Y`Ä`SSSSSSSSSS"
7gJ1/9]`1/2Udcha Y[UX1/9U

a U[nbf
5 VgJ1/9]`1/2Udchca`SSSSSSSSSS"

W`]VY`fa Ē`#bi V]`Y`fĒ
7gJ1/9]`1/2Udch

Y[mYXØ`1/2Ī`#U`UXcb`# hYb

VĒb]i [Urc#J
7gJ1/9]`1/2Udch

\ 1/9Ug

gYdUfUrc#J
7gJ1/9]`1/2Udch

_Ø`Cb`Å`U` \ 1/9Ug]1/9]1/9`

6Yj 1bXcf`1/g
8c_i a Ybh a c_



Xj cfn]Uhc#J
7gU 1/X] 1/2 Udch

Yj 1/h

Vt bj]j YbhY
7gU 1/X] 1/2 Udch

ÅYH1/gj`_UdVgc`UHVub j Ub

]b`i bfii b]cbY`Vj]`Y
7gU 1/X] 1/2 Udch

fY[]grtf 1/2hÅYH1/gj`_UdVgc`UHVub j Ub

]b`i bUVtdd]U`bcb`gdcgJU
7gU 1/X] 1/2 Udch

ÅYH1/gj`_UdVgc`UHVub j Ub

]b`i bfii b]cbY`X]`ZUhc
7gU 1/X] 1/2 Udch

ÅYH1/gj`_UdVgc`UHVub j Ub

j YXcj c#J
7gU 1/X] 1/2 Udch

Òj Y[m

< UZ[`]3
; mYfY_Y_

J UbbU_`[nYfa Y_Y]3

< UZ]a]`]Uf`U`VUf]Vt3
5 bbU_`a Y[ÅfXY_` XÅgYž`c[mj U U_]`UbmU[]`gY[ÉgÅ[YhbmÖH Y`Uj Y`Y`Y[mØthÅ` _bY_

¥`bY_`ÖbbY`Y`Hf`hcttU_3

J cffY]`f]Vt b[]i b[Yfa]`U`U`a]UZ]a][`]U`
7gU 1/X]Y[mYgfhÅg]`gn1bXÅ`_]ZY`YnÅgY

GnYfYtbÅa`Y[mYgfhb]`U`VgU`1/Xca UH`

8c_i a Ybh a c_!`F Y[]grtf 1/2/gY[mj 1/Écg]Ub

c`Ugn
J cffY]`]gV]j Yfa]`U`f]ubU[fUZY
J 1/Écg]Ub] U`fY[]grtf 1/2/g

a U[nbf
GnYfYtbÅ`fY[]grtf 1/2b]"

E i U]`XcW a Ybh`XYj c`dcf]UfY3
GnØ_gÅ[YgXc_i a Ybh a c_

A]`nYb`Xc_i a Ybh a c_Uh_Y``a U[Ua a U` \crbca 3

7]`gcbc`XY`Y`gdYgY`dYf`]gV]j Yfg] U`f]ubU[fUZY3
F Y[]grtf 1/2Y]`gXÉ`ZY` `]`ÅfXY_` XÅg

J Ub`fY[]grtf 1/2Y]`gXÉ`3

6Yj 1bXcf`1/ø 8c_i a Ybh a c_



Gcbc'ei]`dYf`YZZYthi UFY`]`Wba V]c`X]`Xca]W]c`
@U_]` \YmfY[]gnf1/2/ø

GnYfYtbÅa `fY[]gnf1/2b]`U`U` \YnYa "

J cffY]`chYbYFY`i b`Wfh]Z]Wthc`X]`Vi cbU`VtbXchtU`
9f_`ØVg]`V]ncbntfj`1ømi][`ÅbmÅgY

GnYfYtbÅ_`Yf_`ØVg]`V]ncbntfj`1ønti_`Åfb]"

J cffY]`ZUFY`Xca UbXU`dYf`]`dYfa Yggc`X]`gc[[]cfbc`
HUFh`n_cX]ø]`Yb[`YXÅ`nm][`ÅbmÅgY

GnYfYtbÅ_`HUFh`n_cX]ø]`Yb[`YXÅ`nm][`ÅbmÅgY]"

8c_i a Ybh a c_!`9[`ÅngÅ[`V]ntcgh1/ø c`Ugn

J cffY]`ZUFY`XY`Y`Xca UbXY`g` `fllgg]WfUh]cbY`
gUb]HUF]U`
9[`ÅngÅ[`V]ntcgh1/øgU`_`UdVg]`Urcg]_`ÅfXÅgY`_`ZY`hÅHY`Y

a U[`ntf
@YbbY`d1/ø`_`ÅfXÅgY`a`Uh`Y[`ÅngÅ[`V]ntcgh1/øgU`
_`UdVg]`UH/Ub"

<`c`V]gc[`bc`X]`i`b`fllgg]WfUh]cbY`gUb]HUF]U`df]j`U`U3
5`bbU`_`a`Y[`ÅfXY`_`XÅgY`z`c[`mignØ`gÅ[`Yg]`Y`df]j`1øY[`ÅngÅ[`V]ntcgh1/øgh_`Øtb]

GnØ`gÅ[`Ygia`U[`1ø`Y[`ÅngÅ[`V]ntcgh1/øgh_`Øtb]3

7`cgU`Å`VtdYfrc`XU`fllgg]WfUh]cbY`gUb]HUF]U3
5`bbU`_`a`Y[`ÅfXY`_`XÅgY`z`c[`mia`]hZYXYn`UV]ntcgh1/ø

A`]hZYXYn`UV]ntcgh1/ø3

GdYgY`cgdYXU]`YfY
DÅ`XU`UfflZ`c[`mia`]hZYXYn`YhY[`ÅngÅ[`V]ntcgh1/ø

?`İ`f` \`1ø]`_`ØhgÅ[`Y_`

GdYgY`dYf` `U`Vtbg` `Hh]cbY`X]`i`bc`gdYV]U]`gU
DÅ`XU`UfflZ`c[`mia`]hZYXYn`YhY[`ÅngÅ[`V]ntcgh1/ø

GnU`cfj`cg

HYghX]U[`bcgh]W
DÅ`XU`UfflZ`c[`mia`]hZYXYn`YhY[`ÅngÅ[`V]ntcgh1/ø

8]U[`bcgh]`U]j`]ng]`1øUhc`_`

C`dYfUh]cb]`W]fi`f[]WY
DÅ`XU`UfflZ`c[`mia`]hZYXYn`YhY[`ÅngÅ[`V]ntcgh1/ø

A` hÅh]`WUj`U`h`cn1/ø

HfUthUa`Ybrc`dg]W]Urf]Vt
DÅ`XU`UfflZ`c[`mia`]hZYXYn`YhY[`ÅngÅ[`V]ntcgh1/ø

Dgn]W]`1øf]U]`_`YnY`Åg

7`i`fY`XYbhu]`
DÅ`XU`UfflZ`c[`mia`]hZYXYn`YhY[`ÅngÅ[`V]ntcgh1/ø

:`c[`cfj`cg]`_`YnY`Åg

6Yj 1bXcf`1/9 8c_i a Ybh a c_



7i fY'cW`]ghWXY

GnYa ÅgnYh`_YnY Åg

DÅ XU UffUz`c[mia]hZYXn\YhY[ÅgnGÅ[V]ntcgh1/9

8c_i a Ybh a c_! J Éri a

c`Ugn

a U[nbf

DYf'ei U]'a chj]'f]W]YXY]' j]gtr`X]b[fYggc3

A]Åfh][Åbn] UVMi Huh1/9] j Éri a ch3

5 bbU_`a Y[ÅfXY_` XÅgYz`c[mij UU_]`a]Åfh][ÅbnY` VYi Huh1/9] j Éri a ch

< c`V]gc[bc`X] i b]]gtr`dYf`YbhfUY]' b`QlUYgY3

? Y` j Éri a `U\`crz`c[ma Y[`1/2c[UggJa `Cfgn1/2`ch3

5 bbU_`a Y[ÅfXY_` XÅgYz`c[mign0_gÅ[Yg]Y j Éri a `Uh'cfgn1/2`VUj U' `VYi Huh1/9]cn

7ca Y'dcggc`dfc`i b[UY]'`a]c`dYfa Yggc`X] gc[[]cfbc3

< c[ntb`h Xca `a Y[\cggUWÉU] Uj Éri a ch3

¥fXY_` XÅg`Uj Éri a `a Y[\cggUWÉU] Uj Éri a

DYfWÅ`Ua]UXca UbXU'dYf]' `dYfa Yggc`X] gc[[]cfbc`Å`ghU`f]Z]i HUU3

A]Åfhi HUGfch1/2`Y`Uj Éri a `Y`Ybh`YnÅgYa 3

5 bbU_`a Y[_ÅfXYnÅgYz`a]Åfhi HUGfch1/2`Y`Uj Éri a `Y`Ybh`YnÅgY

Dcggc`chYbYfY]' `X]f]tr`X]]gc[[]cfbc`dYfa UbYbhY3

6Y`Ybh`Yn`YfY_`1/2`UbXí` `U`I`_`Åbh3

5 bbU_`a Y[ÅfXY_` XÅgYz`c[m`Y\YrGÅ[Yg]Y`1/2`UbXí` `U`I`_`Åbhj U' `fY[]grf1/2]9

8c_i a Ybh a c_! J YnYhÅg

c`Ugn

a U[nbf

8Yj c`Wla V]UYf`U`Huf[UX]'a a Uf]Vt`Uh]cbY`XY`U a]U'a UWX]bU3

?]_Y` VgYf`Å`HtbYa `Uh`U`H`a `fYbXgn1/2` 1/23

5 bbU_`a Y[_ÅfXYnÅgYz`c[mign0_gÅ[Yg]Y`U`fYbXgn1/2` VgYf`Uh`U`H`bZ`U]XY[Yb'cfgn1/2`VÍ` ` \cnn1/2` `Y

J cffY]'a a Uf]Vt`UY]'`a]c`j Y]Vt`c`

GnYfYtbÅa `fY[]grf1/2]`U`Y`Ea` j Ya YH'

>1/2a` fY[]grf1/2]9

@Ua]U'dUHbHY`X]' [i]XU`Å`j U]XU3

¥fj ÅbnYg]HhU`c[cgfj 1/2nca 3

5 bbU_`a Y[ÅfXY_` XÅgYz`c[miU`c[cgfj 1/2ntU`Uh'cfgn1/2`VUb`Åfj` ÅbnYg]Y

J cffY]'ZUFY`Xca UbXU'dYf'i b`dYfa Yggc`dfc] j]gc]c X]' [i]XU

GnYfYtbÅ_]XY][`YbYg`c[cgfj 1/2nhi][ÅbnY`b]"

⇒XY[`YbYg`c[cgfj 1/2nm][ÅbnÅgY

6Yj 1bXcf`1/ø 8c_i a Ybh a c_



J cffY]dfYbchUFY`fSSSSSSSSSS"

GnYFYtbÅa `YZc[`Ub] U'SSSSSSSSSSS"

J YnYh]j]ng[U'X1/ä a 1bU_`YZc[`U 1/øU

YgJa Y'X]hrcf]U

Ya ÅYh]j]ng[U

J]ng[U'hēdi gU

YgJa Y'X][i]XU

[ntU_cf`Uh]j]ng[U

J]ng[U'hēdi gU

J cffY] Wla V]UFY'SSSSSSSSS'g `U'a]U'dUHybH'X]
[i]XU"

GnYFYtbÅa 'a Y[j 1/2hcnHUb] U'SSSSSSSSSSSSU
^c[cgffj 1bncā cb"

>c[cgffj 1bncāb'gnYFYd` U'XUhc_`a ĩ Xcgff1/øU

`f]bX]f]nnc

VĪā

5a]hia Y['gnYFYtbY'j 1/2hcnHUb]

] `bca Y

bĀj

5a]hia Y['gnYFYtbY'j 1/2hcnHUb]

`U'Zhc

ZĀbm_Ād

5a]hia Y['gnYFYtbY'j 1/2hcnHUb]

J cffY] WlbgY[i]fY`U'dUHybH'dYf U'fY'WUHY[cf]Y"

GnYFYtbÅ_`a 1/ø_UHY[ĩ f]1/2\cm1/2Xb] U
^c[cgffj 1bncā \cn"

5a]hia Y['gnYFYtbY'j 1/2hcnHUb]

J cffY] f]bbcj UFY`U'a]U'dUHybH'X][i]XU"

GnYFYtbÅa 'a Y[Ö'fUub] U'^c[cgffj 1bncā

>c[cgffj 1bncā Y[Ö'f1/øU

J cffY] f]W[X]YXYFY` Xi d]WUhc XY`U'a]U'dUHybH'X]
[i]XU'SSSSSSSSSSS"

GnYFYtbÅ_`dĭ hc'b] Y[n'SSSSSSSSSSS'^c[cgffj 1bncā'

>c[cgffj 1bncā dĭ h1/øU

ga Uff]HU

Yj YgnYth

DfcV_Åa U

fi VUHU

Y`cdch

DfcV_Åa U

6Yj 1bXcf`1/g 8c_i a Ybh a c_



XYhf]cfUU
DfcV`Aa U

gAfØh

J cffY]ZUFY'f]Vefgc`Vebfc`]'f]hfc`XY`U'a]U'dUybh"
J YnYhÅgh`'j Uİ`Yh]`h/g`Y`Yb]Z`YVYnÅg

GnYfYhbÅ`Z`YVYnÅgh`'j Uİ`Yh]`h/g`ca`Y`Yb"

8c_i a Ybh a c_! š`Ua dc`[1/gj/ĸ c`Ugn

J cffY]dfYgYbUfY`Xca UbXU'dYf`U`VhUX]bLbnU
Q[[Yh]j c`XY`dUYgYQ
š`Ua dc`[1/gj/ĸ] [ÅbmÅgY

a U[nbf

GnYfYhbÅ`Q`f gn/ĸ Q/2 Ua dc`[1/gj/ĸ ch] [ÅbmYb]"

8cj`Y`dcggc`]gWj] Yfa]`U`hYghX]`O]b[i UQ
B mY`j]`hYgnfY`j Uİ`Y`Ybh_YnÅg

< c`h`Xc_`Y`Ybh_Yrb]`U`QmY`j`ChYgnfY3

Bcb`c`dfYWXybh]`dYbU]"
Bm]`U`cn/g]VQbYhYb`Y`Å`Yf`

6QbYhYb`Y`Å`Yh`j`U[nc_"

< c`]'`j]`Y`c`f]W]Yg`c`X]`O]b[i UQ
5`gnØ`gÅ[Yg`bmY`j]`gn]bhia`Y[`Å`Y

F`YbXY`_YnYa`U`gnØ`gÅ[Yg`QmY`j`Q`i`X`1/gj/ĸ"

J cffY]dfYgYbUfY`Xca UbXU'dYf`fYgLa`Y`X]
VhUX]bLbnU`Q[[Yh]j c`XY`dUYgYQ
š`hU`1/bcg`Y`a`Å`Yh]j`]ng[U`YhÅ`Y`Y

GnYfYhbÅa`Y`Yhbb]`U`h`1/2`hU`1/bcg`Y`a`Å`Yh]j`]ng[1/b'

E i U]`gcbc`Y`gdYgY`dYf`U`Xca UbXU`X]`VhUX]bLbnU3
8ÉU_

A`Ybbn]VY`_YfØ`1/2`Ua dc`[1/gj/ĸ]`_Å`f`Y`a`Yh`VYbnØ`Y`U`b]3

≡`a`]c`Veb]i`[`Y`Å`X]`VhUX]bLbnU`Q[[Yh]j c`XY`
dUYgYQ
< 1/bUg]1/gj/2`Ua dc`[1/gj/ĸ`U

5`1/bUg]1/gj/2`Ua dc`[1/gj/ĸ`Q/2`Ua dc`[1/gj/ĸ"