

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



8c_i a Ybh a c_! š`HJ1bcg

\c`UbX

K Uf`Ub`_` \YhZcfa i`]Yf`j ccf`SSSS`j]bXYb3
f`Ud`\c`ÁF`ZY`]`ÁFXY`_` XÁg

a U[nbf

< c`HJ`1/2ca` U`SSSS` f`Udch3

K UbbYf`k YfX`i k` O`cW`a Yb`rQUZ` Y[Yj Yb3

9[mXc_i a Ybh a`_]1/2É1g]`X1á a 1bU`_`a Y[_`ÁFXYnÁgY

A]_cf`1/2É`ch1/2`_]`U`O`c`_i a Ybh a ch3

K Uf`k YfX`i k` O`cW`a Yb`rQUZ` Y[Yj Yb3

9[mXc_i a Ybh a`_]1/2É1g]` \Y`mÁbY`_`a Y[_`ÁFXYnÁgY

< c`1/2É`ch1/2`_]`U`O`c`_i a Ybh a ch3

K UbbYf`j Yf`ccdhi k`]X`Yb`h]Y`]hg`U`f`h3

GnYa`Á`n`j][`U`nc`j` 1b`m`Y`1/2U`h`X`1á a 1bU`_`a Y[_`ÁFXYnÁgY

A]_cf`1/2É`Y`U`gnYa`Á`n`j][`U`nc`j` 1b`n`b3

? Ub`i`_`a]`^` \Y`dYb`_`a Yh` \Yh`]bj`i` `Yb`j` Ub` \Yh`
Zcfa`i`]Yf`3

5n` f`Ud`_]`h`D`h`Á`g`Á` \Yn`h`D`f`Á`b` `gY[`É`g`Á[`_`Á`f`Á`g`

Gy[`É`YbY`_]`h`D`h`b`]`Y`rh`U`h`_` f`Udch3

K Y`_`Y`XcW`a Yb`hYb`_`a cYh`i`_`_`a Y`YbYa` Yb`j` ccf`
SSSSSSSSSS`3

5bbU`_`a Y[_`ÁFXY`_` XÁgYza`]`mYb`Xc`_i a Ybh a c`_fU`Y`gn`gn0`gÁ[

A]`nYb`Xc`_i a Ybh a c`_U`h` \cmU`_`_`a U[`Ua` a U3

Ca` Y`Yb`O`cW`a Yb`rQUb`h`j` fU[`Yb`ža` cYh`i`
hYba`]bgY`SSSSSSSS`j` ccf`Y[]`Yb`"

A]fY`j` Ub`gn0`gÁ[`_`U`Y`Ybh`_`YnÁg`Yn`

< c[`m`Y`Ybh`_`Yn` \Y`gYb`_`U`O`c`_i a Ybh a`Á`f`h`Z`VY`_`Y`
a`i` h`U`b`]U`Y[`U`1/2V`SSSSSSSS`"

A]`b`O`cW`a Yb`rQk` YfX` [`Y`g`c`_`Yb`"

8c_i a Ybh a`_`Y`cd`1/2g]`bU`_`VY`Y`Ybh`Á`gY`

9`cdh1/2`_`U`O`c`_i a Ybh a ca`U`h0

=_j` Yfj` c`YX][`_`X`YnY`U`dd`]`W`h`Y`b`Ua` Ybg`SSSS`"

J`U`U`_]`_`a 1/2g]`f`Á`g`n`Á`f`Y`h`D`f`Á`b`_`_`Y`Ybh`_`YnÁg`

SSSSsbY`Á`Yb`h`r`D`h`D`a`_]`Y`rh`U`Y`Ybh`_`YnÁg`h`

8YnY`]bZcfa`U`h`Y`]g`j` Yffci`k`Y`]^`"

5n`]bZcfa` 1/2V`]`V`n`U`a`U`g`_`Á`g`b`Ya`_`U`X`1/2`_]` \`U`fa`U`X[`_`Z`Á`b`Y`_`

5n`]bZcfa` 1/2V`]`V`n`U`a`U`g`_`

? Ub`i`_`a]`^`Y`Yb`cb`lj`Ub[`g`h`Yk`]`g`j` ccf`X`YnY`U`b`j`fU[`
[`Yj`Yb3

Ⓢ1/2cg][`U`nc`j`_`1/2g]`_`Á`f`Á`g`Y`_`U`Y`Ybh`_`YnÁg`_`_`

? Ud` \U`h`b`Á`_`É`f`1/2gY`][`U`nc`j`_`1/2g]`U`Y`Ybh`_`YnÁg`_`_`3

8c_i a Ybh a c_! GnYa ÁmYgUXUhc_

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



\c`UbX

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

K Uh]gi k `bUa 3
BÅj

a U[nbf
< c[m\ ħ ʹ 2 3

? Ub`i `a]^Ugi V]YZhj YfY`Yb`k Wf`i k
[YwcfYd`Uhg]g`Yb`k Uhi k [YwcfYXUi a `]g3
GnØYhÅg`Y mY`Åg]XY`Y

A _cf`Åg`c`gØYhYh3

K Wf`k ccbhi 3
@U_`Ym

< c` `U_`3

K Uh]gi k `UXfYg3
7Ēa

A]`UVĒa Y3

K Uh]gi k `bUh]cbU]hY]h3
š `Ua dc` [1Ēg]ĒU3

A]`Uh`1/2Ua dc` [1Ēg]ĒU3

K UbbYf`Ybhi `]b`OubXQUb[Y_ca Yb3
Cfgr1ĒVUj UĪ `a Y[Åf_YnÅg]X dcbhU

A _cf`Åf_YnYh]Cfgr1ĒVUC3

? Ub`i `a]^Ugi V]YZhi k `]XYbh]hY]hg_Ufh]cbYb3
GnYa Åm`][Uhc`j 1ØmVYa i hU]ĒU

? ÅfYa ža i hUgg]a Y[`UgnYa Åm`][Uhc`j 1ØmVY`

8c_i a Ybh a c_! 7gJ 1X] 1/2Udch `c`UbX

A]b`Vi f[Yf]^Y`gUhg]SSSSSSSSSS"
7gJ 1X] 1/2Udcha Y[UX1ĒU

a U[nbf
5 1ĒU 1X] 1/2Udcha `SSSSSSSSSS"

U`YbghUbx
7gJ 1X] 1/2Udch

Y[nYXØ 1/2Ī #UUXcb#b hYb

[Yni k X
7gJ 1X] 1/2Udch

\ 1ĒUg

i]hY`_Wf
7gJ 1X] 1/2Udch

_ØCb`Å`U` \ 1ĒUg]Ēg]Ī`

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



[YgWY]Xyb
7gU 1/2] 1/2 Udch

Yj 1/h

gJa Ybk cbYbX
7gU 1/2] 1/2 Udch

Å YH1Eg]_ UdVg^ UHUb j Ub

[YfY[]gfYfX`dUfbYfgWUd
7gU 1/2] 1/2 Udch

fY[]grf 1/2h Å YH1Eg]_ UdVg^ UHUb j Ub

cb[Yfci k XY`dUfbYfg
7gU 1/2] 1/2 Udch

Å YH1Eg]_ UdVg^ UHUb j Ub

]b`Yyb`fY`UjY
7gU 1/2] 1/2 Udch

Å YH1Eg]_ UdVg^ UHUb j Ub

j Yfk YXi k X
7gU 1/2] 1/2 Udch

Òj Y[m

< YYZhi `_]bXYfYb3
; mYfY_Y_

J UbbU_ '[nYfa Y_Y]3

< YYZhi `]bk cbYbXY`dYfgcbYb`hYb`UgY3
5 bbU_`a Y[ÅfXY_` XÅgZ`c[mj UU_]`UbU[]`gY[ÉgÅ[YhbmÖH Y`Uj Y`Y`Y[mØthÅ` _bY_

¥`bY_`ÖbbY`Y`Hf`h`U_3

=_`nci `a]^[fUU[] YfYb][Yb`a Yha]`b`ZJa]`Y"
7gU 1/2Y[mYg`h`Åg]`gn1bXÅ`_]ZY`YnÅgY

GnYfYbÅa `Y[mYg`h`b]`U`VgU`1/2ca`UH'

8c_i a Ybhi a c_! F Y[]grf 1/2] 1/9 Y[mj 1/2cgUub

\c`UbX

a U[nbf

=_`nci `a]^[fUU[`Ugb]Yi k _ca Yf`fY[]gfYfYb`V]`^XY
gtUX"

GnYfYbÅ_`fY[]grf 1/2b]"

J 1/2cgUub j U`i`fY[]grf 1/2] 1/9

K Y`Y`XcW`a YbH`b`a c`Yh]_`a YybYa Yb3
GnØ`gÅ[Yg`Xc_i a Ybhi a c_

A]`mYb`Xc_i a Ybhi a c_`Uh_`Y``a U[`Ua a U` \`cnbca 3

N]`b`Yf`fY[]gfU]Y`cgYb3

J Ub`fY[]grf 1/2] 1/9 gXÉ3

F Y[]grf 1/2] 1/9 gXÉ`ZY` `]`ÅfXY_` XÅg

6Yj 1bXcf`1/ø 8c_i a Ybh a c_



=_Vyb`\\Yf'ca `a]'b'k ccbd`Uhg'h'Xca]W']QfYb"
@U_ï \\YmfY[]gnf1/2/ø

GnYfYtbÅa `fY[]gnf1/2/ø'U`U`\\YnYa "

=_nci `[fU[`Yyb Uthghj Ub [cYX[YXfU[`Yb`nXYyb
Ubj fU[Yb"
9f_ÖVg] V]ncbntfj `bmi][ÅbmiÅgY

GnYfYtbÅ_ Yf_ÖVg] V]ncbntfj `bnti_Åfb]"

=_nci `[fU[`Yyb] YfV]Zg Yf[i bb]b[`Ubj fU[Yb"
Hufi n_cX1/ø] `Yb[YXÅ`m][ÅbmiÅgY

GnYfYtbÅ_ Hufi n_cX1/ø] `Yb[YXÅ`nti][ÅbmiÅgY]"

8c_i a Ybh a c_!`9[ÅngÅ[V]ntcgf1/ø \\c`UbX

=_nci `[fU[`Yb_Y`Y`j fU[Yb`gh`Y`Yb`cj Yf`XY
n]Y`_H`_cgYbj YfnY`Yf]b["
9[ÅngÅ[V]ntcgf1/ø] `UdVg`Urcg`ÅfXÅgY`Z`hÅH`Y`Y

a U[ntUf
@YbbY`d1/2`_ÅfXÅgYa `Uh`Y[ÅngÅ[V]ntcgf1/ø]U
_UdVg`UHVb"

<YV`_ `bccX`Uub`Yyb`dUfh]W`]YfY
n]Y`_H`_cgYbj YfnY`Yf]b[3
5 bbU`_a Y[ÅfXY`_ XÅgYz`c[mgnØ_gÅ[Yg]Y`df]j `1/2Y[ÅngÅ[V]ntcgf1/ø]_Øtb]

GnØ_gÅ[Yga U[1/2`Y[ÅngÅ[V]ntcgf1/ø]_Øtb]3

K Uhk cfXhYf` [XY`hXccf`XY
n]Y`_H`_cgYbj YfnY`Yf]b[3
5 bbU`_a Y[ÅfXY`_ XÅgYz`c[mia]hZYXn`UV]ntcgf1/ø

A]hZYXn`UV]ntcgf1/ø]3

N]Y`_Yb`i]g`cgYb
DÅ`XU`UffUz`c[mia]hZYXn`YhY[ÅngÅ[V]ntcgf1/ø

? `i`f`\\`1/2]`_ØhgÅ[Y`_

? cgYb`j ccf`\\YhfUUXd`Y[Yb`j Ub`Yyb`gdYWU]gh
DÅ`XU`UffUz`c[mia]hZYXn`YhY[ÅngÅ[V]ntcgf1/ø

GnU`cfj`cg

8]U[bcg]gWY`hcYfng
DÅ`XU`UffUz`c[mia]hZYXn`YhY[ÅngÅ[V]ntcgf1/ø

8]U[bcg]h`_U]j]ng] 1/2Uc`_

7`\\fi`f[]gWY]b[fydyb
DÅ`XU`UffUz`c[mia]hZYXn`YhY[ÅngÅ[V]ntcgf1/ø

A `hÅ]`VWU] Uh`cn1/ø

DgnW]Uhf]gWY`V\\UbXY]b[
DÅ`XU`UffUz`c[mia]hZYXn`YhY[ÅngÅ[V]ntcgf1/ø

Dgn]W]1/2f]U]`_YnY`Åg

6Yj 1bXcf`1/ø 8c_i a Ybh a c_



HUb\YY_j bX][YV\UbXY]b[Yb : c[cfj cgj`_YnY Åg
DÅ XU UfflU`c[mia]hZYXn\YhY[ÅgngÅ[V]ntcgrf1/ø

Cc[ncf[`V\UbXY]b[Yb GnYa ÅgnYh`_YnY Åg
DÅ XU UfflU`c[mia]hZYXn\YhY[ÅgngÅ[V]ntcgrf1/ø

8c_i a Ybh a c_ ! J Éri a

\c`UbX

a U[nbf

K Ufca `j fU[hi `Yb`j]gj a `Uub3

A]Åfh][Åbm] UVYi hUh1/ø] j Éri a ch3

5 bbU_`a Y[ÅfXY_` XÅgYž`c[mij U U_]`a]Åfh][ÅbmY `VYi hUh1/ø] j Éri a ch

< YV`_`Yb`j]gj a `bcX][`ca `OubXQhY`VYncY_Yb3 ? Y` j Éri a `U\cnž`c[mia Y[`1/øc[UggJa `Cfgr1/ø] ch3
5 bbU_`a Y[ÅfXY_` XÅgYž`c[mgnØ_gÅ[Yg Y`j Éri a `Uhc`fgr1/ø] VUj U`i `Vi hUh1/ø] \cn

< cY`_Ub`_]`a]b`j]gj a `j Yf Yb[Yb3 < c[ntb`h`i Xca `a Y[\cggUWÉhUb]`Uj Éri a ch3
¥fXY_` XÅg`Uj Éri a `a Y[\cggUWÉhUb]`Uj

K Ufca `k YfX`a]b`j]gj a `Uubj fU[`[Yk Y][YfX3 A]Åfhi hUgfrch1/2` Y `Uj Éri a `Y`Ybh_YnÅgYa 3
5 bbU_`a Y[_ÅfXYnÅgYž`a]Åfhi hUgfrch1/2` Y `Uj Éri a `Y`Ybh_YnÅgh

? Ub`_]`Yb`_Uubj fU[Yb`ca `Yb`dYfa UbYbhY`]bk cbYf 6Y`Ybh_Yn\YhY_`1/2`UbXí ``U`i`_`Åbh3
h`k cfXYb3
5 bbU_`a Y[ÅfXY_` XÅgYž`c[m`Y\YhÅ[Yg Y`1/2`UbXí ``U`i`_`Åbhj U`i `fY[]grf1/2]ø

8c_i a Ybh a c_ ! J YnYhÅg

\c`UbX

a U[nbf

A cYh]_`Yh_YbhY_Yb`j Ub`a]b`U hc`j YfUbXYfYb3

?]_Y` VgYfÅhYbYa `UhU` h`a `fYbXgn1/ø 1/ø3

5 bbU_`a Y[_ÅfXYnÅgYž`c[mgnØ_gÅ[Yg Y`U`fYbXgn1/ø VgYfY`Uh`U` h` bž`U`]XY[Yb`c`fgr1/ø] VÍ ``\cnn1/2` VY

=_nci `[fU[`a]b`j cYfh][`fY[]grfYfYb" GnYfYhbÅa `fY[]grf1/2]`U`Y`æa `j Ya Yh`
>1/æa `fY[]grf1/2]ø

=_ga]b`f]VYk]g`Yf[YX][3 ¥fj ÅbnYg]hU`c[cgfj 1/øncæ 3
5 bbU_`a Y[ÅfXY_` XÅgYž`c[miU`c[cgfj 1/ø] mU`h`c`fgr1/ø] VUb`Åfj` ÅbnYg Y

=_nci `[fU[`Yb`j cc`f`cd][`f]VYk]g`Uubj fU[Yb" GnYfYhbÅ_`]XY][`YbYg`c[cgfj 1/ø]nhi][ÅbmY`b]"
=>XY][`YbYg`c[cgfj 1/ø]m][ÅbmÅgY

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



=_inci '[fU['Yyb`UzgdFU_`a U_Yb`j ccf`a]`b
SSSSSSSSSS"

GnYfYtbÅa ``YZc[`Ub]`USSSSSSSSSS"

J YnYh]j]ng[UX1a a 1bU_`YZc[`U 1gU

h.YcfYh]gWY`hYgh
J]ng[U`hdi gU

Ya ÅYh]j]ng[U

f]Yi Ua Yb
J]ng[U`hdi gU

[nbU_cf`Uh]j]ng[U

=_inci '[fU['SSSSSSSSSSSS`UbdUggYb`cd`a]`b
f]VYk]`g'
>c[cgfj 1bncb`gnYfYd` `UXUc_`a i Xcgf1gU

GnYfYtbÅa `a Y[j 1zcnhUrb]`USSSSSSSSSSSSSU
^c[cgfj 1bncb cb"

a]`b`UXfYg
5a]ha Y[`gnYfYtbY`j 1zcnhUrb]

V1a

a]`b`bUa
5a]ha Y[`gnYfYtbY`j 1zcnhUrb]

bÅj

a]`b`Zhc
5a]ha Y[`gnYfYtbY`j 1zcnhUrb]

ZÅbm`Ad

=_inci '[fU['Yyb`^c[YfY`WYh[cf]Y`hcY] cY[Yb`Uub
a]`b`f]VYk]`g'
5a]ha Y[`gnYfYtbY`j 1zcnhUrb]

GnYfYtbÅ_`a 1g_`Uy[i f]1b`^cm1bXb]`U
^c[cgfj 1bncb `cnr'

=_inci '[fU[`a]`b`f]VYk]`gj Yfb]Yi k Yb"
>c[cgfj 1bma Y[Öf1gU

GnYfYtbÅa `a Y[ÖfUub]`U`^c[cgfj 1bncb

=_inci '[fU['Yyb`SSSSSSSSSS`f]VYk]`gj
j Yfj Ub[Yb"
>c[cgfj 1bmidí h1gU

GnYfYtbÅ_`dí hc`b]`Y[n\$SSSSSSSSSS`^c[cgfj 1bnth'

j Yf`cfYb
DfcV`Åa U

Yj YgnYth

[Ygnc`Yb
DfcV`Åa U

Y`cdch

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



VgWUX] X
DfcV`Aa U

gAfØh

=_nci` [fU]]b`VYfcYd [Uub`hY [Yb`a] `b`f] } YFvcX"
J YnYhÅgh` `j Uİ` `Yh]`h/g`Y`Yb]`ZY`YVYnÅg

GnYfYhbÅ`ZY`YVYrb]`Uj YnYhÅgh` `j Uİ` `Yh]`h/g`ca`Y`Yb"

8c_i a Ybh a c_! š`Ua dc` [1/g]` `c`UbX

a U] nbf

=_nci` [fU] `XY`OubX!`UX`YV]YZObU]cbU]h]h
Ubj fU] Yb"
š`Ua dc` [1/g]`] [ÅbmÅgY

GnYfYhbÅ`Ocfgn]`Q/2`Ua dc` [1/g]`ch] [ÅbmYb]"

K Uf`Ub]`_a]`^]bgWf]`Yb] ccf`XY`OU`OHYgB
BmY]]`hYgnfY] Uİ` `Y`Ybh`YnÅg

< c`hi Xc_`Y`Ybh`Yrb]`U`OmY]`CHYgnfY3

=_`YV`Yb`V`UbWt`gfUzV`UX"
Bm]`Uh`cn]`g]VObhYhYb`Y`Å`Yf` `

6ObhYhYb`Y`Å`Yh`j`U]`nc_`"

=_`YV`Yh]`YfY]gY`hU]b]`YU` `j`Ub`Yh`OU`O
5`gnØ`gÅ]`Yg`bmY]`]`gn]`bia`Y]`Å`hY

F`YbXY`_YnYa` `U`gnØ`gÅ]`Yg`OmY]`O]`X]`ggU`"

=_nci` [fU] `Yb`U [Ya`Yb`Y`hYghVcY`Yb`cj`Yf`Yh
`Y]`Yb`]b`OubXQ
š`hU`YbcgY`a`Å`Yh]`j`]ng]`U`YhÅY`Y

GnYfYhbÅa` `YhYbb]`Uh]`1/2`hU`YbcgY`a`Å`Yh]`j`]ng]`1/2`

K`Uhn]`b`XY`_cgYb]`ccf`Yh]`Ubj`fU]`Yb]`Ub`Yb
gU]`hVi`f]`YfgWUd3
8ÉU_

A`Ybhn]`Y`_YfØ`1/2`Ua dc` [1/g]`]`_Å`Y`a`Yh`VYbnØ`hU]`3

A]`b`YW]h]`Ybcch`Y`YznXY`Oub]cbU]h]h!`UX`YV]YZO
bU]cbU]h]h"
<`1/2`hU]h]`g]`1/2`Ua dc` [1/g]`]`U

5`1/2`hU]h]`g]`O]`Ua dc` [1/g]`]`O]`Ua dc` [1/g]`"