



HUMS1012

5i ghfU`]Ub`5Vcf][]bU``@Ub[i U[Yg

Gi a a Yf`##`&\$&%

7 ci fgY`Cj Yfj]Yk

GhJZZ`7 cbhJWw`8 YhU]`g

7 cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cWlhcb	D\cbY
7`U]f`<]`	WU]f`\]`4 i bgk "YXi "Ui	cb`]bY`j]U Uddc]bha Ybh	&&, `A cfj Yb 6fck b	B 5

GWx cc``7 cbhJWw`bZcfa Uh]cb

GWx cc``cZ<i a Ub]h]Yg`UbX`@Jb[i U[Yg

@cWlhcb. `GWx cc``C Z]Ww`ZA cfj Yb`6fck b`6i]X]b[ž`@Yj Y``&ž&),

CdYb]b[`<ci fg.`A cbXUm!`: f]XUmž`- Ua `!`) da

D\cbY. `ž`*%&`i`-`'` ,`)` `)%*,` %

: Ul. `ž`*%&`i`-`'` ,`)` ;` ,` +\$)

9a U]. [\U`4 i bgk "YXi "Ui](#)

7ci fgY'8YHJ]`g

7fYX]hDc]bqg`*`

Gi a a UfmicZ\hY'7ci fgY

6miH_]b['h]g'Wci fgYžmci 'k]` [U]b'Ub'UddfYW]U]cb'cZ5i ghfU]U'g'f]W\UbX'Wca d'Yi '5Vcf][]bU`]]b[i]gh]W \Yf]H]Y`]b'WcbhYa dcfUfmUbX'fUX]h]cbU'WcbhY]hg"Mcic'k]`XY'j Y`]bhc'U'W fUHY'X'fUb[Y'cZhd]Mg`]bW] X]b['Ub[i U[Y'UbX'hY'UbXž_]bg\]d'UbX'gcW]U'cf[Ub]gU]h]cbž'bUffU]h] Y'UbX'Wcbj YfgU]h]cbž'Ub[i U[Y'UWci]g]h]cbž 'Ub[i U[Y'WcbhUWž'Ub[i U[Y'UbX'YXi W]h]cbž'Ub[i U[Y'a U]bhYbUbW'UbX'fYj]j U`"9UW\cZ\hYgY'hd]Mg'k]` VY'X]gW ggYX'k]h'fYZfYbW'hc'Yb[U[]b['WUgY'ghi X]Yg'cZW ffYbhfYgYUfW\UbX'W ffYbhWca a i b]m]VUgYX dfcYW]g" H\fcic [\ 'hY'Yi d'cfU]h]cb'cZ\hYgY'hd]Mgžmci 'k]`YUfb'UVci h'hY'W\UfUWY'f]gh]W]b[i]gh]W dfcdYf]Yg'cZ5i ghfU]Ub'Ub[i U[Yg'UbX'Udd'mUbU'm]W]g_]`g'hc'hY'XYgW]d]h]cb'cZ5i ghfU]Ub'Ub[i U[Y XU]U" H\YfY'k]`VY'U'ZcW'g'cb'ck'byk'k Umg'cZgdYU_]b['UfY'WYUHYXž'ck'Ub[i U[Yg'UfY'cg]ž'UbX'hY k Umg']b'k \]W'5Vcf][]bU`gdYU_Yfg'UfY'hUW\]b['UbX'fYj]j]b['hY]f'fUX]h]cbU'Ub[i U[Yg'hcXUm'Mcic'k]` kcf_]k]h'U'gY'YW]h]cb'cZUi hYbh]WBGK '5Vcf][]bU`Ub[i U[Y'a UHY]U'Zca'GHUHY'@]VfUfmicZBGK Wc'YW]h]cbg" b'Xc]b['gcžmci 'k]`\Uj Y'UbXg!cb'Yi dYf]YbW']b'ck'hc'Z]bX'UbX'i h]gY'f]W'UfW]j U']b[i]gh]Wa UHY]U'UbX'hY'Yh]W]d'fUW]W]g']b'hY'a UbU[Ya YbhUbX'i gY'cZ5Vcf][]bU`Ub[i U[Y'a UHY]U'g" Mcic'k]`H_Y'Uk Um]Zca 'h]g'Wci fgY'U'XYdYbYX'i bXYfg]h]cb]b['cZgcW]U'UbX'W'h'fU'X]j Yfg]m]Ug'gYyb h'fcic [\ 'hY'Ybg'cZ'Ub[i U[Yž'UbU'm]W]a Yh'cXg'UbX'W]h]W]h]b_]b['g_]`gž'UbX'_bck'YX[Y'cZfYgYUfW\ Yh]W]g'UbX']bh'YWi U']bh[f]m]

7ci fgY'@YUfb]b['Ci hWca Yg

%` ÆYbh]ZmW ffYbhXYVUHY'g'UbX']ggi Yg]b'hY'ghi XmcZ5i ghfU]Ub'Ub[i U[Yg
&" F YWc[b]gY'Wca a cb`]]b[i]gh]WZYUhi fYg'cZ5i ghfU]Ub'Ub[i U[Yg
' " 5dd'mdf]bW]d'Yg'cZ'Ub[i U[Y'UbU'm]g]g'UbX'XYgW]d]h]cb'hc'5i ghfU]Ub'Ub[i U[Y'XU]U
(" 9I \]V]h]fYgYUfW\Yh]W]g'UbX'UfW]j Y'dfc'hc'Wc'g']b'hY'a UbU[Ya Ybh'cZ5Vcf][]bU`Ub[i U[Y'a UHY]U'

HYUW\]b['GhfUHY[]Yg`

H\Y'Wci fgY'k]`H_Y'hY'Zcfa'cZgYa]bUfg'X]j]XYX']bhc'hk'c'dUf]g" H\Y'Z]fgh\U'ZcZ\hY'gYa]bUf'k]`Wcbg]gh cZWcbhYbhk \]W'dfYgYbhg]Z bXUa Yb]U'WcbW'd]g'UbX'VUW_] fci bX'_bck'YX[Y" H\Y'ch'Yf'\U'ZcZ\hY gYa]bUf'k]`]bW] XY'U'Wca V]bU]h]cb'cZ]gW gg]cbg'UbX'[_ fci d'UW]j]h]Ygždfc]]X]b['Ub'cddcf]h]b]m]Zcf gh'XYbhg'hc'UW]j Y'mYb[U[Y'k]h'hY'Wci fgY'a UHY]U" H\Y'Wci fgY'k]`U][b'k]h'] BGK 'g' b]h[fUHYX 7i ff]W'ia': fUa Ykcf_

5ggYgga Ybh

5ggYgga YbhHUg_g

5ggYgga YbhHUg_g	K Y][\h	8i Y'8UH	Gh XYbh@YUfb]b[Ci hWta Yg'5ggYggYX
E i]n'	&\$!	&&#%#&\$&%\$*.\$\$.DA	%ž &
8UH'UbU'mg]g'hUg_g	(\$!	' %&\$%#&\$&%\$*.\$\$.DA	&ž' ž(
F YgYUfW 'YggUm	(\$!	\$' #&#&\$&%\$*.\$\$.DA	%ž &ž'

5ggYgga Ybh8YHU]`g

5ggYgga Ybh% 'E i]n

GHUfhXUH. '&%#%#&\$&%\$*.\$\$.DA

8YHU]`g.

Gh XYbh]k]`Wta d'YH'U' (\$!)Hya 'cb]bY'ei]n'Wcj Yf]b['WUgg'WcbH'bH'H\Y'ei]n'k]`]bWl XY'a i 'hd'Y!Wc]Wž
hfi Y#U]g'UbX'Z']!b]hY! [Ud'ei Ygh]cbg" -bX]j]Xi U'a Uf_g'k]`VY'fYh fbYX'Y'Wfcb]WU`mž'Zc`ck YX'VmWUgg!
k]XY'ZYXVUW`"

Hi fb]h]b'gYH]b[. 'H\]g]g'bchU'Hi fb]h]b'Ugg][ba Ybh

5ggYgga Ybh& '8UH'UbU'mg]g'hUg_g

@Yb[h. '%ž\$\$\$

8YHU]`g.

Gh XYbh]k]`gY'YWhBGK 'UfW]j U`Ub[i U[Y'XUH'hc'UbU'mgY'UWw'fX]b['hc'cbY'cZhY'Wci fgY'hcd]Wg'f%ž\$\$\$
k cfXg'Yl Wl X]b['UbmUbU'mh]WU'hUV'Yg'cf'dfYgYbH]cb'cZXUH'U'A Uf_]b['i]g]b['U'fi Vf]W'Gh XYbh]g'fYW]j Y
Ub]bX]j]Xi U'a Uf_'UbX']bX]j]Xi U'k f]hYb'ZYXVUW`"

Hi fb]h]b'gYH]b[. 'H\]g]Ugg][ba Ybh]g]gi Va]hYX'hfci [\ 'Hi fb]h]b'UbX'gh XYbh]Xc'bchgYY'Hi fb]h]b
g]a]Uf]mifYdcftr"

5ggYgga Ybh' . 'F YgYUfW 'YggUm

GHUfhXUH. 'Bch5dd]WUVY

@Yb[h. '&ž) \$\$

8YHU]`g.

Gh XYbh]k]`k f]hY'Ub'UbU'mh]WU`gW'c'Uf'f'UWXYa]WYggUm]f&ž) \$\$'k cfXg'U'Gi [[YghYX'YggUm]hcd]Wg'k]`VY
a UXY'Uj U]UV'Y'cf'gh XYbh]WUb'XYj Y'cd'hY]f'ck b']b'Wcbgi 'hU]cb'k]h'hY'Wci fgY'Wcbj Ybcf"A Uf_]b[

i g]b['U'fi Vf]W'Gh XYb]g'fYVW]j Y'Ub']bX]j]Xi U`'a Uf_'UbX']bX]j]Xi U`'k f]hYb'ZYXVUW_"

Hi fb]h]b'gYh]b[. 'H\]g'Ugg][ba Ybh]g'gi Va]hYX'hfci [\ 'Hi fb]h]b'UbX'gh XYb]g'Xc' bchgYY'Hi fb]h]b'g]a]Uf]mifYdcf]g"

5 HbXUbW F Yei]fYa Ybhg

Gh XYbhg UFY gfcfb [mYbWci fU[YX hc UHbX U WUggYg UbX fyj]Yk YWfi fy fYWcfX]b[g"

7 ci fgY GWYXi Y

[J Yk WUgg ha YHUVY](#)

Hja YHUVY

8 UHr	HmdY	7 cbHrYbh
A cXi Y % @Ub[i U[Y YWc c []Yg	GYa]bUf	dfcXi Wjcb hc hY bX][Ybci g Ub[i U[Yg cZ 5i ghU]U @Ub[i U[Y YWc c []Yg]b dfY! WcbHWHUbX WcbHYa dcfUfmWcbHYI hg fk]h U gdYWU ZcW g cb GmXbYm Ub[i U[Yfg
A cXi Y & @Ub[i U[Y UbX hY UbX	GYa]bUf	GYa UbhVg UbX _bck YX[Y gmghYa g UbXgWUdY UbX Ybj]fcb a YbHU _bck YX[Y
A cXi Y " . GrcfntY]b[GYa]bUf	GrcfntY]b[UbX]hg W hi fU UbX]b[i]ghW g[b]WbW UbX fc Y]b Ub[i U[Y XcW a YbHhcb
A cXi Y (. BYk Ub[i U[Yg	GYa]bUf	@Ub[i U[Y WcbHWHUbX bYk bX][Ybci g Ub[i U[Yg. WYc Ygza]l YX Ub[i U[Yg UbX j Uf]YhYg cZ 5Vcf[]bU 9b[]g\
A cXi Y) . 7cbj YfgUhcU ghmYg	GYa]bUf	7cbj YfgUhcU ghmYg UbX Wfcgg! W hi fU Wca a i b]WUhcU]b YXi WUhcU UbX Y[U gYh]b[g
A cXi Y * . @Ub[i U[Y UVei]g]hcb	GYa]bUf	@Ub[i U[Y UVei]g]hcb]b bX][Ybci g Wca a i b]hYg]bVh X]b[Ub[i U[Y fyj]j U WcbHYI hg
A cXi Y + . @Ub[i U[Y fyj]h]gUhcU dUfh%	GYa]bUf	

A]

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

D`YUgY`fYZf`h`A ccX`Y`Zf`a cfY`XYHJ]g"

F YWca a YbXYX`F Ygci fWg

D`YUgY`fYZf`h`A ccX`Y`Zf`a cfY`XYHJ]g"

7ci fgY`9j U`i Uh]cb`UbX`8Yj Y`cda Ybh

H\]g`]g`h`Y`Zfgh]a Y`h`]g`Wci fgY`Ug`VYYb`cZZfYX"=k]`k Y`Wca Y`ZYXVUW`h`fci [\ci h`h`Y`Wci fgY`gc`h`Uh]h`Wb`VY`]a dfcj YX`UbX`k]`fYei YghZcfa U`ZYXVUW`Zca`ghi XYbhg`Uh`h`Y`YbX`cZ`h`Y`Wci fgY`H\]g ZYXVUW`U`cb[`k]h`fYgi`hg`cZ`h`Y`ghi XYbhZYXVUW`]b`a m9I dYf]YbW`fYdcf]g`k]`VY`i gYX`h`]a dfcj Y`h`Y Wci fgY"

Gi Va]gg]cb 'cZ5ggYgga YbhiHUg_g

Hi fb]h]b 'Gi Va]gg]cb

≠Zmci 'YbWci bHYf'U'dfcV'Ya 'k \Yb'UHYa dh]b['hc'gi Va]hmc i f'Ugg][ba YbhiHfci [\ 'Hi fb]h]bž'd'YUgY
HY'Yd\cbY'9I HYfbU'Gi ddcfhcb'- ' ,) " ' ' %cf'Ya U] 'h'Ya 'cb'YI HYfbU'HY'hgi ddcfh4 i bgk "YXi "Ui "'Gi ddcfh
\ci fg'UfY' , .\$Ua '—%\$. \$\$da 'cb'k YY_XUmg'UbX'-. .\$Ua '—) . \$\$da 'cb'k YY_YbXg'f1 *) 'XUmg'U'mYUfL" ≠Zmci
UfY'i bUV'Y'hc'gi Va]hmc i f'Ugg][ba YbhiXi Y'hc'U'Zi 'hk]h'Hi fb]h]b'mci 'a UmiUdd'mZcf'Ub'YI HYbg]cbž'Vi hmc i
a i ghfYhU]b'mci f'h]W_Yhbi a VYf'Zca '9I HYfbU'Gi ddcfhfU'cb['k]h'Ubmic'hYf'fY'Y] UbhXcW a YbfgL'hc

5 WUXYa]W< cbYgmiUbX'D`U[]Uf]ga

D`U[]Uf]ga]g'i]b['hY'k cfXg'cf]XYUg'cZcH.Yfg'UbX'dfYgYbh]b['hYa 'Ug'mci f'ck b" #WUb'fU_Y'a Ubm
Z'ca gZ'Zca 'XY'VYfUHY'WX.YU]b['hc'UW]XYbhU'mWcdm]b['Zca 'U'gci fW'k]h'ci hUW_bck 'YX[Ya Ybh'

I BGK '[fci dg'd`U[]Uf]ga]bhc'hY'Z'ck]b['WU] [cf]Yg.

7 cdm]b[.i]g]b['hY'gUa Y'cf'j Yfmg]a]Uf'k cfXg'hc'hY'cf][]bU'hYi hcf]XYU'k]h'ci hUW_bck 'YX[]b['hY
gci fW'cf'i]g]b['ei chU]cb'a Uf_g" 'H\]g'U'gc'Udd'Yg'hc]a U[YgZ'UfhUbX'XYg][b'dfc YWgZ'Ug'k Y''Ug
dfYgYbhU]cbg'k \YfY'gca YcbY'dfYgYbhg'Ubch.Yf'g]XYUg'cf'k cfXg'k]h'ci hWYX]h'

#Uddfcdf]UHY'dUfUd\UfUg]b[.7\Ub[]b['U'Zk'k cfXg'UbX'd\UfUg'k \]Y'a cghmfYU]b]b['hY'cf][]bU'
ghf' W'fY'UbX#f'dfc[fYgg]cb'cZ]XYUg'cZcH.Y'cf][]bU'z'UbX']bZ'ca U]cb'k]h'ci hUW_bck 'YX[Ya Ybh'H\]g'U'gc
Udd'Yg]b'dfYgYbhU]cbg'k \YfY'gca YcbY'dUfUd\UfUg'g'Ubch.Yf'g]XYUg'cf'k cfXg'k]h'ci hWYX]h'UbX'hc
d]YW]b['hc[Y'hYf'ei chYg'UbX'dUfUd\UfUg'g]bhc'U'bYk'k \c'Yz'k]h'ci hUddfcdf]UHY'fYZYfYbW]b["

7c''i]g]cb.'k cf_]b['k]h'c'hYfg'Vi hdUgg]b['cZcH.Y'k cf_'Ug'U'dYfgcb'g']bX]j]Xi U'k cf_"7c''i]g]cb'U'gc
]bWi XYg'dfcj]X]b['mci f'k cf_'hc'Ubch.Yf'g]h'XYbhVYz'fY'hY'Xi Y'XUHY'z'cf'Z'f'hY'di fdcgY'cZcH.Ya
d`U[]Uf]g]b['UhUbmi]a Yz'dUm]b['Ubch.Yf'dYfgcb'hc'dYfZ'ca 'Ub'UWXYa]W]Ug_z'gh'U']b['cf'UW'ei]f]b[
Ubch.Yf'dYfgcb'g'UWXYa]Wk cf_'UbX'Wcdm]b[]h'cZ'Z]f]b['hc'W'ca d'YHY'Ubch.Yf'dYfgcb'g'k cf_'cf'gYY_]b[
dUma YbhZ'f'W'ca d'Y]b['UWXYa]Wk cf_"

#Uddfcdf]UHY'W]U]cb.'7]h]b['gci fW'g'k \]W\Uj Y'bhVYYb'fYUXz'k]h'ci hUW_bck 'YX[]b['hY''gYW'cbXUfm'
gci fW'Z'ca 'k \]W'_bck 'YX[Y'cZcH.Ya '\Ug'VYYb'c'fU]bYX"

8i d']W]cb'f'fY'Z'd`U[]Uf]ga 'E'gi Va]h]b['mci f'ck b'k cf_z']b'k \c'Y'cf']b'dUf'z'k \YfY']h\Ug'dfYj]ci g'm
VYYb'dfYdUfYX'cf'gi Va]hYX'Z'f'Ubch.Yf'UggYgga Ybhcf'W'ei fgY'Uhi BGK 'cf'Ubch.Yf'i b]j Yfg]h'

7 cffYW'fYZYfYbW]b['dfUW]W]g.

- DUfUd\UfUg]b[žgi a a Uf]g]b[žYggUmk f]h]b['UbX'h]a Y'a UbU[Ya Ybh
- 5ddfcdf]UHY'i gY'cZUbX'Uhf]Vi h]cb'Z'f'U'fU]b[Y'cZa UHYf]U'g']bWi X]b['hYi hz']a U[YgZ'Z'ca i 'UY'UbX
W'cbW'dtg"

#X]j]Xi U'Ugg]ghU]bW']g'Uj U]UV'Y'cb'fYei YghZ'ca 'H\Y'@YUfb]b['7YbhY'f'f'hd.#k k k "Wi bgk "YXi "Ui #"
Gh XYbhg'UfY'U'gc'fYa]bXYX'hUhW]fYz' 'h]a Y'a UbU[Ya Ybh]g'Ub]a dcfU]bhdUfhcZgh XmiUbX'cbY'cZcH.Y
]XYbh]ZYX'W]i gYg'cZd`U[]Uf]ga]g'dccf'h]a Y'a UbU[Ya Ybh'Gh XYbhg'g'lc'i 'X'U'ck'gi Z]W]Ybh]h]a Y'Z'f
fYgYUfW'z'XfU]b['UbX'dfcdYf'fYZYfYbW]b['cZgci fW'g']b'dfYdUf]b['U''UggYgga Ybh]h]a g"

I BGK '@]VfUfmU'gc'\Ug'hY'9@G9'hc''Uj U]UV'Y'hc'Ugg]ghmci 'k]h'mci f'gh'XmiUhi BGK "'9@G9']g
XYg][bYX'hc]bhcXi W'bYk'gh XYbhg'hc'gh X]b['Uhi BGK 'Vi h]hW]b'U'gc'VY'U'[fYUhfYZYg\Yf'Xi f]b['mci f

- i bXYfghUbx'mci f'f][\hg'UbX'fYgdcbg]V]h]Yg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[]Uf]ga ž'Wcdmf][\hžI BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5Ww'dhUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Wm
- VY'Uk UfY'cZh'Y'ghUbxUfXg'cZVY\Uj]ci f'YI dYW'X'cZYj Yfmcby'j]b'h'Y'I BGK 'Wca a i b]m
- `cWJh'gYfj]Wg'UbX'j]bZcfa Uh]cb'UVci hl BGK 'UbX'I BGK '@]VfUfm

Gca Y'cZh'YgY'UfYUg'k]`VY'ZJa]]Uf'hc'mci ž'ch'Yfg'k]`VY'byk "; U]b]b['U'gc`X'i bXYfghUbx]b['cZU`h'Y fY'UH'X'UgdYW'g'cZ9@G9'k]`Y'd'mci 'a U_Y'h'Y'a cghcZmci f'gh X]Yg'Uhl BGK ""

[\hd. #gj V'YWf i \]XYg" \]VfUfm'i bgk "YXi "Ui #'\]gY#JVci h' \]gY](#)

5 WUXYa]WbZcfa Uh]cb

: cfYggYbh]U`gh XYbh]bZcfa Uh]cb fY`Uh]b[`tc.

- fYei Yghg`Zcf`YI H`bg]cb/
- `UhY`gi Va]gg]cbg`[i]XY`]bYg/
- fYj]Yk `cZa Uf_g/
- I BGK `<YU`h`UbX`GUZYmidc`]WYg/
- YI Ua]bUh]cb`dfcW`Xi fYg/
- gdYW]U`W`bg]XYfUh]cb`]b`hY`Yj Ybhcz]`bYgg`cf`a]gUXj Ybh fY/
- gh XYbhYei]mUbX`X]gUV`]m/
- UbX`c`hYf`YggYbh]U`UWUXYa]W]bZcfa Uh]cbz`gYY

[\ftdg.#k k k "Uftg"i bgk "YXi "Ui #W ffYbh\]gh XYbh\]UWUXYa \]W\]bZcfa Uh\]cb#dfchW`g`\[i \]XY`\]bYg#](#)

⇒ a U[Y`7 fYX]h

GmbYf[]Yg`]b`Gci bX`&\$%*`

7F ⇒ CG

7F ⇒ CG`Dfcj]XYf`7cXY.`\$\$\$- , ;

5W_bck`YX[Ya Ybhcz`7ci b]fm

K Y`UW_bck`YX[Y`hY`6YXY[U`dYcd`Y`k`c`UfY`hY`hfUX]h]cbU`W`ghcX]Ubg`cZ`hY`UbXg`cb`k` \]W`I`BGK
? Ybg]b[hcb`W]a`di`g`]g`cW]hYX"