



HUMS2000

5 fmg' ðhY fbg\]d

HYfa `C.bY`##`&\$&\$

GWXcc`cZGcWJU`GWYbWg`#`1 BGK ``5ffg`UbX`GcWJU`GWYbWg

7ci fgY`Cj Yfj JYk

`GHUZZ7cbhUW`i8YHU]`g`

`7cbj Ybcfg`

B Ua Y	9a U]`	5j U]`UV]`]m	@cWU]hcb	D\cbY
@ci]gY`Gfi XXm	``gh XXm# i bgk "YXi "Ui	6mUddc]bha Ybhj]U Ya U]`	Fcca`%*)`!, ž]fghiZccfž Acfj Yb`6fck b 6i]X]b[

GWcc`7cbhUW`i#Zcfa Uh]cb

GWcc`cZGcWU`GWYbWg

Fcca`%) -

Acfj Yb`6fck b`7 &\$

Ya U]`.gcgg4 i bgk "YXi "Ui

d\cbY. '\$&-' ,)`% \$+

7ci fgY'8YHJ]`g

7fYX]hDc]bhtg`*`

Gi a a UfmicZ`h\Y'7ci fgY

Gi V`YWh5fYU. 3dfe

H\]g`Wci fgY`WUb`U`gc`VY`gh`X]YX`]b`h\Y`Zc`ck`]b[`gdYW]U`]gU]cbg. `5d_ [`a`aYk?` W[S`/?` W[S`BdaVgUf]a` fi
?` W[S`/E`UdW] S` `V`E`ag` `Vfi`?` W[S`/5`a`_`_`e` `<agd` S`fe`_`fi`?` W[S`/BgT`U`D`W`S`f]a` `e` S` `V`3VhW]e[`Yfi

H\Y`<I` A`G`&`\$\$\$`Wci fgY`]g`Ub`Y`Y`W]j`Y`]b`h\Y`I` BGK` `5f]g`UbX`GcW]U`G`W]YbW]g`dfc[fUa`g`UbX`h\Y`
7`f]a`]bc`c[`mia`U`cf]b`h\Y`6`U`W`Y`cf`c`Z`D`gm`W`c`c[]W]`G`W]YbW]g`dfc[fUa`" `#`ia`Um`VY`hU`_`Yb`Uh`h\Y`YbX`c`ZU`
Z]fghm`Y`Uf`c`Z`gh`Xm`UbX`c`Z`Y`fg`gh`X`Yb]k`k`cf`_`YI`d`Yf]YbW]`]b`U`f`Ub[`Y`c`Z`cf[`Ub]gU]cbg`i`h`]g]b[`gcW]U`
fYgYUfW`UbX`dc`]W]UbX`li`a`Ub]h]Yg`g_]`g"

H\Y`j`c`W]h]cbU`d`U`W]a`Yb]k`k`]W]`]g`k`cf`_`YX`]b`h\Y`Gm`Xb`Y`ma`Y`f`c`d`c`]h]b`U`f`Y`U`z`d`f`c`j`]X`Y`g`k`cf`_`YI`d`Yf]YbW`
UhU`cg]h]cf[`Ub]gU]cb]Z`c`f`%(`Z`""X`U`mg`f`%`\$)`k`cf`_]b[`h\ci`fg]e`H\]g`d`f`U`W]W]`YI`d`Yf]YbW]`]g`U`W]a`d`Ub]Y`X`V`m`
U`f`Y`U`X]b[`d`f`c[fUa`" `H\Y`f`Y`U`X]b[`W]a`d`c`b`Y`b`h`YI`Ua`]b`Y`g`X]Z`Y`f`Y`b`h`U`d`d`f`c`U`W]Y`g`h`c`h\Y`gh`X`m`c`Z`c`f[`Ub]gU]cbg`z`
h\Y]f`g]h]i`W]h`f`Y`g`z`Z`b`W]cbg`UbX`dc`]W]Y`g`z`U`g`k`Y`""U`g`]b`_`g`h\Y`g`Y`]g`g]i`Y`g`h`c`h\Y`d`U`W]a`Y`b`h`YI`d`Yf]YbW]"

B`c`h`Y`. `G`h`X`Y`b]g`a`i`g`h`U`j`Y`U`W]Y]j`Y`X`U`W]Y`X]h`Y`j`Y`c`f`V`Y`h`Y`f`U`j`Y`f`U[`Y`U`W]c`g`g`h\Y`Wci fgYg`]b`h\Y]f`X`Y[`f`Y`Y`"
H\Y`]b`h`f`b`g`]d`a`Um`V`Y`]b`W]h`X`Y`X`U`g`d`U`f`h`c`Z`U`a`U`cf]b`h\Y`:`U`W`h`m`i`d`f`c[fUa`g`k`]h`h\Y`d`Y`f`a`]g`g]c`b`c`Z`h\Y`
f`Y`Y`j`Ub`h`7`c`b`j`Y`b`c`f"

5ggYgga Ybh

[5ggYgga Ybh](#)

HUg_

@Yb[h`#
Xi fU]cb

K Y][\h 8i Y`XUHY

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gi a a Ufrž

+) \$`-%z\$\$\$`hcU` %)_
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6gW(b_ a`
VSk) aXfZW
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b`SUW_ W f/ [ZVž
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: cf'gh XYbht'Xc]b['a cfY 'h'Ub'cbY'XUmdYf'k YY_'h]g'k]''fYei]fY]bh'bg]j Y'fYUX]b['VY'Zc'fY'UbX'Uh'h'Y'ghUfh
 cZ'h'Y']bh'f'bg\]d'hc'U'ck'UXYei'Uh'Y'dfYdUfU]cb'Zc'f'h'Y'Z]fghUggYgga YbhXi Y'cb'XUm+'A'YY]b['k]h
 @ci]gY'Gh'XXm'z'h'Y'5WUXYa]W7'cbj'Ybcf'k]''Ugg]gh]b'X]fYW]b['h'Y'gh'XYbh'hc'Udd'fcd'f]U]Y'fYUX]b[g'z
 WUf]z]b['h'Y'dUfUa'Y'h'fg'c'Zc'f[Ub]nU]cbU' h'Y'cfm'UbX'Ugg]gh]b'W'k]h'X'fUz]b['U'ei'Ygh]cb'Zc'f'h'Y'Z]fgh
 UggYgga Ybh'

I'g]b['h'Y]f'YI'dYf]YbW'Z'ca' h'Y]f'j'cWU]cbU'd'UW'a Ybh'gh'XYbht'g'lc'i'X'VY'UV'Y'hc'd'fcj]XY'Ub
 i' bXYfgh]bX]b['cZ'h'Y'cf[Ub]nU]cbU'd'f'c'W'ggYg'UbX'gh'i'W'i'fY'h'Ym'\Uj'Y'Yb'Ve'i'bh'f'YX'Xi'f]b['h'Y]f'
 j'cWU]cbU'd'UW'a Ybh'K '\]Y'[U]b]b[']bg][\h]b'hc'h'Y]f'\c'gh'cf[Ub]nU]cb'z'gh'XYbht'k]''VY'YI'dYW'X'hc
 W'a'd'Y'h'h'Y'h'Ug_g'Ugg][bYX'hc'h'Ya'V'm'h'Y]f'b'ca]bU]X'k'c'f_d'UW'gi'dYf]]gc'f'Hc'gi'W'W'gg'z'`m'UW'Y]Y'Y
 h'Y'g'Y'h'Ug_g'z'h'Y]f'gi'dYf]]gc'f]g'YI'dYW'X'hc'Yb'gi'fY'h'Y']bh'f'b'i' bXYfgh]bX'g'h'Y'b'U'i'fY'cZ'h'Y'h'Ug_g'h'Ym
 \Uj'Y'VY'Yb']] Yb''

5ggYgga Ybht'g'lc'i'X'VY'fY'Z'fYbW'X']b'U'W'W'cf'X'Ub'W'k]h'h'Y'E'UZaa'^aXE'aU[S^E'U]W'U'W'e'D'W'W'd'W'U] Y
 9'g]W'z'Uj'U]UV'Y'Uh'[\h'g'g'c'W'U'g'W'Y'b'W'g'U'f'g'i'bgk'Y'Xi'Ui'gh'XYbht'g'Y'g'ci'f'W'g'd'c'W'Y'g'l'i'X'Y'\]b'Y'g'z'](#)

5ggYgga Ybh'Ug_g'

5ggYgga Ybh'Ug_g'	K Y][\h	8i Y'8U]Y'	Gh XYbh@YUfb]b[C i h'W'a Yg'5ggYggYX
8fUz]9ggUmD'Ub'Gi a a Ufm	%)	8i Y'U'Z'Y'f'+X'Umg'c'Z]bh'f'bg\]d'W'a'd'Y'h'X"	%
F YZYW]j Y'>ci fbU'	%)	%('W'Y'b'X'U'f'X'Umg'U'Z'Y'f'h'Y]bh'f'bg\]d'Z]b]g\Y'g"	&Z(
<cgh'9j U'i U]cb'	&\$)	Gh XYbh'Ya U]g'h'Y'Z'c'f'a'hc h'Y]f'gi'dYf]]gc'f]b'h'Y''Ugh k YY_'gc'h'U'h'h'Y'W'a'd'Y'h'X Z'c'f'a'W'b'V'Y'f'Y'h'f'b'Y'X'hc'h'Y K @h'U'a'hc'U]c]X'h'Y gh'XYbht'g'Z]bU'] f'U'X'Y'V'Y]b[X'Y'U'm'X"	&Z z(
C f[Ub]gU]cbU'YggUm) \$)	%('W'Y'b'X'U'f'X'Umg'U'Z'Y'f'h'Y]bh'f'bg\]d'\U'g'V'Y'Y'b W'a'd'Y'h'X"	' z(

5ggYgga Ybh'8Y]U]g'

5ggYgga Ybh%'8fUz]9ggUmD'Ub'Gi a a Ufm

GhUfh'XU]Y'.'B'ch'5dd']W'V'Y'

@Yb[h.'+) '\$!'%\$\$\$'k'cfXg

8Y]U]g'.D'fY'W'f'g'c'f'hc'h'Y'cf[Ub]gU]cbU'YggUm'+) '\$'hc'%'\$\$\$'k'cfXg'"K'f]h'Y'b'Z'Y'X'V'U'W_

5XX]h]cbU'X'Y]U]g'.

H'Y'gh'XYbha'Y'Y'f'g'k]h'h'Y'5WUXYa]W7'cbj'Ybcf'U'Z'Y'f'&!''X'Umg'c'Z'h'Y']bh'f'bg\]d'hc'X]g'W'gg'U'f'Y'U'g'c'Z

]bHYfYghZcf'hY'hd]WZcf'h]g'YggUmigi a a UfmfUbx'h]g'hd]W]g'a U]bHJ]bYX'Zcf'hY''cf[Ub]nUhc]bU''YggUmik
H\Y'hd]W]g'U'ghUHYa Ybhcfe'i Ygh]cb'h\Uh]bWcfdcfUHYg'U'ZYk '_YmiUgdYVhg'cZ'cf[Ub]nUhc]bU''hYcfm'Y"["'hY
ghfi Vh fYz'Z bW]cb'z'W'h fYz'YUXYfg\]d'z'Wca a i b]W]h]cb'z'WU''Yb[Yg'YhW'h\Uh]W]b'VY'WcgY'mfY'UHYX'hc'hY
gh XYbhfj']bHYfb'hUg_g''Gh XYbhf'W]b'i gY'Ub'UddfcUW'h\Uh]bWcfdcfUHYg'Y"["'Ub
cf[Ub]nUhc]bU''dYfgdYVW]j Yz'a UbU[Ya YbhdYfgdYVW]j Yz'_bck'YX[Y'dYfgdYVW]j Y'cf'W]b''cc_'Uhgca Y
cf[Ub]nUhc]bU''a cXY'g'UbX'hYghci h]Z'hYmUfY'YI'd'U]b'\ck'h\Y]f'\cg]hcf[Ub]nUhc]b'Z bW]cbg''H\Y
ghfi Vh fY'cZ'h]g'dUdYf'k]''VY'WUf]Z'YX'YgdYVW]U''m]Zgh XYbhf'\Uj Y'bchWca d'YhX'Ub'YggUmigi a a Ufm
VYZcfY''5'hci [\ 'U'gi a a Ufnz'h]g'hc'VY'k f]hYb'Ug'Ub'UWUXYa]WdUdYf'gc'bchXchdc]bhfj''Gh XYbhf
XYj Y'cd'Ub'Uf[i a Yb'z'UbX'XYbhf]Zm\ck'h\Ymid'Ub'hc'i gY'fY'Yj Ubh'YI hg'UbX'Ufh]WYg'f'fgYY''Y[Ub'hc'Zcf'ci f
hYI hg'UbX'gi [[YghYX''hYfUh fY'hc'gi ddcf'h'h]g''Gi [[YghYX'XYUg'UfY'g\UfYX'Vm'hY'7cbj Ybcfz'Ug'bYXYXz

cZk Umg'hc'XYj Y`cd'h\]g'UggYgga YbhUbX'Zcf'h]dg'cb'Z' f\Yf'fYUX]b[""

Hi fb]h]b'gYh]b[. 'H\]g'Ugg][ba Ybh]g'gi Va]hYX'h\fc[[\ 'Hi fb]h]b'UbX'gh XYbhg'WUb'gYY'Hi fb]h]b'g]a]'Uf]m
fYdcfg"

F Ygci fWg

DfYgWf]VYX'F Ygci fWg'

F Ygci fWgž']b'UXX]hcb'hc'hAY'dfcj]XYX'@Y[Ubhc'k]''VY'UXXYX'hc'A ccX'Y'k \YfY'Uddfcdf]UHY''Zcf'U''
gh' XYbtg''5XX]hcbU''fYgci fWg'k]''VY']XYbh]ZYX'VmihY'7 cbj Ybcf'Ug'bYYXYX'Zcf']bX]j]Xi U'ghi XYbtg''''

F YWca a YbXYX'F Ygci fWg

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

Gh' XYbhZYXVUW']g' \]' \ 'm' j U'i YX'VmihY'7 cbj Ybcf'UbX']g'gci [\ h'h'fci [\ ci h'h'Y'h'fa' Vc'h']bZcfa U'm
UbX'Zcfa U'mj]U'h'Y'7 ci fgY'Yj U'i Uh]cb'UbX'A m9I dYf]YbW''Gh' XYbtg'\Uj Y'Wca a YbhX'cb'\ck '\Y'dZ'`
h'Y']bX]j]Xi U'gYgg]cbg'k]h' h'Y'7 cbj Ybcf'\Uj Y'VYb'Ug'k Y''Ug'h'Y'fYW'bhmi]bfcXi W'X'cdh]cbU'
gYa]bUfg'dfcj]XYX'cb'XUmj'k \Yb'a cghgh' XYbtg'WUb'Uh'h'bX''5X'g'ha Ybtg'\Uj Y'VYb'a UXY'hc'h'Y'A ccX'Y
dU[Y'hc'a U_Y']h'Ug'WYUf'Ug'dcgg]V'Y'UbX'bYk' fYgci fWg'UfY'gci fW'X'hc'_YYd'fYgci fWg'i d'hc'XU'h'UbX'
]b'']bY'k]h' W'Ub[Yg']b' h'Y'k cf_d'UW''H'Y'gYa]bUfg'k YfY']bfcXi W'X'UZ'Yf'h'Y'7 cbj Ybcf'Ug_YX'gh' XYbtg'
]Zgi W' d'Yf'gi ddcfh'UbX'cddcfh' b]mhc'g'UfY']b'h'fb'YI dYf]YbW'k ci 'X'VY'k Y'Wca YX'k \]W']h'fcj YX'hc'
VY''Gca Y'ghi XYbtg'UfY'bchWYUf'cb'k \Uh'Ub'YggUmigi a a Ufmigc']bZcfa Uh]cb'cb'h']g'k]''VY'UXXYX'hc'
A ccX'Y''

Gi Va]gg]cb`cZ5ggYgga YbhHUg_g

Gi Va]gg]cb`cZ5ggYgga YbhHUg_g

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≠nci`YbWci bhYf`U`dfcV`Ya`k`Yb`UthYa dh]b[`hc`gi Va]hnci f`Ugg][b

ga YbhHUg_g

5 WUXYa]W<cbYghmiUbX`D`U[]Uf]ga

D`U[]Uf]ga `]g`i`g]b[`h`Y`k`cfXg`cf`]XYUg`cZc`h`Yfg`UbX`dfYgYb]b[`h`Ya`Ug`mci`f`ck`b" `#WUb`hU`Y`a`Ubm
Zcfa`gž`Zca`XY`]VYfU`h`W`Y`U`h]b[`h`U`W`Y`X`Y`b`U`m`W`d`m]b[`Zca`U`gci`f`W`k`]h`ci`h`U`W`b`ck`Y`X[`Ya`Y`b`h`

- i bXYfgHUbX'mci f'f][\hg'UbX'fYgdcbg]V]]hYg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[]Uf]ga ž'Wcdmf][\hž' BGK 'Gh XYbh7cXY'cZ7cbXi WñUbX'5WwdfUV'Y'I gY'cZ
I BGK '⇒H'F Ygci fW'g'Dc`]Wñ

5 WUXYa]WbZcfa Uhcb`

: cfYggYbhU`ghi XYbh]bZcfa Uhcb`fY`Uh]b[`rc.

- fYei YghZcfYI hYbg]cb/