

MUSC1708

65 DYfZcfa UbW @UVcfUhcfm5

HYfa 'H\fYY''##'&\$%-

7ci fgY[·]Cj Yfj]Yk

GHJZZ:7cbHJWh:8YHJ]`g`

'7cbj Ybcfg'

B Ua Y	9a U]`	5j U]`UV]`] m	@cWUhjcb	D\cbY

5ggYgga Ybh

8 YHU]`g. `DYfZcfa UbW\#dfYgYbHUh]cbg`k]```VY`WcbXi WhYX`Xi f]b[`k cf_g\cd`gYgg]cbg`]b``H%`H&`UbX H' "```±oghfi a YbHU`]ghg`UbX`j cWU`]ghg`k]```dYfZcfa `cbY`Wca d`YhY`]hYa ž`k\]W\`a UmVY`U`a cj Ya YbhcZU``Uf[Yf k cf_"`9UW\`dYfZcfa UbW\#dfYgYbHUh]cb`a i gh`]bWi XY`bYk `a UhYf]U`"``K f]hhYb`ZYYXVUW_`k]```VY`dfcj]XYX`]b k f]h]b[`UZhYf`dYfZcfa UbW\g#dfYgYbHUh]cbg

5XX]h]cbU`XYhU]`g.

 $H\Y''\% a]bi HY'UggYggYX'dYfZcfa UbWYg'dfYgYbHYX']b' HYfa '' 'WUb'bch']bWi XY'H\Y'fYdYfhc]fY'dfYgYbHYX']b HYfa g''\%UbX'&"'H\Y'dYfZcfa UbWY'a i gh']bWi XY'Ub'Ui fU''dfYgYbHJHJcb'gHJHJb[''h\Y'fUhJcbU''UbX'^A gh]ZJWJHJcb Zcf'h\Y'fYdYfhcf]Y'W\cgYb"$

5 https://bxubwww.Fyei]fya Ybhg

 $\label{eq:continuity} D`YUgY`bchY`h\Uh`YWh fY`fYWcfX]b[g`UfY`bchUj U]`UV`Y`Zcf`h\]g`Wci fgY"`Ghi XYbhg`UfY`ghfcb[`miYbWci fU[YX`hc UhhYbX`U```WUggYg`UbX`WcbhUWhh\Y`7ci fgY`5i h\cf]mnhc`a U_Y`U`hYfbUh]j Y`UffUb[Ya Ybhg`Zcf`WUggYg a]ggYX"$

7 ci fgY GWX YXi `Y

J]Yk Wugg'ha Yhuv'y

H]a YHJV`Y

8 UhY	HmdY	7 cbh/bh
K YY_'%''%*'GYdhYa VYf'! &\$'GYdhYa VYf	@YWh fY	HYfa 'd`Ub'X]gW ggYX'UbX'UggYgga YbhXYfU]`g'UbX XUhYg'UfY'YI d`U]bYX"
K YY_^&.^&' `GYdhYa VYf'! &+`GYdhYa VYf	@YWn fY	Gh XYbh]b!WUgg'dYfZcfa UbWfg/8]gW gg]cb'cZgHJ[YdfYgYbHJh]cb'g_]`g"
K YY_" ." \$"GYdhYa VYf"! ("C WcVYf	@YVVn fY	±0!WUggʻgc`cʻdYfZcfa UbWg/
		; fci d'k cf_/
		±bHYbHjcb!Vi]`X]b[`UbX`dfUWjWY`d`Ubb]b[`Zcf`dfUW YIUag'!`fYZYWhjjY'YIWYfWjgYg/
K YY_'(.'+'CWvcVYf'!'%% CWvcVYf	@YVVn fY	+b!WUgg'gc'c'dYfZcfa UbW/g/
		; fci d'k cf_/
K YY_').'%('CWcVYf'!'% CWcVYf	≢bhYbg]j Y	F YUX]b['K YY_
		Ghi XYbhgʻk j```U``cWJhY`YI hfU!hja Y`Zcf`dYfgcbU` dfUWnjWY`UbX`fYZYWnjcb`cb`h\Y`a UghYfWUggYg UhnYbXYX`jb`h\jg`hYfa `gc`ZJf"
K YY_'*.'&%'CWcVYf'!'&) CWcVYf	@YWhifY	GYW¶cbU`fY\YUfgU`g/
C WEVII		; fci d'k cf_/
K YY_'+.'&, 'C WcVYf'!'% Bcj Ya VYf	@YWhi fY	→ `WUgg`[fci d`dYfZcfa UbWY`UbX`XYVf]YZ → `WUgg`[fci d`dYfZcfa UbWY`UbX`XYVf]YZ
K YY_', . '('Bcj Ya VYf'!', Bcj Ya VYf	@YWhi fY	±Ð!WUggʻdfYgYbhUhjcbʻUggYgga YbhgʻVY[]b
K YY_''%%Bcj Ya VYf'! %) Bcj Ya VYf	5ggYgga Ybh	Gh XYbh']b!WUgg'dYfZcfa UbW''UggYgga Ybhg Wcbh]bi Y"
K YY_`%\$.`% `Bcj Ya VYf`! &&`Bcj Ya VYf	5ggYgga Ybh	Gh XYbh']b!WUgg'dYfZcfa UbWY'UggYgga Ybhg Wcbh]bi Y"

FYgci fW/g

DfYgWf]VYX F Ygci fWYg

%''9j Yfmt\]b[']g'7cbbYWYX.'H\Y'Dck Yf'cZA i g]WVm8Ub]Y``6UfYbVc]a

&" ``A chicbž'9a chicbž'UbX'@cj Y. `H\Y'B Uhi fY'cZ5fhighiWDYfZcfa UbWY'VmiH\ca Ug'7 Ufgcb'A Uf

' "@Yhhyfg hc U Mci b[DcYhVmF U]bYf F]`_Y

FYWca a YbXYX FYgci fWfg

BchUj U]`UV`Y

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

@f]YZmci h]bY`\ck 'ghi XYbhZYYXVUW_'flVch\ 'Zcfa U``UbX`]bZcfa U`Ecb'h\Y`Wci fgY`k]```VY`[Uh\YfYXž\ck ']h k]```VY`UbU`mgYX`UbX`\ck ']hk]```VY`UWYX`i dcb'hc']a dfcj Y'h\Y'ghi XYbh`YUfb]b['YI dYf]YbWY"': cf'YI Ua d`Yž mci 'a][\hX]gW gg`k \Uhk Ug`]XYbh]Z]YX`]b`dUghZYYXVUW_'UbX`\ck 'h\]g'Wci fgY`k Ug`W\Ub[YX`hc`UXXfYgg`h\Y]ggi Y"Q

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

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

#mci YbWci bhYf'U'dfcV'Ya 'k \Yb'UthYa dr]b['rc'gi Va]hmci f'Ugg][ba Ybht\fci [\'Hi fb]r]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'fl *) 'XUmg'U'mYUft'''#c'ici
UfY'i bUV'Y 'rc'gi Va]hmci f'Ugg][ba YbhXi Y'rc'U'ZJi 'hk]h\'Hi fb]r]b'mci 'a Um'Udd'mZcf'Ub'YI hYbg]cbž'Vi hmci
a i ghfYhJ]b'mci f'r]WYhbi a VYf'Zfca '9I hYfbU''Gi ddcfhfU'cb['k]h\'Ubmch\Yf'fY'Yj UbhXcW a Ybfgt'rc
]bWi XY'Ug'Yj]XYbWY 'rc'gi ddcfhmci f'YI hYbg]cb'Udd']WUh]cb'''#mci 'Ya U]''9I hYfbU''Gi ddcfhmci 'k]'`
Ui hca Uh]WJ''mfYWY]j Y'U'r]W_Yhbi a VYfž'Vi h]Zmci 'hY'Yd\cbY'mci 'k]'''bYYX'rc'gdYW]ZJWJ''mUg_'Zcf'cbY''
Hi fb]h]b'U'gc'dfcj]XYg'i dXUhYg'cb'h\Y]f'gmghYa 'gfUh' g'cb'Hk]hYf"

; YbYfU``mž'UggYgga YbhiHug_g'a i ghVY'gi Va]hhYX'Y`YVWfcb]\W)``mij]U'Y]h\Yf'Hi fb]h]b'cf'U'A ccX`Y Ugg][ba Ybh'' =b']bgHJb\W'g'k \YfY'h\]g']g'bchdcgg]V`Yž']hk]``'VY'gHJhYX'cb'mci f'\\ci fgY'g'A ccX`Y'g]hY'k]h\ U`hYfbUh]j Y'gi Va]gg]cb'XYhJ]`g''

cfi]bZcfa Uh]cbicbi\ckihcigi Va]hUgg][ba Ybhgicbi]bYij]UiA ccXiY.i\hdg.#gh XYbh'i bgk "YXi "Ui #\ck! qi Va]hUgq][ba Ybha ccXiY

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

D`U[]Uf]ga i]gii g]b[ih\Yik cfXgicfi]XYUgicZch\YfgiUbXidfYgYbh]b[ih\Ya iUgimci fick b"i±i\WbihU_Yia Ubm Zcfa gžZfca iXYi]VYfUhYiW\YUh]b[ihciU\W]XYbhU`m\Wcdm]b[iZfca iUigci f\Wik]h\ci hiU\w_bck iYX[Ya Ybh'

IBGK [fcidg'd'U[]Uf]ga]bhc'h\Y'Zc``ck]b[WUhY[cf]Yg.

7 cdm]b[.'i g]b['h\Y'gUa Y'cf'j Yfmg]a]`Uf'k cfXg'hc'h\Y'cf][]bU`hYl h'cf']XYU'k]h\ci h'UW_bck `YX[]b['h\Y gci fW'cf'i g]b['ei chUh]cb'a Uf_g"'H\]g'U`gc'Udd`]Yg'hc']a U[Ygž'Ufh'UbX'XYg][b'dfcYWhgž'Ug'k Y``'Ug dfYgYbhUh]cbg'k \YfY'gca YcbY'dfYgYbhg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci h'WfYX]h'

⇒ Uddfcdf]UhY 'dUfUd\fUg]b[. '7\Ub[]b['U'ZYk'k cfXg'UbX'd\fUgYg'k\]Y 'a cghmfYhU]b]b['h\Y'cf][]bU`ghi Wh fY 'UbX#cf'dfc[fYgg]cb'cZ]XYUg'cZh\Y'cf][]bU`žUbX']bZcfa Uh]cb'k]h\ci hUW_bck`YX[Ya Ybh'H\]g'U`gc Udd`]Yg']b'dfYgYbhUh]cbg'k\YfY'gca YcbY'dUfUd\fUgYg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci h'WfYX]h'UbX'hc d]YW]b['hc[Yh\Yf'ei chYg'UbX'dUfUd\fUgYg']bhc'U'bYk'k\c`Yžk]h\ci h'Uddfcdf]UhY'fYZYfYbW]b['"

7 c``i g]cb.'k cf_jb['k]h\ch\Yfg'Vi hdUgg]b['cZZh\Y'k cf_'Ug'U'dYfgcb'g']bX]j]Xi U``k cf_"'7 c``i g]cb'U`gc]bWi XYg'dfcj]X]b['mci f'k cf_'hc'Ubch\Yf'ghi XYbhVYZcfY'h\Y'Xi Y'XUhYžcf'Zcf'h\Y'di fdcgY'cZh\Ya d`U[]Uf]g]b['UhiUbmh]a Yž'dUm]b['Ubch\Yf'dYfgcb'hc'dYfZcfa 'Ub'UWUXYa]WhUg_ž'ghYU']b['cf'UWei]f]b[Ubch\Yf'dYfgcb'g'UWUXYa]Wk cf_'UbX'Wcdm]b[']hz'cZYf]b['hc'Wca d'YhY'Ubch\Yf'dYfgcb'g'k cf_'cf'gYY_]b[dUma YbhZcf'Wca d'Yh]b['UWUXYa]Wk cf_"

±bUddfcdf]UhY`W]hUh]cb.`7]h]b[`gcifWrg`k\]W\`\UjY`bchVYYb`fYUXžk]h\cihUW_bck`YX[]b[`h\Y`´gYWcbXUfm´gcifWrZfca`k\]W\`_bck`YX[Y`cZh\Ya`\Ug`VYYb`cVhU]bYX"

8 i d`]\WUh]cb`ffgY`Zd`U[]\Uf]ga "Ł gi Va]\h]b[`mci f`ck b`k cf_ž]b`k \c`Y`cf`]b`dUfhžk \YfY`]h\Ug`dfYj]ci g`m VYYb`dfYdUfYX`cf`gi Va]\hYX`Zcf`Ubch\Yf`UggYgga Ybhcf\Wci fgY`UhI BGK `cf`Ubch\Yf`i b]j Yfg]\m'

7 cffYWnfYZYfYbWlb['dfUWnWyg.

• DUfUd\fug]b[z'gi a a Uf]q]b[z'YggUmk f]hb['UbX'ha Y'a UbU[Ya Ybh

5 WUXYa]W = b Zcfa Uh cb.

: cf`YggYbhJU``gh XYbh`]bZcfa UhJcb`fY`UhJb['hc.

- fYei Yghg Zcf Yl hYbg]cb/
- `UhY`gi Va]gg]cbg`[i]XY`]bYg/
- fYj]Yk 'cZa Uf_g/
- I BGK '< YU`h\ 'UbX'GUZYhm'dc`]W[Yg/
- YI Ua]bUhcb dfcWXi fYg/
- gdYWJU``Wcbg]XYfUhJcb`]b`h\Y`Yj YbhcZ]``bYgg`cf`a]gUXj Ybh fY/
- gh XYbhYei]lmUbX X]gUV]`]lm/
- UbX'ch\Yf'YggYbhJU`'UWUXYa]W]bZcfa UhJcbž'gYY

\hdg.#k k k "Uffg"i bgk "YXi "Ui #W ffYbhgh XYbhg#UWJXYa]W]bZcfa Uf]cb#dfchcWc`g![i]XY`]bYg#

.

a U[Y'7fYX]h

Gc`c'DYfZcfa UbWY'A U_]b['&\$%

7F = 7CG

7F = 7CG Dfcj]XYf 7cXY. \$\$\$-,;