DYdUfh a Ybh cZ B]c`c[m

Cc``Y[Y cZ Afhg UbX SW]YbWYg

FUW i `hm

A Uf_ 6c`mUfX (200*). DfcZYggcf cZ 6]c`c[m UbX 8YdUfha Ybh 7\U]f. 6.5., < Ubcj Yf 7c``Y[Y/D\.8., I b]j Yfg]hm cZ B cfh\ 7Ufc`]bU

7\YfYm 7fcggYhh (1--2). 5gg]ghUbh DfcZYggcf cZ 6]c`c[m@UWfUWfc]`Yg 6.G., I b]cbI b]j Yfg]hm/A .5., K YghYfb ? Ybhi Wmy
I b]j Yfg]hm/5XX]h]cbU` ghi Xmy6cghcb I b]j Yfg]hm/DcfhUbXGhUhYI b]j Yfg]hm UbX I b]j Yfg]hm cZ A Ya d\]g

>Ua Yg 5. < u [[ ]bg (1-, +). I b]j Yfg]hm DfcZYggcf cZ 6]c`c[m UbX 8]fYWcf cZh\Y 7YbhYf Zcf GW]YbWY/ÚWGhi XYg. 6.G.5.
UbX A .G., 5f_UbgUg GhUhY I b]j Yfg]hm/D\.8., I b]j Yfg]hm cZ A Ya d\]g/5XX]h]cbU` ghi Xm,I b]j Yfg]hm cZ H^bbYggYY Uh
A Ya d\]g A]X-5 a Yf]WU 6Udh]ghH\Yc`c[]WU` GYa]bUfm,UbX I b]j Yfg]hm cZ A Ya d\]g

>Ua Yg A UfWg @c W_YYhh (200(). 5gg]ghUbhDfcZYggcf cZ 6]c`c[m 6.G. UbX A .G., A uffUmJ   Ub]j Yfg]hm/A -
j Yfg]hm cZ H^bbYggYY.

5bXimA UX]gcb (2002). 5ggcWUhY DfcZYggcf cZ 6]c`c[m 6.G., I b]j Yfg]hmcZHbbYggYY/A .G., I b]j Yfg]hmcZ? Ybhi Wmy/
D\.8., ? UbgUg GhUhY I b]j Yfg]hm

A]WWUY @. A WWWa U\ Ub (1-, 0). I b]j Yfg]hm DfcZYggcf cZ 6]c`c[m 6.G. UbXA .G., I b]j Yfg]hmcZA]gg]gg]dd]/D\.8., @ci]-
g]UbUGhUhY I b]j Yfg]hm

9`g]YYVMGa ]h* (1-*2). 5ggcWUhY DfcZYggcf cZ 6]c`c[m 6.G., I b]cbI b]j Yfg]hm/A .G., I b]j Yfg]hmcZ=`]bc]g/5XX]h]cbU`
ghi Xm]b FUX]Uh]cb 6]c`c[m,I b]j Yfg]hmcZHbbYggYYUhA Ya d\]g

7Ufc` K YUj Yf (1--, ). 5ggcWUhY DfcZYggcf cZ 6]c`c[m 6.G., I b]cbI b]j Yfg]hm/A .G., I b]j Yfg]hmcZA]ggci f]ÌGh @ci]g/
D\.8., Gh @ci]gI b]j Yfg]hm

K Unb Ye K cZZcfX (1-, +). DfcZYggcf cZ 6]c`c[m 6.G., I b]cbI b]j Yfg]hm/A .G. UbXD\.8., HXUg5 & A I b]j Yfg]hm

Ciff]Wi`i a

H\YWUff]Wi`i a ]b V]c`c[m gXYg][bYX hc UWWi UbhghghgiXYbhk]h\ ]`v]b[ cf[Ub]ga g Ugw \c`Y, Zi bWcb]b[Ybh]h]Yg
h\Uh,]b h\Y]f X]vYfg]hm,g\UfYa UbmWa a cb ZUuf Yg. =b UXX]h]cb hc dfcj]X]b[h\Yg]jWbh]ÚWWUW[fci bX fcEi]fYX
cZU`^XYu WUhYX W]fmYbg h\YWci fgYg dfcj]XYUZci bXUh]cn ubcn k\]W\ h\Ygh]XYbha Unu\ ]`XU[fUXi UfY dfc[fUa ,
u bXYfU_]Y fU]b]b[ ]b \YUh\-fWUfYX dfcZYggcbg cf dfYdUfY Zcf gWWbUfmY`Y gWWbWh]UW]b(. Ghi XYbhg a Uny
dUfh]W]pUhY]b]bXYdYbXYbhfYgYUfWUg kY`` Ugg\`WUWci fgYg

6WUu gYg WbhYmYa dcfUfmV]c`c[ m\YUbg ]h\YU j ]`]mcn a Uh\Ya Uh\]WUbXd\ngWWUgW]YbWYg ghi XYbhma U`cf]b[ ]bV]c`c[m
g\ci]X]bWuXYm Uh\Ya Uh\]WUbXWYa]ghfyh\bh\YZfYga a UnmY. =n h\YVY[ ]bbu]b[Wci fgY6=C 112, ghi XYbhgk]`vVu]X
UZci bXUh]cn Zcf ghi XymcZV]c`c[ ]WU` dfcWcggg Ghi XYbhgWUb dfcWYXhc h\YUfgh200-`j Y V]c`c[mWci fgYgXi f`]b[h\Y
gWWbXgYa YghYf cZh\YZfYga a Un mU. =n h\Ygcd\ca cfmYUf, ghi XYbhk]`WbhbuYh\Ygi fj YncZh\Y_]b[Xca gcZ
`ZVcmh\_]b[ UXX]h]cnU` 200-`j Y V]c`c[mWci fgYg Ghi XYbhgg\ci `XghYbuh\Yh\YfiubXfghUnXbg cZu Ua h\Ya Uh]Wg
UbXcVhUbUVW_ fci bX]bcf[Ub]WWWha]ghfmXu f]bu h\UhmUf. 6]c`c[ mWYUfgUhh\Y300-(00`j Y g cui `XVYhuEYb
Xu f]bu h\Y u bu]cf UbX gYb]cf mYUfg w]h\ gUma]bUu fYgfv YX Zcf h\YgYb]cf mUf. Ghi XYbhk]`` Ya]byY]b XYU]`\ ]cwh
cf[Ub]ga g Zu bWW]cn UbU]bhfUWuWk]h\ h\Y]f Ybv]fccma YbhUbX UW ch\Yf. 6]c`c[ ma U`cfg UrcYUYbWci fU XY hc a]bcf
]b WYa]ghfm

I ddYf-`j Y g ghi XYbhga UmYnfc``]ma Uf]YbV]c`c[ mWci fgYgVmYcdUfu`tj Ua fYYa Ybhk]h\ h\Y; u `Z7cUghfYgYUfWUW
@UVcfUhcfmUbX h\Y5u GUW`Y=bgh]hu hYcZ9bv]fcna Ybh U`Ghu X]Yg :cf]bZcfma U]cn, gYYh\Y8YdUfha Ybh7\U]f.

=. A U`cf ]b 6]c`c[mí 39 \ci fg (A U`cf 7cfY+ cbYWbWbhfUh]cb)

5. 7cfY: 6=C 112, 302, (2), (2*, (2+, (-, Í , \ci fg

6. ; YbYfU` 6]c`c[m7cbWbhfUh]cb
1. 6=C 211, 213, 21(, 21)
2. 6=C 31) , 3-300 `j Y 6=C /cf 6=C 221, 222, & 2-300 `j Y 6=C

7. Ncc`c[m7cbWbhfUh]cb
1. 6=C 213, 21(/200 cf 211
2. 6=C 31*, (-300`j Y 6=C Y\ WW]XYb 6=C 322 UbX 33+

8. 7Y``6]c`c[m7cbWbhfUh]cb
1. 6=C 211/21(cf 21)
2. 6=C 31) , 31+, 320, 323, 32)
3. 6=C 31* cf 321
(. A u ghma]bcf]b 7\Ya]ghfmhc]bWWXYb 7< 9 32-

=. A U'cf]b 7cbgYfjUh]cb 6]c`c[mí 49-50 \ci fg
DfYfYei]g]h]g 7< 9 111, 112/D< M213, M 5H 11*, 211, 20,
5. 6=C 112, 200, 213, 21(, 21), 23) Í 23 \ci fg
6. 6=C 302, 31), 31, , 33), 33*, 33+Í 1- \ci fg
7. 6=C (2), , (2*, (2+, (-, Í (\ci fg
8. 6=C 9`YWljYÍ 3cf (\ci fg

==. HYUWYf @]WYbgifY=b 6]c`c[m(; fUXYg 7-12)
5. A Ucf fYei]rfYa YbhgUgg\ck b Uvcj Yhc]bWi XY 6=C 221, 222, UbX 31, .
6. 5XX]h]cbU`fYei]rfYa Ybhg D< M112/D< M213 & 21((cf 231 & 232)
7. DfcZYgg]cbU`9Xi WUh]cb. 98Í 1)0, 2)0, 32*, (1, , (33/DGM213, 31, /C9 22)
8. 7ca d`YYh]cb cZUdd`]WWYdcfh]cbgcZh`YDfU]g=.
9. : cf UXX]h]cbU`]bZcfa Uh]cb, gYYh`Y 5gg]ghUbh 8YUb Zcf HYUWYf 9Xi WUh]cb UbX 5WWfYX]hUh]cb.

=J. A]bcf]b 6]c`c[mí 23 \ci fg
5. 6=C 112
6. Hk c 200-`YjY` 6=C Wci fgYg
7. H\fYY 300-`YjY` 6=C Wci fgYg

AggYgga Ybh cZ MU^cfg

6]c`c[ma UcfgUfYfYei ]fYXhc hU_Yh\Y_bck c h\Yfa ]bU Wci fgYgUgUfYei ]fYa YbhZcf [fUXi Uh]cb. 6=C (2+, FYgYUfW DfYgYb-hUh]cn, UbX 6=C (-, , GYa ]bUf. H\Y 8YdUfhm YbhUXa ]b]ghfgh\M Ucf : ]YX 9l[ma ]bUh]cn hc gYb]cf b]c`c[ma Ucfg

Shi XYbh Of[Unln]h]cbg

G][ma UNYHUjgUbUh]cnU \cnorUfmgVVYbWgcVYhym Zcfh]cgYk \c \UjYWma d`YhXc 1) \ci fg]bbUufU gWYbWYUbX aUhYam Uh]gUnX\c \UjYUa ]b]a i a ; D5 cZ 3.0]bh\YgYWci fgYg M Ma WYfg\]pdUhYUh\Yg]b WY XYfWYf]b]h]cn Zcf UWWXY ]WWWYj Yma Ybhg VnY h\YG]ma UNYHUbcf 5k UnX, dUfh]W]dUh]cn ]b bUh]cnU`mzYWcf[b]nYX fYgUfW dfcYYWg UbX aa YbgcZWcdYfUh]cn]bgma]`UfUfYUgVm gh]XYnhgcZXJZZYbhWc``Y Yg

6]c`c[]ghg-]bC VgYfjUh]cncZh`YM U[bYhn9Ufh\, 6=CM 9, gYfjYgghiXYbhgbthrhYghYXbYliod`cf]b[ h\Yk cf`XXoZb]c`-c]mVynorobXh`YWUggfccma . 6=CM 9]gXYg][bYXcfm]m Uf]`m]Zcf b]c`c[ma UcfgUbX]bcfghVi h]gcdYbhc UnyoXYk]h\U]bh]rYghb b]c`c[ma5bcn`c]b[dfcYWio cZ6=CM 9]ghc dfcj]XYm Ybhorghc U`]hhrcXi hcfym b]o`c[magtiXYbhg

Shi XYbh Ak UfXg

H\Y6]c`c[mfYgYUfW 5k UfX]g[ ]jYn Vmh\YZUWi`hmcZh\Y8YdUfma Ybhcf6]c`c[mhc h\YghiXYbhk \c dfYgYbhg
h\Y VYghfYgYUfW dUUYf cbh\Ym YUf. H\YfYgYUfW a ugh \UjYVYYb Un or][ ]nU`d]YWcZk cf_ UbX a ush \UjYVYYb
dfYgYbhYXUhUgghUhY, fY[ ]cnU`, cr bUh]cnU` dfcZYgg]cnU`b]c`c[ma YYh]b[dr]cr hc [fUXi Uh]cn.

W\]hU_Yr: fYg\m Un 6]c`c[ma5k UfX H\Y8YdUfha Ybhgrg YWgUZfYg\m Un a Ucf or m]bncr VUrYXcn ci ghUbX]b[
gWc`Ugh]WUWY]Yma Ybh. ÚUbUVUbYYY, 7\ir]ghUn gYrj ]WY, UbXgcc`gd]f]h

Cci fgY OZZYr]b[ ]b B]c`c[m (BIO)

() < ci fg 7fYX]h

100. Gi fjYmcZ6]c`c[]WU` 7cbWYdhg(4) :, K, G

5 Wci fgYcfbcn-g]Y]bWYa Ucfg ZcWgYXcn h\YVUg]W\]dXUgVc Yn Ubd`Yghi XYbhghc UddfYWUhYh\YY " Y XUhYh\   Y f
    $ W&i srG f•V Ð p D D P À 0

211. A]WčV]c`c[m(4) : , G

DfYfYei]g]hY. 7< 9 10) cf 111, cf D< M111 UbX 6=C 112. B i fg]b[g]hi XYbhg a i g]ha YYhfYei]fYa YbhgcZbi fg]b[dfc-[fUa .

7`Ugg]ÚW]h]cb, a cfd\c`c[md\ng]c`c[ m,UbXYWc`c[mcZVU]Ŵmf]UUbXj]fi gYg k]h]g d]YWU Ya d\Uggcb VU]ŴmfU H\fYY \ci fgcZ`YW]fYUbX 3\ci fgcZ`UcfUhcfm/ k YY .

213. =bjYfhYvfUhYNcc`c[m(4) :

DfYfYei]g]hY. 6=C 112.

7`Ugg]ÚW]h]cb, a cfd\c`c[md\ng]c`c[ m,UbXYWc`c[mcZh\Y]bj YfhYvfUhYUb]a Ug H\fYY \ci fgcZ`YWi fYUbX 3\ci fg cZ`UcfUhcfm/ k YY .

214. JYfhYvfUhYNcc`c[m(4) G

DfYfYei]g]hY. 6=C 112.

7`Ugg]ÚW]h]cb, a cfd\c`c[md\ng]c`c[ m,UbXYWc`c[mcZh\Yj YfhYvfUhYUb]a Ug H\fYY \ci fgcZ`YWi fYUbX 3\ci fg cZ`UcfUhcfm/ k YY .

215. 6cHLbm(4) :

DfYfYei]g]hY. 6=C 112 UbX 7< 9 111.

7`UT YWi

2135.6˘ Ê ÚA

a % R R U„W R • T X a
0 P ` 3̀ U
3 U P 0 0 @ Q G

52

318 9Wˇc[m(4) GÍ 9j Yb MˇUfg

DfYfYei]g]hY. 12\ci fgcZV]c`c[mYl W[X]b[221-22.

498 6]c`c[mGYa]bLf (1) : , G

DfYfYei]g]hY. 2, \ci fg]hck UFX 6=C a Ucf, Ua]b]a i a 6=C ; D5 cZ2.0, gYb]cf g]hUbX]b[.

K f]hh]b UbXcfU dfYgYbLh]cb cZU`]VfUfmfYgYUfW dUdYf UbXk YY_`mX]g]WggcbgcZWffYbhV]c`c[ ]W fYgYUfW. A Um

VYa cX]ÚYX Uhh`YX]g]hmIh]cb cZh`YXYpUfha Ybh