# 8YdUfhaYbh`cZ`6]c`c[m 7c``Y[Y`cZ`5fhg`UbX`GW]YbWYg

:UWi`hm

C\YfYm CfcggYth(1--2). 5 gglgfUbhDfcZ/ggcf cZ6]c`c[m@UvcfUrcf]Yg 6.G, I b]cb I b]j Yfglm/A.5., K Yghfb ? Ybh WmI b]j Yfglm/5XX]ljcbU gli Xm6cglrcb I b]j Yfglm DcfhUbX CfUhYI b]j YfglmUbXI b]j YfglmcZA Ya d\]g

Jua YgMUfWgLcWYth(200(). J]gh]b[ =bgfii Wcf cZ6]c`c[m6.G UbXA.G, A i ffUmCHUhY O I b]j Yfghm/D\.8., I b]j YfghmcZHybbYggYY.

AbXmMUX]gcb (2002). 5 gg]gfLbhDfcZ/ggcf cZ6]c`c[m6.G, I b]j Yfg]mcZHbbYggYY/A.G, I b]j Yfg]mcZ? Ybh Wm/D\.8., ? Ubg/gGLHYI b]j Yfg]m

MJWUY L. MWIU (1-, 0). I blj YfglmDfcZiggef cZ6]c`c[m6.G UbXA.G, I blj Yfglm cZA ]gglggldd]/D\.8., @ci ]gUbUGUYI blj Yfglm

E`gJYM Sa ]h (1-\*2). 5 ggcVJUY DfcZ/ggcf cZ6]c`c[m6.G, I b]cb I b]j Yfglm/A.G, I b]j YfglmcZ=`]bc]g/5XX]I]cbU gli Xm]b FUX]U]cb 6]c`c[mI b]j YfglmcZHbbYggYY UhA Ya d\]g

 $\label{eq:curve} \begin{array}{l} \textbf{CUfc`WMJ}\ \textbf{M}\ (1--,\ ).\ 5\ ggc\ \textbf{WLM}\ Dfc\ \textbf{Z}\ ggc\ f\ c\ \textbf{Z}6]c\ c\ [\ m6.G,\ I\ b]c\ b\ l\ b\ \textbf{J}\ \textbf{M}\ \textbf{gm}\ \textbf{A}\ .G,\ I\ b]-\\ j\ \textbf{M}\ glmc\ \textbf{Z}A\ ]ggc\ i\ f\ \textbf{J}\ \textbf{Ch}\ @ci\ ]g\ D\ .8\ .,\ \textbf{Ch}\ @ci\ ]g\ b\ \textbf{J}\ \textbf{M}\ \textbf{gm}\ \textbf{M}\ \textbf{M}\ \textbf{M}\ \textbf{A}\ .G,\ I\ b]-\\ j\ \textbf{M}\ \textbf{M}$ 

 $\label{eq:constraint} \begin{array}{l} \mbox{WLhbY WcZcfX} (1\mbox{-},\mbox{+}). \ DfcZggcf\ cZ6]c\ c[\ m6.G,\ I\ b]cb\ I\ b]j\ Yfglm(A\ .G\ UbX\ D\ .8\ ., \ HM\ Uc5\ \&\ A\ I\ b]j\ Yfglm \\ \end{array}$ 

)-

#### 7 iff]Wi`i a

 $\label{eq:hyperbolic} \begin{array}{ll} H YWff]W'ia ]b V]c'c[m]gXYg][bYXhc UWi U]bhgi XYblgk ]h `]j ]b[cf[Ub]ga gUg k \c Y, Z bWicb]b[Ybh]HYgh Uh ]b h Yf X]j Yfg]mg UYa UmWa a cb ZYUi fYg =b UX-X]hcbhc dfcj ]X]b[ h YgWbh]ÚVWUW[ fci bXfYei ]fYXcZU` YXi WhYXWf]mhbg h YWi fgYg dfcj [XYUZci bXUhcbi dcbk \]Wh Ygi XYbha UmW ]'XU[ fUXi UhYdfc[ fUa , i bXYfHU_Y HU]b]b[ ]b \YU ]c'c[ ]W dfcWggYg Gi XYblgWb dfcWYXhc h YÚfgh2Oo 'Y Y V]c'c[ mWi gYWbXgYa Yghf cZh YZYg a UmYU. =b h Ygcd \ca cfYmYU, gi XYblgk ]``Wbh]bi Yh Y gi fj YmcZh Y_]b[ Xca gcZ']ZY mHU_]b[ UXX]h]cbU 200 'Y Y V]c'c[ mWi fgYg Gi XYblg bUyd[ fci bX]b cf$ 

 $[ Ub] WWYa ]gfmXi f]b[ h UhnYUf. 6]c`c[ mWi fgYgUhh Y 300 (00 `Yj Y g\ci `XVYH_Yb Xi f]b[ h Y1 b]cf UbXgYb]cf mYUf g k ]h gYa ]bUf fYgYfj YXZcf h YgYb]cf mYUf. Gi XYblg k ]``Yl Ua ]bY]b XYIU`\ck cf[ Ub]ga gZ bWjcb, UbX]bhYUMuk ]h h Y]f Ybj ]fcba YbhUbX YUW ch Yf. 6]c`c[ ma UcfgUfYYbWi fU YXhc a ]bcf ]b WYa ]gfm$ 

I ddYf-`Yj Y gli XYblga UnYbfc``]ba Uf]bYV]c`c[mWi fgYgVmWcdYfU]j YU fYYa Ybh k]h h Y; i `Z7cUghFYgYUW@UVcfUrcfmLbX5i GU/Y=bg]]i hYcZ9bj ]fcba YbIU Gli X-]Yg : cf]bZcfa Uf]cb, gYYh Y8 YdUfha Ybh7\U]f.

- I. MUcf ]b B]c c[m i 39 ci fg]
  - 5. 6=C 112, 211, 213, 21(, UbX 21)
  - 6. : ci f 300 `Yj Y 6=C Wri fgYg]bWr X]b[ 6=C 302 UbX 31) UbX Yl Wr X]b[ 3-).
  - 7. 6=C (2), (2\*, (2+, UbX(-,
  - 8. 6]c`c[mYYMj Y( \ci fg(221 UbX 222 Udd`mcb`mhc[Yh Yf)
- II. TYUWYf L]Wbgi fYIb B]c`c[m(GfUXYg 7-12)
  - 5. A Ucf fYei ]fYa YblgUgg\ck b UVcj Yhc ]bWi XY6=C 221, 222, UbX 31, .
  - 6. 5 XX]h]cbU fYei ]fYa Ybhg D< M112/D< M213 & 21( (cf 231 & 232)
  - 7. DfcZ/gg]cbU 9Xi Whjcb. 981 1) (0, 2) (0, 32\*, (1, , (33/DGM213, 31, /G9 22)
  - 8. 7ca d`Yhcb cZUdd`]WWYdcfhcbgcZhYDfU ]g=
  - 9. : cf UXX]ljcbU ]bZcfa Ujcb, gYYh Y5 gg/gLbh8 YLb.
- III. M]bcf ]b B]c`c[ m 23\ci fg
- 5.6=C112
  - 6. Hk c 200 Yj Y 6=C Wi fgYg
  - 7. H\fYY300 YjY6=CWifgYg

## 5ggYgg a Ybh'cZ'AU^cfg

6]c<sup>\*</sup>c[ ma UcfgUYfYei ]fYXhc HJ\_Yhk c hhfa ]bU Wi fgYgUgUfYei ]fYa YbhZcf [ fUXi Ulcb, 6=C (2+, FYgYUfW DfYgYblUlcb, UbX6=C (-,, GYa ]bUf. H\Y8 YdUfha YbhUXa ]b-]ghfgh\YA Ucf : ]YX9l Ua ]bUlcb hc gYb]cf V]c<sup>\*</sup>c[ ma Ucfg

## GhiXYbh<sup>C</sup>f[Ub]nUh]cbg

6=C@C ; M

#### 121. Hi a Ub B]c`c[m(4)

Gi fj YmcZg/fi Wai fY UbX Zi bWajcb cZh\Y\i a Ub VcXmk ]h\Ya d\Ugg cb h\Ybcfa U cdYfU]cbg cZcf[Ub gnghYa g UbX h\Yfc`YcZ\ca Ycg/Lgig H\fYY\ci fg`WMai fY UbX 2 \ci fg`UV/k YY\_. 7fYX]hWubbchVYYUfbYXUZhAf YUfb]b[Y]h\Yf 6=C 221 cf 222. B c WAYX]h hck UfX 6=C a Ucf/a ]bcf.

#### 200 W]`X]ZYB]c`c[m(4)

DfYfYei ]g]h¥g 6=C 100cf 112. 6]c`c[ ]W/ WbWdhg]bj c`j YX]bÚg\Yf]YgUbXk]`X`]Z/V]c`c[mh\Yf Udd`]Wh]cb]bdfUW h]W, UbXYId`cfUh]cbcZWbh¥adcfUfm]ggi YgZUJb[ h\Ycf[Ub]gag\UV]hUgUbX\i aUb Wbgi aYfg

211. M]WCV]c`c[m(4)

DfYfYei ]ghY. 7< 9 10) cf 111, cf D< M111& \cA 7efm W/Wq h 6=C@C; M

 $\label{eq:constraint} \begin{array}{l} \label{eq:constraint} \end{tabular} \label{eq:constraint} \end{tabular} \label{eq:constraint} \end{tabular} \label{eq:constraint} \end{tabular} \label{eq:constraint} \end{tabular} \label{eq:constraint} \end{tabular} \end{tabu$ 

#### 315. GYbYfjVg(4)

DfYfYei ]ghY. 12 \ci fgcZV]c`c[mY] Wi X]b[ 6=C 221-2. 5 ghi XmcZh Y df]bV/d`YgcZ\YfYX]hm]bWi X]b[ Vch\WLgg]Wi UbX a c`YW`Uf [YbYh]Wg H\fYY\ci fgcZ`YMi fYUbX 3 \ci fgcZ`UVcfUncfmi k YY\_.

#### 316 $P \ge cc[m(4)]$

DfYfYei]glhY. 12 6=C \ci fg Yl Wi X]b[ 221-2/7<9 10\* cf 31(. Ncc`c[m D\ fYW a Y hY 5 gli Xm cZ h\Y df]bV/d`Yg cZ D\nglc`c[nZ D`Ug X]b[ a `UVdh]Y i fV `Y `Yg W

## 3 5. XYjYcda YbW( g|c`c[m(4)

on 5 ghiXm <sup>C</sup>O 3 5 XXj <sup>C</sup>O ^ ma Q <sup>C</sup>

## 425 IblfcXi Wjcb hc RYgYUfW (1)

\* •