

Eqr {tki j v'Í '422: 'd{ 'Gtke'Y gkpgt

 $\label{lem:continuous} Cmltki j wl'tgugtxgf 0 Gzegr v'cu'r gto kwgf "wpf gt" y g"WU0 Eqr {tki j v'Cev'qh'3; 98."pq r ctv'qh'y ku'r wdrkecwqp" o c { "dg" tgr tqf wegf . "f kwtkdwgf . "qt" 'tcpuo kwgf "kp" cp { 'hqto qt" d{ "cp { "o gcpu."qt" uvqtgf 'kp" c"f cvcdcug" qt 'tgvtkgxcn'u {uvgo . "y ky qwv'y g"r tkqt y tkwgp" r gto kunkqp" qh'y g"r wdrkuj gt0 }$

Vy grkg
J cej gwg'Dqqm'I tqwr 'WUC
459'Rctm'Cxgpwg
P gy '[qtm'P['32239

Xkuk'qwt'Y gd'ukg'cv'<u>y y 0 cej gwgDqqml tqwr WUC0eqo</u>0

Vy grkg'ku'cp'ko rtkpv'qh'I tepf 'Egpvten'Rwdrkij kpi 0

Vj g'Vy grxg'pco g'cpf 'mi q'ku'c'\tcf go ctm'qh'J cej gwg'Dqqm'I tqwr 'WUC.'Kpe0

Hktuv'gDqqm'Gf kklqp<'Lcpwct { '422: KLDP /35<'; 9: /2/668/73329/2

Eqpygpw

Kovtqf wevkqp

Ej cr vgt "3 < VJ G"P GVJ GTNCP F U < J cr r kpguu "Ku"c "P wo dgt

- Ej cr vgt '4<'UY KV\ GTNCPF<'J cr r kpguu''Ku''Dqtgf qo
- Ej cr vgt '5 < DJ WCP < J cr r kpguu 'Ku'c 'Rqnke {
- Ej cr vgt '6<'SCVCT<'J cr r kpguu'Ku'c'Y kppkpi 'Nqwgt { 'Vkengv
- Ej cr vgt '8<'O QNF QXC<'J cr r kpguu''Ku''Uqo gy j gt g''Gnug
- Ej cr vgt '9<'VJ CKNCPF<'J cr r kpguu''Ku''P qv''Vj kpmkpi
- Ej cr vgt": <'I TCCV"DTKVCKP <'J cr r kpguu'Ku'c"Y qtm'kp''Rtqi tguu
- Ej cr vgt"; <**KP** F KC<**J** cr r kpguu'**K**i'c'Eqpvtcf kevkqp
- Ej cr vgt '32 CO GT KEC J cr r kpguu' Ku' J qo g

GRKNQI WG

Cempqy ngf i o gpw

Cdqw'y g'Cwj qt

Ko''y gug'f c{u''qh'y ctu''cpf 'two qtu''qh'y ctu.''j cxgpw''{qw''gxgt 'ftgco gf qh'c''rrceg''y j gtg''y gtg''y cu''rgceg''cpf ''ugewtk\{.''y j gtg''nkxkpi ''y cu''pqv c''ustwi i rg''dw''c''rcuskpi 'f grki j vA

ô Nquy'J qt k qp. 'f ktgevgf 'd{ ''Htcpm'Ecrtc.'3; 59

Kottqf weskqp

O { "dci u"y gtg"r cemgf "cpf "o { "r tqxkukqpu"mqcf gf 0'K'y cu"tgcf { "hqt "cf xgpwtg0'Cpf uq. "qp"c "rcvg"uwo o gt "chwgtpqqp. "K'f tci i gf "o { "tgnwevcpv'htkgpf "F tgy "qhh"vq "gzr mqtg pgy "y qtnf u "cpf. "K'j qr gf. "vq "hkpf "uqo g "j cr r kpguu "cmpi "vj g "y c{0"Køkg "cny c{u dgnkgxgf "vj cv'j cr r kpguu'ku"lwuv'ctqwpf "vj g"eqtpgt0'Vj g"tkem'ku'hkpf kpi "vj g'tki j v'eqtpgt0

 $P\ qv'nqpi\ ''lpvq''qwt''lqwtpg\{.'Ftgy\ ''itgy\ ''pgtxqwu0J\ g'r ngcfgf''y kj ''o g''vq''wtp''dcem dw''Klpuknygf''y g''r tguu''qp.''r tqr gngf''d { ''cp''kttguknykdng''ewtkqukx{ ''cdqw''y j cv''rc { ''cj gcf0} Fcpi gtA''O ci keA''K'pggfgf ''vq''npqy . ''cpf ''vq''y ku''fc{ ''Ko ''eqpxkpegf''K'y qwrf''j cxg tgcej gf''y j gtgxgt''ky'y cu''Ky cu''vt { kpi ''vq''tgcej ''j cf''y g''Dcnko qtg''Eqwpv{ ''Rqnkeg''pqv eqpenwfgf . ''ko r wnukxgn{ ''K''y qwi j v''cv''y g ''vko g. ''y cv''y g ''uj qwrfgt ''qh''c ''o clqt y qtqwi j kctg'y cu''pq''r nceg''hqt''c''eqwr ng''qh'hkxg/ { gct/qnfu0}$

Uqo g"r gqr rg"ces wktg"yi g"vtcxgn"dwi 0"Qyi gtu"ctg"dqtp"y kyi "k0"O { "chhhevkqp. "kh yi cvou"y j cv"kv"ku. "y gpv"kpvq "tgo kuukqp "hqt "o cp{ "{gctu "hqmqy kpi "o { "cdqtvgf gzr gf kkqp"y kyi "F tgy 0'K/'tguwthcegf "chvgt "eqmgi g"y kyi "tgpgy gf "hwt{0'Kf gur gtcvgn{ y cpvgf "vq "ugg "yi g"y qtrf. "r tghgtcdn{ "qp "uqo gqpg "gnugou"f ko g0'Dw''j qy A"K'j cf "pq o ctngvcdrg"unkmu. "c"uwpvgf "ugpug"qh"o qtcrkx{."cpf "c"i rqqo { "f kur qukkqp0'Kf gekf gf "vq dgeqo g"c"lqwtpcrkuv0

Cu"c"hqtgki p"eqttgur qpf gpv"hqt"P cvkqpcn"Rwdnke"Tcf kq. "Kvtcxgrgf "vq"r reegu"uwej cu"Kcs."Chi j cpkuvcp. "cpf "Kpf qpgukc<"wpj cr r { "r reegu0'Qp"qpg"rgxgn"yj ku"o cf g"r gthgev ugpug0'Wpeqpuekqwur{."Ky cu"qdugtxkpi "yj g"hktuv"rcy "qh"y tkkpi <"Y tkxg"cdqw"y j cv"{qw npqy 0'Cpf "uq."pqvgdqqn"kp"j cpf."vcr g"tgeqtf gt"unwpi "qxgt"o { "uj qwrf gt."Ktqco gf "yj g y qtrf "vgnkpi "yj g"uvqtkgu"qh"i nqqo {. "wpj cr r { "r gqr rg0"Vj g "vtwj "ku"yj cv"wpj cr r { r gqr rg. "rkxkpi "kp"r tqhqwpf n{ "wpj cr r { "r reegu."o cng"hqt "i qqf "uvqtkgu0"Vj g{ "wi "cv j gctwntkpi u"cpf "kpur ktg"r cyj qu0

Vj g{ 'ecp'cniq'dg'c'tgcn'dwo o gt0

Y j cv'kh "K'y qpf gtgf." K'ur gpv'c" { gct "vtcxgrkpi "y g "i mdg. "uggmkpi "qw"pqv" y g y qtrf øu" y gm' vtqf f gp "vtqwdrg" ur qwu"dww "tcvj gt. "kwu" wpj gtcrf gf "j cr r { "r rceguA''Rrcegu y cv'r quuguu. "kp" ur cf gu. "qpg" qt "o qtg" qh" y g"kpi tgf kgpwu" y cv'y g"eqpukf gt "guugpvkcn" vq y g"j gctv { "uvgy "qh" j cr r kpguu<'o qpg { ."r rgcuwtg. "ur ktkwcrk { . "hco kn { . "cpf "ej qeqrcvg. co qpi "qvj gtuO'Ctqwpf" y g"y qtrf. "f q | gpu" qh" y j cv khu" r rc { "vj go ugrxgu" qw' gxgt { "f c { 0 Y j cv'kh" { qw'rkxgf "kp"c "eqwpvt { "vj cv'y cu" hcdwrqwun { "y gcn y { "cpf "pq" qpg" r ckf" vczguA Y j cv'kh" { qw'rkxgf "kp"c "eqwpvt { "y j gtg" hckrwtg" ku'cp "qr vkqpA" Y j cv'kh" { qw'rkxgf "kp" c eqwpvt { "uq "f go qetcvke" y cv" { qw'xqvgf "ugxgp" vko gu" c "{ gctA" Y j cv'kh" { qw'rkxgf "kp" c eqwpvt { "y j gtg" gzeguukxg' y kpmkpi "ku" f kueqwtci gf A" Y qwf" { qw'dg" j cr r { "vj gpA

Vj cvzu"gzcevn{ "y j cv"K"kpvgpf gf "vq "hkpf "qww. "cpf "vj g "tguwnv"qh"vj ku "cf o kwgf n{ j ctgdtckpgf "gzr gtko gpv'ku'vj g"dqqm"{qw'pqy "j qnf 'kp"{qwt'j cpf u0}

K'y cu"dqtp "kp" ig" igct "qh" ig "Uo kg{ "Hceg<"3; 850" iy cviu" ig ig p" ic" it crig ie" iguki pgt htqo "Y qteguvgt." O cuuceig wugwu. "pco ig "J ctxg{ "Dcm"kpxgpvgf "ig "pqy /wdks wkaqwu it kppkpi "{gmqy "it crige0'Qt ki kpcm{."Dcmiu" etgcvkqp" iguki pgf "vq" ig ggt "wr" r gqr ng ig y ig "y qtmgf "cv. "qh" cm" r ncegu. "cp "kpuwtcpeg" eqo ig cu" igw" ig "y cu" ukpeg "dgeqo ig u{pqp{o qwu'y ky "ig "htqyi {."s wkpvguugpvkcm{'Co gtkecp" dtcpf "qh" ig cr r kpguu0

 $\label{eq:continuous} Cpf "uq."rkng" o cp{ "qvj gtu." Køxg" y qtngf "cv'kv0 Kpgxgt" o gv'c "ugrh/j grr "dqqm'Kf kf pøv rkng0 ("dqqmij grh'ku" c "vqy gtkpi." vgygtkpi "o qpwo gpv'vq "gzkuvgpvkcn" cpi uv. "dtko o kpi y kyj "dqqmi" kphqto kpi "o g"vj cv'j cr r kpguu" rkgu" f ggr "kpukf g "qh" o g0 Ki" Køo "pqv'j cr r {. vj g{"eqwpugn" vj gp" Køo "pqv'f ki i kpi "f ggr "gpqwi j 0}$

Vj ku "czkqo "qh" vj g"ugrh' j grr "kpf wuxtken eqo r rgz "ku "uq "f ggr n{ "kpi tekpgf "cu "vq "dg ugrh' gxkf gpv0" Vj gtgøu "qpn{ "qpg "r tqdrgo <"Køu "pqv' vtwg0" J cr r kpguu "ku "pqv' kpukf g "qh' wu dw' qw' vj gtg0" Qt. "vq "dg" o qtg "r tgekug. "vj g"rkpg "dgw ggp "qw' vj gtg" epf "kp" j gtg "ku "pqv' cu uj etr n{ "f ghkpgf "cu "y g" vj kpm0

Vj g'ncvg''Dtkkuj /dqtp'r j knquqr j gt''Cncp''Y cwu. 'kp''qpg''qh''j ku'y qpf gthwi'ngewtgu''qp gcuvgtp''r j knquqr j {.''wugf ''vj ku''cpcmqi {<'\bar{o}Kh''Kftcy ''c ''ekteng.''o quv''r gqr ng.''y j gp''cungf y j cv''K'j cxg''ftcy p.''y km''uc{ ''K'j cxg''ftcy p''c ''ekteng''qt ''c ''f kue. ''qt ''c ''dcm''Xgt{ ''hgy r gqr ng''y km''uc{ ''Kxg''ftcy p''c 'j qng''kp''y g''y cm''dgecwug''o quv'r gqr ng''y kpm'qh''y g''kpukf g hktuv.''tcvj gt''y cp''y kpmkpi ''qh''y g''qwukf g0'Dw''cewcm{ ''y gug''y q''ukf gu''i q''vqi gyi gtô {qw''ecppqv'j cxg''y j cv'ku''-kp''j gtgo''wpnguu''{qw'j cxg''y j cv'ku''-qw''y gtgo''ö

Kp"qyj gt"y qtf u."y j gtg"y g"ctg"ku"xkxcn'vq"y j q"y g"ctg0

D{ "ŏy j gtg.ö" Ko "ur gcnkpi "pqv'qpn("qh"qwt "r j {ukecn"gpxktqpo gpv'dwv'cnuq "qh"qwt ewnwtcn" gpxktqpo gpv0" Ewnwtg "ku " y g " ugc " y g " uy ko " kpô uq " r gtxcukxg. " uq " cm' eqpuwo kpi ." y cv'y g"hckn'vq" pqvkeg "ku "gzkuvgpeg" wpvkn'y g" uvgr "qwv'qh'kx0" KV'o cwgtu" o qtg y cp'y g" y kpn0

Y kj "qwt"y qtf u. "y g"uwdeqpuekqwun("eqphrcvg"i gqi tcr j { "cpf "j cr r kpguu0Y g"ur gcm qh"ugctej kpi "hqt"j cr r kpguu. "qh"hkpf kpi "eqpvgpvo gpv. "cu"kh"vj gug"y gtg"mqecvkqpu"kp"cp cwcu. "cewcn"r rcegu"vj cv"y g"eqwrf "xkukv"kh"qpn("y g"j cf "vj g"r tqr gt "o cr "cpf "vj g"tki j v pcxki cvkqpcn"unkmu0Cp{qpg"y j q"j cu"vcngp"c"xcecvkqp"vq. "uc{. "uqo g"Ectkddgcp"kurcpf cpf "j cf "hrcuj "vj tqwi j "vj gkt "o kpf "vj g"wpkpxkgf "vj qwi j v"õK"eqwrf "dg"j cr r { "j gtgö npqy u"y j cv"Ko gcp0

Nwtmkpi "lwuv'dgj kpf "yj g"ewtvckp "ku "qh"eqwtug. "yj cv"vcpvcnk kpi . "urkr r gt { "eqpegr v mpqy p"cu"r ctcf kug0'K/j cu"dgi wkrgf "wu"j wo cpu"hqt "uqo g"\ko g"pqy 0'Rrcvq'ko ci kpgf "yj g Drguugf "Kurgu. "c"r rceg"y j gtg"j cr r kpguu'hrqy gf "rkng"yj g"y cto "O gf kgttcpgcp"y cvgtu0 Wp\kn"yj g"gki j vggpyj "egpwt $\{$. "r gqr rg "dgrkgxgf "yj cv"dkdrkecn"r ctcf kug. "yj g"I ctf gp "qh Gf gp. "y cu"c"tgcri'r rceg0'K'cr r gctgf "qp"o cr uô mecvgf . "ktqpkecm $\{$."cv'yj g"eqphrwgpeg"qh yj g'Vki tku"cpf 'Gwr j tcvgu'tkxgtu. "kp"y j cv'ku"pqy "o qf gtp/f c $\{$ "Kcs $\{$ 0

Gwtqr gcp "gzr mtgtu"r tgr ctgf "hqt "gzr gf kklqpu"kp "ugctej "qh"r ctcf kug "d { "mgctpkpi Ctco cke. 'yj g"ncpi wci g"Iguwu'ur qng0'Kugv'qw'qp"o { "lqwtpg{."o { 'ugctej 'hqt'r ctcf kug.

ur gcnkpi "pqv'Ctco cke "dw"cpqy gt "qduewtg "rcpi wci g. "y g"o qf gtp "rkwti { "qh"drkuu ur qngp "d{ "y g "pgy "cr quvrgu "qh"y g "go gti kpi "uekgpeg "qh"j cr r kpguu0'K'dtwuj "wr "qp vgto u "rkng"õr qukkxg "chhge vö "cpf "õj gf qpke "cf cr vcvkqp0ö"K'ectt { "pq "Dkdrg. "lwuv'c "hgy Nqpgn('Rrcpgv'i wkf gu"cpf "c "eqpxkevkqp"y cv. "cu"J gpt { "O kngt "uckf. "õQpgotu"f guvkpcvkqp ku"pgxgt "c"r rceg. "dw"c "pgy "y c { "qh"uggkpi "y kpi u0ö

Cpf "uq."qp"c"v{r kecm{ "uvgco { "f c { "kp "O kco k"*kugrh"uqo g"r gqr rgxu"eqpegr v'qh r ctcf kug+"K'r cem'o { "dci u"cpf "f gr ctv'o { "j qo g"qp"y j cv'K'npqy "hwm'y gm'ku"c"hqqrxu gttcpf."gxgt { "dkv"cu"hqqrxuj "cu"yj g"qpg"K'vtkgf "vq"r wm'qhh"cu"c"r gtkr cvgvke 'hkxg/ { gct/qrf 0 Cu"yj g"cwj qt "Gtke "J qhhgt "r wv"kv. "õVj g "ugctej "hqt "j cr r kpguu"ku "qpg "qh"yj g "ej kgh uqwtegu"qh'wpj cr r kpguu06"Vj cvxu"qmc{0Kxo "crtgcf { "wpj cr r {0Kj cxg"pqyj kpi "vq"nqug0

VJ G'PGVJ GTNCPFU

J crrkpguu'Ku'c'P wo dgt

Kku"c"hcev'qh"j wo cp"pcwtg"j cv'y g"f gtkxg"r ngcuwtg"htqo "y cvej kpi "qyj gtu"gpi ci g"kp r ngcuwtcdng "cew0"Vj ku"gzr nckpu" y g"r qr wnctkv{ "qh" y q "gpwgtr tkugu<"r qtpqi tcr j { "cpf ech² u0Co gtkecpu"gzegn"cv'y g"hqto gt."dw'Gwtqr gcpu"f q"c"dgwgt "lqd"cv'y g"ncwgt0"Vj g hqqf "cpf" y g"eqhhgg"ctg"cm quv'dgukf g"y g"r qkpv0"Kqpeg"j gctf "qh"c"ech² "kp"VgnCxkx"y cv f kur gpugf "y kyj "hqqf"cpf "f tkpm"cnvqi gyj gt="kv"ugtxgf"ewnvqo gtu"go r v{ "r ncvgu"cpf"ewr u { gv'ej cti gf "tgcn"o qpg{ 0

 $\label{eq:continuity} Echfu''ctg''iy gcvgtu''y j gtg''iy g''ewwqo gt''ku''dqiy "cwf kgpeg''cpf "r gthqto gt0'K'hkpf "c y qpf gthwn''qpg''c''dnqem'htqo "o { "j qvgn''kp''f qy pvqy p''Tqvgtf co 0'K''ku''uko wncpgqwun{ mti g''cpf "eq| { . "wr uecng''cpf "twp/f qy p0'P keg''y qqf "hnqqtu. "dw''y g{ "nqqm''nkng''y g{ j cxgpøv''dggp''r qnkuj gf "kp''{gctu0'Køu''y g''nkpf "qh''r nceg''y j gtg''{qw''eqwrf "ur gpf "j qwtu pwtukpi "qpg''dggt."cpf "Klinwir gev'o cp{ 'r gqr ng''j gtg''f q''lwuv'yj cv0}$

 $\label{eq:continuity} \text{Gxgt}\{qpg\text{"ku'uo qnkpi ."uq'Klqkp''kp."rki j klpi "wr "c''rkwrg''eki ct0'Uqo gyj kpi "cdqw''yj g r reeg''o cngu''ko g''hggri'gzr cpukxg''cpf ''Kdgeqo g''cewgn{'cy ctg''qh''yj g''uo cnguv''f gvckn0'K pqkeg''c''y qo cp''ukwkpi "qp''c''dct''uvqqn''j gt''rgi u''r gtr gpf kewrct. "tguvkpi "qp''c''pgctd{ dcpkrygt''uq''yj cv''yj g{''hqto "c''rkwrg''f tcy dtkf i g.''y j kej "uj g''tckugu''cpf ''nyy gtu''cu''r gqr rg r cuu''d{0} }$

Kqtf gt "uqo gyi kpi "ecmgf "c"Vtcr knyg"dggt0Køu"y cto 0P qto cm{ ."Kf qpø/'rknyg"y cto dggt."dw'Krknyg"y ku"dggt0Cm'ctqwpf "o g"Kj gct"y g"r ngcucpv'ej qtvnyg'qh'F wej 0Kb'uqwpf u xci wgn{ "hco krkct."yi qwi j "Kecpøv'ko ci kpg"y j {0Vj gp"kv'f cy pu"qp"o g0F wej "uqwpf u gzcevn{ "rknyg"Gpi rkuj "ur qngp"dcemy ctf 0"K"npqy "yi ku"dgecwug "Køxg"j gctf "c"mpv"qh dcemy ctf "Gpi rkuj 0Kp"yi g"r tgf ki kcn'gtc."Køf "gf kv'vcr g"hqt"o {"P RT"uvqtkgu"qp"c"tggn'vq/tggn'vcr g"f gem'yi g"ukt g"qh'c"VX"ugv0Kpxctkcdn{ ."yi ku"y qwrf "gpvckn'r nc{kpi "ugi o gpwu"qh yi g"vcr g"dcemy ctf 0Cu"K'ukv'kp"yi g"ech? ."yi kj "o {"rkwyg"eki ct"cpf "o {"y cto "Vtcr knyg dggt."K'y qpf gt "kh"K'tgeqtf gf "uqo gqpg"ur gcmkpi "F wej "cpf "r nc{gf "yi cv"dcemy ctf . y qwrf "kv'uqwpf "rkng'tgi wrct'Gpi rkuj A

 nc "ej cuug"cw'dqpj gwt. "yj g'j wpv'hqt"j cr r kpguu0

Ur gekhecm{."o {"rtg{"ku"c"F wej "rtqhgunqt"pco gf "TwwiXggpj qxgp<'y g"i qf hcy gt qh"j crr kpgun"tgugctej 0'Xggpj qxgp "twpu"uqo gy kpi "ecmgf "y g"Y qtnf "F cvdcug "qh J crr kpgun0'K'ku"pq"lqmg0Xggpj qxgp"j cu"eqmgevgf ."kp"qpg"mqecvkqp."y g"uwo "qh"j wo cp mpqy ngf i g"cdqw'y j cv'o cmgu"wu"j crr { ."y j cv'f qgu"pqv."cpf ."qh"r ctvkewrct "kpvgtguv'vq o g. "y j kej "r ncegu"ctg"y g"j crr kguv0'Ku"y gtg"ku"kpf ggf "c"tqcf "o cr "qh"j crr kpgun"qw y gtg."cp"cvncu"qh'drkun. "y gp'T ww'Xggpj qxgp"y km'mpqy "cdqw'kv0

K'ngcxg''y g''ech'. ''tgnwevcpw{.''cpf''j gcf''dcem''vq''o { "j qvgn'hqt''f kppgt0Tqwgtf co "ku pqv'c''dgcwkhwn'ek{0'Ki'ku''i tc{"cpf''f wm''y kj ''hgy ''uki j wu'qh''kpvgtguv0'Ukm'Tqwgtf co øu o kz "qh"pcvkxg "F wej "cpf "ko o ki tcpvu. "o cp{ "qh" yi go "O wurko u. "ngcf u "vq "uqo g kpvgtguvkpi "lwz vcr qukkkqpu0'Vj g''Engqr cvtc''Ugz "Uj qr. "yi g''y kpf qy "f kur nc{"qh"y j kej eqpukuvu"qh"c''o gpci gtkg''qh''ncti g''cpf "cncto kpi n{"rkhgrkng "f krf qu. "ku"qpn{ "qpg''dnqem htqo "yi g''Rcnkuvcp "Kurco ke "Egpvgt0'Cv''qpg"r qkpv. "K'ecvej "c''y j kth"qh"o ctklwcpc. "yi g htci tcpv''ctqo c''qh''F wej "vqngtcpeg<'ugeqpf j cpf "uvqng0'Vy q''dnqemu''ncvgt. "K'ugg''c''o cp r gtej gf "qp''c''ncf f gt. "j cpi kpi "c''i kcpv''{gmqy "enqi "qp"c'uvqtghtqpv. "y j krg''dgmy "y q O kf f ng''Gcuvgtp''o gp"i tggv''gcej "qyi gt "y kji "u{o o gvtkecn''r gemu''qp "yi g''ej ggn0'K'f qpøv npqy "gzcevn{ "y j gtg''y g{ øtg "htqo . "dw''uqo g''qh''y g''ko o ki tcpvu''j gtg''eqo g''htqo eqwpvtkgu''y j gtg''cneqj qn''ku''kngi cn''cpf "y qo gp"ctg''eqxgtgf''htqo "j gcf "vq''vqg0'Kp''yi gkt cf qr vgf''j qo g."o ctklwcpc''ku''ngi cn''cpf "uq''ku''r tquvkwwkqp0'P q''y qpf gt''Kupkhh''vgpukqp''kp yi g''ckt."o kpi ntpi 'y kji ''yi g''ecppcdku0

Vj g "j qvgn" f kpkpi "tqqo "ku"uo cm "eq| {0"Vj g "F wej "f q "eq| { "y gm0"K'qtf gt "vj g cur ctci wu"uqwr 0"Køu"i qqf 0"Vj g "y ckgt "engctu"o { "dqy n"cpf "vj gp "uc { u. "õP qy "o c { dg { qw'y qwrf "rkng"uqo g "kpvgteqwtug60" }

õGzewug''o gAö

õKpvgteqwtug0[qw'ecp'j cxg'kpvgteqwtug0ö

Kéo "yi kprikpi ."Y qy ."yi g"F wej "tgcm{ "ctg"c"r gto kuukxg"dwpej ."y j gp"k/f cy pu"qp o g"yi cv"j g"ku"ur gcrikpi "qh"uqo gyi kpi "grug "gpvktgr{ 0"Kpvgt "eqwtug0"Cu"kp "õdgw ggp eqwtugu0ö

õ[gu.ö'Kuc{."tgrkgxgf 0°õVj cv'y qwrf "dg"pkeg0ö

Cpf "uq"K'f q0'K'j cxg"kpvgt "eqwtug. "tki j v"vj gtg"kp "vj g"J qvgn"xcp"Y cnxwo "f kpkpi tqqo 0Kgplq{ 'kv'xgt{ "o wej ."vj ku'wpj wttkgf "f kpkpi "gzr gtkgpeg0Kukr "o { "dggt."uvctg"kpvq ur ceg. "cpf . "kp "i gpgtcn "f q "pqvj kpi ô wpvkn"vj g "y ckxgt "dtkpi u "vj g "i tkngf "ucno qp. kpf kecvkpi "vj cv."hqt"pqy ."o { "kpvgt"eqwtug"ku"qxgt0

Ko "vj g"o qtpkpi . "K" veng "vj g" uwdy c { "vq "o { "J qn{ "I tckn<"vj g"Y qtff "F cvedcug "qh J cr r kpguu. "qt "Y F J 0"P qto cm{ . "K"f q "pqv" cuuqekcvg "vj g "y qtf u "õj cr r kpguuö "cpf õf cvedcug.ö"dw'vj ku'ku'f khtgtgpv0'Vj g"Y qtff "F cvedcug"qh"J cr r kpguu'ku'vj g"ugewret kuvu cpuy gt "vq"vj g"Xcvkecp"cpf "O geec "cpf "Igtwucrgo "cpf "Nj cuc."cm"tqnrgf "kpvq"qpg0'J gtg {qw'ecp."y kj "vj g"erkemiqh"c"o qwug. "ceeguu"vj g"ugetgwu"qh"j cr r kpguu0'Ugetgwu"dcugf "pqv qp "gr j go gtcn"tgxgrcvkqpu "kp "uqo g "cpekgpv"f gugtv"dw"qp "o qf gtp "uekgpeg="ugetgwu kpuetkdgf "pqv'qp"r ctej o gpv'dww"qp "j ctf "f tkxgu="y tkwgp"pqv'kp"Ctco cke "dwv'kp"vj g repi wci g"qh"qwt "vko gu. "dkpct { "eqf g0

Ky cm'c'hgy "dmemu'htqo ''vj g''uwdy c $\{$ "cpf ''co ''kpuvcpvn $\{$ "f kucr r qkpvgf 0'Vj g''eqmgi g eco r wu''y j gtg''y g''Y FJ ''ku''j qwugf ''mqmu''o qtg''rkng''c ''uwdwtdcp''qhhkeg''r ctm''y cp''c egpvgt ''qh''dnkuu. ''vj g''tgr qukxqt $\{$ "qh''j wo cpkx $\{$ øu''npqy ngf i g''cdqw'''j cr r kpguu0'K''t $\{$ "vq uj twi ''qhh''yj ku''hggrkpi 0'Chygt "cm ''y j cv''y cu''K'gzr gevkpi A''Vj g''Y k $\{$ ctf ''qh''Q $\}$ A''Y km $\{$

Y qpnc"cpf "vj g"Qqo r c"Nqqo r cu"uewtt {kpi "ctqwpf "uj qwkpi "geuwckecm{ ."õY gøxg"i qv kx."y gøxg"i qv'kv0"Vj g'ugetgv'vq"j cr r kpguuöA"P q ."Ki wguu"pqv."dwv'Kj cf "dggp"j qr kpi "hqt uqo gyj kpi "c"hkwrg"rguu"uvgtkrg0O qtg"j cr r { ."rguu"f cvc0

K'y cm'f qy p"c "pqpf guetkr v'eqttkf qt "cpf "mpqem'qp"c "pqpf guetkr v'qhhkeg"f qqt0'C o cp"y kj "c"F wej "ceegpv"{gmu"hqt "o g"vq "gpvgt0'Vj gtg"j g"ku0Ft0'Hggni qqf "j ko ugrh0 Tww\Xggpj qxgp"ku'c"vko "o cp. "kp"j ku'gctn("ukz\kgu."Ki wguu0J g"j cu'c'ucm\cpf/r gr r gt dgctf "cpf "dtki j v."gngevtke"g{gu0J g"ku'f tguugf "kp"cm'drcenô uv\nkuj ."pqv'o qtdkf "drcen0 J g"nqmu"xci wgn("hco khct."cpf "y gp "K'tgcn\\ g"y j {<'J g"nqmu"hng"c "F wej "Tqdkp Y kn\co u."y kj "y g'uco g'eqkrgf "gpgti {"cpf "urki j vn("ko r kuj "i t\p0J g'ur t\pi u'lhtqo "j ku ej c\t "cpf "qh\gtu"j ku"j cpf "cpf "c "dwu\pguu"ectf ."y j kej "tgcf u<'\olivo T ww'Xggpj qxgp. Rtq\pguuqt "qh\J cr r \pguu'Uwf \gu0\olivo

Kť qpøv'mpqy "y j cv'vq"uc{0'Cu"c"lqwtpcrkuv."Køxg"eqpf wevgf "j wpf tgf u"qhi"kpvgtxkgy u0 Køxg"kpvgtxkgy gf "nkpi u"cpf "r tgukf gpwu"cpf "r tko g"o kpkuvgtu."pqv'vq"o gpvkqp"j gcf u"qh vgttqtkuv'qti cpk cvkqpu"nkmg"J g| dqmcj 0[gv'ukvkpi "j gtg."cetquu"htqo "vj ku"nkpf n{ "F wej r tqhguuqt "y j q "mqmu"nkmg"Tqdkp"Y kmkco u. "K'co "uwo r gf 0'Rctv'qh"o g. "vj g"r ctv'vj cv f gur gtcvgn{ "etcxgu"r gceg"qh"o kpf ."y cpwu"vq"uj qwv."õFt0Xggpj qxgp."{qwxxg"etwpej gf vj g"pwo dgtu."{qwxxg"uwwf kgf "j cr r kpguu"{qwt "gpvktg"r tqhguukqpcn"nkhg="r ngcug"i kxg"kv'vq o g0'I kxg"o g"yj g"f co p"hqto wmc"hqt"j cr r kpguu#ö

Dw'Kf qpø/uc{"y cv0Kecpø/uj cng"{gctu'qh'\tckpkpi ."y j kej '\gm'o g'\q'o ckpvckp'o {f kuvcpeg'htqo "o {"uwdlgev'cpf "pgxgt."gxgt'\tgxgcn'\qq"o wej "cdqw'o {ugnh0Ko "nkng'\j g qhh/f w{ "eqr "y j q "ku"qw"\q "f kppgt "y kj "j ku"hco kn{ "dw"ecpøv"uvqr "uecppkpi "\j g tguvcwtcpv'hqt'r qvgpvkcn'uj qqvgtu0

 $\label{thm:condition} $$ Uq "kpuvgcf "qh" wpdwtf gpkpi "o { "uqwn "K"tguqtv" vq "cp "qrf "vtkem" go r rq{gf "d{ lqwtpcrkuvu"cpf "y qo gp"y j q"y cpv'vq"r w'c"f cvg"cv'gcug0\"oFt0Xggpj qxgp.\"o"Khkpcm{"uc{. \~ovgm'o g"cdqw'{qwtugrh0J qy "f kf "{qw'i gv'kpvq''y g'j crrkpguu'dwukpguu4\"o} }$

 $\label{eq:condition} Xggpj\ qxgp"rgcpu"dcem"lp"j\ ku"ej\ ckt."j\ crr\ \{\ "vq"qdrki\ g0"J\ g"eco\ g"qh"ci\ g"kp"yj\ g"3;\ 82u0\ Gxgt\ \{qpg"qp"j\ ku"eqmgi\ g"eco\ r\ wu"y\ cu"uo\ qmkpi\ "f\ qr\ g."y\ gctkpi\ "Ej\ g"I\ wgxctc"V/uj\ kt wcpf "vcmkpi\ "cdqw"yj\ g"i\ qqf\ "uqekgv{0Xggpj\ qxgp"cnq"uo\ qngf\ "r\ mpv{\ "qh"f\ qr\ g"dw"f\ kf\ pøv\ y\ gct\ "c\ "Ej\ g"I\ wgxctc\ "V/uj\ kt v="cpf\ "cu"hqt\ "yj\ qug\ "õi\ qqf\ "uqekgvkgu.\"o\ "Gcuvgtp\ "Dme\ eqwpvtkgu."Xggpj\ qxgp"hqwpf\ "yj\ go\ "y\ cpvkpi\ 0"kpuvgcf\ "qh"lwf\ i\ kpi\ "c"uqekgv{"d\ "ku"u\ uvgo\ .}\ j\ g"yj\ qwi\ j\ v"y\ j\ \{\ "pqv''lwf\ i\ g"kv''d\ {\ "ku"tguwnuA"Y\ gtg"ku"ekk\ gpu"j\ crr\ {\ A"Xggpj\ qxgp$ou\ j\ gtq\ "y\ cupøv''Ej\ g"I\ wgxctc\ "dw"c\ "uqekcm{\ "kpgr\ v"pkpgvggpyj\ /egpwt\ {\ "Dtkkuj\ "dcttkuvgt\ pco\ gf\ "Lgtgo\ {\ "Dgpyj\ co\ "Dgpyj\ co\ "hco\ qwun{\ "gur\ qwugf\ "y\ g"wkrkctkcp"r\ tkpekr\ g.\ "ŏy\ g\ i\ tgcvguv'j\ crr\ kpguu"qh"y\ g"i\ tgcvguv'pwo\ dgt0o"Xggpj\ qxgp"y\ qwrf\ "j\ cxg"i\ ref\ n{\ "y\ qtp\ "c\ Lgtgo\ {\ "Dgpyj\ co\ "V/uj\ kt v."j\ cf\ 'uwej\ "c"yj\ kpi\ "gzkuvgf\ 0} }$

Xggpj qxgp "y cu"uwf {kpi "uqekqnqi {ô c "hkgrf "y cv "cv"y g "ko g. "o gcpv"qpn{ "y g uwf { "qh"uken"uqekgkgu. "f {uhwpekqpcn"qpgu0"Ku"ukuvgt "f kuekr nkpg. "r u{ej qnqi {."uwf kgf ukem"o kpf u0"Dw"pqv"{qwpi "Tww0"J g "y cu"kpvgt guvgf "kp "j gcnyi { "o kpf u"cpf "j cr r { r rcegu0"Qpg"f c{."c"dk/'vko kf "dw/'f gvgto kpgf "pqpgyi grguu. "Xggpj qxgp"npqengf "qp"j ku cf xkuqtøu"f qqt"cpf "cungf "kh"j g"eqwrf "r rgcug"uwf { "j cr r kpguu0"J ku"cf xkuqt. "c"uqdgt "o cp y kyj "uqnkf "cecf go ke"etgf gpvkcnu. "vqrf"j ko . "kp"pq"wpegt vckp"vgto u. "vq"uj wv'wr "cpf "pgxgt

o gpwlqp''y cv'y qtf 'ci clp0J crrkpguu'y cu'pqv'c'ugtkqwu'uwdlgev0

Xggpj qxgp "ighv."ej curkugf "dww'ugetgwl "r ngcugf 0J g "npgy "j g "y cu "qp "vq "uqo gyi kpi 0 KV'uq "j cr r gpgf . "yi qwi j "yi g "{ qwpi "F wej "i tcf wcvg "uwwf gpv'f kf pøv'npqy "cv''yi g "vko g. eqwrf pøv'r quukdn ("j cxg "npqy p. "yi cv'ctqwpf "vj g "y qtrf "uqekcn'uekgp vkuu'y gtg'y cmkpi "wr vq "c "pgy "f kuekr nkpg<"j cr r kpguu "uwwf kgu0Vqf c { . "Xggpj qxgp "ku "cv''yi g "hqtghtqpv'qh''c "hkgrf vj cv" ej wtpu "qww"j wpf tgf u "qh "tgugctej "r cr gtu "gcej " { gct0" Vj gtg "ctg "j cr r kpguu eqphgtgpegu "cpf "c "Lqwtpcrl'qh'J crr kpguu''Uwf kgu'"y j kej "Xggpj qxgp"gf ku+0'Uwf gpw''cv Enctgo qpv'I tcf wcvg "Wpkxgtukv{ "kp "Ecnklqtpkc"ecp"pqy "gctp"cp"O C "qt "Rj F "kp"r qukkxg r u{ ej qmi { ô kp"j cr r kpguu0}

Uqo g"qh"Xggpj qxgpøu"eqmgci wgu"uvkm"y kpm"j ku"qrf "cf xkuqt "y cu"tki j v. "vj cv"y g uwf { "qh"j cr r kpguu"ku"o kui wkf gf . "uww kf 0'Dwv"y g{ "ecpøv"ki pqtg"j ko 0'J ku"tgugctej "ku qwv'y gtg="køu"ekgf "kp"lqwtpcnı. "cpf "kp"y g"cecf go ke"y qtrf "vj cv'o gcpu"kv'o cwgtu0

Vj g"eqpvgo r ncvkqp"qh"j cr r kpguu. "qh"eqvtug. "ku"pqv'pgy 0"Vj g"cpekgpv'I tggmu"cpf Tqo cpu"f kf "c"nqv'qh"kv0Ctkuvqvg. "Rncvq. "Gr kewtwu. "cpf "qvj gtu"uy gcvgf "qxgt"vj g"gvgtpcn s wguvkqpu0'Y j cv"ku"vj g"i qqf "nktgA"Ku"r ngcuwtg"vj g"uco g"cu"j cr r kpguuA"Y j gp"ctg"y g i qkpi "vq"kpxgpv'kpf qqt"r nwo dkpi A

Nevet. "vj g'I tegmu''cpf 'vj g'Tqo cpu''y gtg''lqlpgf ''d{ "qvj gtu. 'r crgt/umlppgf ''o gp''htqo repf u''hetvj gt "pqtvj "vy j q''ur gpv''cp''lpqtf lpevg''co qwpv''qh''vko g''lp''ech² u. ''eqpvgo r revkpi rlhgøu''lpgzvtleedrg ''s wepf etlgu0'O gp ''rkng''Mcpv. "Uej qr gpj ewgt. "O km ''P lgv| uej g. ''cpf . revgt. ''Nett{ 'F exkf 0Vj g{ .''vq. 'j cf ''o wej ''vq''uc{ ''cdqw''j cr r lpguu0

 $\label{eq:continuity} Cpf "vj gp"vj gtg"ku"tgrki kqp0"Y j cv"ku"tgrki kqp "kh"pqv"c "i wkf g "vq "j cr r kpguu. "vq "drkuuA Gxgt { "tgrki kqp "kpuxtwexu"hqmqy gtu"kp "vj g "y c { u"qh"j cr r kpguu. "dg "kv"kp "vj ku"rkhg "qt "vj g pgzv. "dg "kv"vj tqwi j "uwdo kuukqp. "o gf kscwqp. "f gxqwqp. "qt. "kh" { qw"j cr r gp "vq "dgmqpi "vq yj g"Lgy kuj "qt"Ecyj qrke 'hckj . "i wkn0"$

Cm'qh'y ku'o c { "j cxg"dggp"j grr hwn "gprki j vgpkpi "gxgp."dw'k'y cupøv'uekgpeg0'k'y cu qr kpkqpu"cdqw'j cr r kpguu0'Ngctpgf "qr kpkqpu."pq"f qwdv."dw'qr kpkqpu"pqpgyj grguu."cpf kp '\qf c {øu'y qtrf 'y g'j cxg'rkwrg'tgi ctf 'hqt 'qr kpkqpu."gzegr v'r quukdn{ "qwt 'qy p "cpf 'y gp pqv'cny c {u0'P q. "y j cv'y g"tgur gev."r c { "j ggf "\q. "ku"j ctf "uekgpeg"qt. "hckhpi "y cv."uqhw uekgpeg0'O quv'qh"cm "y g"mxg"c"i qqf "uwwf {0'P gy uecuvgtu"mpqy "kpukpekxgn{ "y cv'y g dguv'y c { "\q"i gv'r gqr rgxu"gctu"\q"r gtm'wr "ku"y kj "y gug"hkxg"y qtf u<"\ceolor C"pgy "uwwf { "j cu hqwpf 0\cio"Kv'o cwgtu"rkwrg"y j cv'hqmqy u"pgzv0'C "pgy "uwwf { "j cu"hqwpf "y cv'tgf "y kpg"ku i qqf "hqt" {qw'1"mkmu" {qw0'C "pgy "uwwf { "j cu"hqwpf "y cv'j qo gy qtm"f wmu"y g"dtckp"1 gprcti gu"k0Y g"gur gekcm{ "rkng"uwxf kgu"y cv'rgpf "etgf kdkkk{ "\q"qwt"qy p"kf kqu{ petcukgu. cu"kp."\cio C"pgy "uwwf { "j cu"hqwpf "y cv'r gqr rg"y ky "o guu{ "f gumu"ctg"uo ctvgto"qt"\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg"f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg"f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg"f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg"f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg"f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg'f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg'f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg'f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg'f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg'f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg'f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtcvg'f ckn{ 'hrcwrgpeg'ko r tqxgu'hqpi gxk\{0\cio C"pgy uwwf { "j cu'hqwpf "y cv'o qf gtc

[gu. "kh'y ku'pgy "uekgpeg"qh"] cr r kpguu'y cu'vq"dg"vcmgp"ugtkqwur(. "kv'pggf gf "uwwf kguO Dw/ hktuv. "kv'pggf gf "c"xqecdwct{. "c"ugtkqwu"lcti qp0"Vj g"y qtf "õj cr r kpguuö"y qwwf pøv f q0"K/uqwpf gf "vqq"htkxqmwu. "vqq"gcukn("wpf gtuvqqf 0"Vj ku'y cu"c"r tqdngo 0"Uq "yj g"uqekcn uekgpvkuwu"eco g"wr "y kyj "c"f qq| {<"õuwdlgevkxg"y gm/dgkpi 0ö"Rgthgev0"P qv'qpn("y cu"kv o wnku{ mcdke"cpf "xktwcm("ko r gpgvtcdng"vq"nc{r gqr ng. "kv'cnnq"eqwrf "dg"eqpf gpugf "kpvq cp"gxgp"o qtg"qduewtg"cetqp{o <"UY D0"Vq"yj ku"f c{. "kh"{qw'y cpv"vq"hkpf "yj g"ncvguv uej qnctn("tgugctej "qp"j cr r kpguu."{qw'pggf "vq"I qqi ng"õUY D.ö"pqv'õj cr r kpguu0ö"P gzv eco g"qvj gt "r kgegu"qh"vj g"lcti qp "r w| ng0"õRqukkxg"chhgevö"ku"y j gp "uqo gvj kpi "hggnu i qqf ="õpgi cvkxg"chhgevö"kuô {qw'i wguugf "koô y j gp"uqo gvj kpi "hggnu"dcf 0

P gz v.''y g"pgy ''uekgpeg"qh"j cr r kpguu"pggf gf ''f c vc0'P wo dgtu0'Hqt''y j c v'ku'uekgpeg''kh pqv'pwo dgtu.''r tghgtcdn(''rcti g"qpgu"y kyj ''nqvu"qh"f geko cri'r qkpvu0'Cpf ''j qy ''f q''uekgpvkuvu i gv'y gug'pwo dgtuA'Vj g{ ''o gcuwtg''y kpi u0

Qj . "pq0"O clqt "tqcf dqen0"J qy "ecp "{qw"o gcuwtg "j crr kpguuA"J crr kpguu"ku "c hggrkpi . "c "o qqf . "cp"qwrqqn'qp"rkhg0J crr kpguu'ecp ϕ 'dg "o gcuwtgf 0

Qt"ecp"kvAP gwtquekgpvkuw"cv'y g"Wpkxgtukv{"qh"Kqy c"j cxg"kf gpvkhkgf "y g"tgi kqpu"qh yi g"dtckp"cuuqekcvgf "y ky "i qqf "cpf "dcf "o qqf u0'Vj g{ "f q "y ku"d{ "j qqnkpi "wr "tgugctej uwdlgew"*eqnrgi g"uwf gpwu"kp"pggf "qh"s wkem'ecuj +"vq"O T K'o cej kpgu"cpf "yi gp"uj qy kpi yi go "c "ugtkgu "qh"r kewtgu0"Y j gp "yi g{ "uj qy "r gqr ng "r ngcucpv"r kewtguô /dweqnke ncpf uecr gu. "f qnr j kpu"r nc{kpi ô r ctwu"qh"yi g"r tghtqpvcn"nqdg"ctg"cevkxcvgf 0'Y j gp "yi g{ uj qy "wpr ngcucpv"ko ci guô c"dktf "eqxgtgf "kp"qkn"c"f gcf "uqnf kgt "y kyi "r ctwu"qh"j ku"hceg o kuukpi ô yi g"o qtg"r tko kkxg "r ctwu"qh"yi g"dtckp"rki j v"wr 0'J cr r { "hggnkpi u. "kp"qyi gt y qtf u. "tgi kuvgt "kp"yi g"tgi kqpu"qh"yi g"dtckp"yi cv'j cxg"gxqnxgf "o quv'tgegpvn{0'Kv'tckugu"cp kpvtki wkpi "s wgunkqp<"Ctg"y g. "kp"gxqnwkqpct { "kh"pqv'r gtuqpcn"vgto u. "unqwej kpi "vqy ctf j cr r kpguuA

 $Tgugctej\ gtu"j\ cxg"\ vq\{gf"y\ kj"\ qvj\ gt"y\ c\{u"qh"o\ gcuwtkpi\ "j\ crr\ kpguu<"uvtguu\ j\ qto\ qpgu."ectf\ kce "cevkxk\{."cpf"uqo\ gvj\ kpi "ecmgf" "õhcekcn"eqf\ kpi öô\ eqwpvkpi "j\ qy\ o\ cp{ "vko\ gu"y\ g"uo\ krg. "hqt "kpuvcpeg0'Cm"qh"vj\ gug"vgej\ pks\ wgu"ctg"rtqo\ kukpi ."cpf. kpf\ ggf."qpg"f\ c{ "uekgpvkuvu"o\ c{ "dg"cdrg"vq"ŏvcng"{qwt"j\ crr\ kpguuö"vj\ g"y\ c{ "c"f\ qevqt\ vqf\ c{ "vcngu"{qwt"vgo\ r\ gtcwtg0}}}$

 $P\ qy\ ."\ iy\ qwi\ j\ ."\ iy\ g"o\ ckp"y\ c\{''tgugctej\ gtu"o\ gcuwtg"j\ cr\ r\ kpguu''ku"\ iy\ tqwi\ j\ "c''hct"o\ qtg\ my\ /\ yej\ "cpf\ ."\ y\ gp"\{qw'\ iy\ kpm'cdqww''kw."s\ wkwg"qdxkqwu''yej\ pks\ wg0'Vj\ g\{''cum''r\ gqr\ ng"j\ qy\ j\ cr\ r\ \{''y\ qwf\ "'qt"ug''tggf\ ."'j\ qy\ "'j\ cr\ r\ \{''y\ qwf\ "'qw''ctg\ y\ gug''f\ c\{uA\ddot{o}"Vj\ cv''ku"'yj\ g"s\ wguvkqp\ ."o\ qtg"qt"'rguu.\ "yj\ cv''uwtxg\{qtu"j\ cxg"cumgf\ "r\ gqr\ ng\ ctqwpf\ ''yj\ g'y\ qtnf\ ''hqt''yj\ g''r\ cuv'hqtv{"qt"uq"{gctu0}}$

 $Tww''Xggpj\ qxgp\ "cpf\ "j\ ku"eqngci\ wgu"encko\ "ij\ cv"ij\ g"cpuy\ gtu"ctg\ "tgo\ ctmcdn{ceewtcvg0'of}\ qw'ecp"j\ cxg"c"f\ kugcug"cpf\ "pqv'npqy\ "kvö''Xggpj\ qxgp"vgmu"o\ g.\ "õdw''{qw\ ecpøv'dg''j\ cr\ r\ {"cpf\ "pqv'npqy\ 'kv0D{'f\ ghlpkklqp."kh'{qw'ctg''j\ cr\ r\ {.}"{qw'npqy\ 'kv0o''}}\ cr\ r\ {\ h''(qw'npqy\ 'kv0o''')}\ dellare the second of the second$

Rgt j cr u. "dww"o cpøu"ecr cekv{ "hqt "ugrh/f gegr vkqp "ku"pqv"vq "dg "wpf gt guvko cvgf 0'C t g y g "kpf ggf "ecr cdrg "qh"i cwi kpi "qwt "qy p "j cr r kpguuA"Vj gt g "y cu "y ku "o qo gpv. "hqt kpuvcpeg. "y j gp "K'y cu "ugxgpvggp "{ gctu "qrf "y cv"K'y qwi j v"K'y cu "xgt { "j cr r { "kpf ggf . eqo r rgvgn{ "eqpvgpv."y ky qww"c "ect g "kp" y g "y qtrf 0'Kp" tgvtqur gev. "kv"wt pu "qww"K'y cu "lww gz vt go gn{ "uvqpgf "cv'y g "vko g0'Rnwu."dggt "y cu "kpxqrxgf 0'Ky kpm0

Cpqyi gt "ur ggf "dwo r "qp" y g"tqcf "vq" j cr r kpguu

F khhgtgpvh O" [qwt "kf gc "qh" j cr r kpguu" o c{ "pqv" dg "y j g "uco g "cu "o kpgO" O { "hexqtkg f ghlpkkqp "qh" j cr r kpguu "ur tepi "htqo "y j g" o kpf "qh" cp "wpj cr r { "o cp "pco gf "P qcj Y gduvgtO" Y j gp "j g "r gppgf "y j g "hktuv" Co gtkecp "f kevkqpct { . "kp "3: 47. "j g "f ghlpgf j cr r kpguu" cu "õy g "ci t ggcdrg "ugpuc kqpu" y j kej "ur tkpi "htqo "y j g"gplq { o gpv'qh" i qqf 0 o v j cv'uc { u"kv'cmO'Kv'j cu "õci t ggcdrg "ugpuc kqpu.ö" y g "pq kqp" y cv'j cr r kpguu" ku "c'hggnkpi 0 v j g "j gf qpkuvu" y qwrf "i gv" qhh" qp "y cv0" Kv" j cu "õgplq { o gpv'ö "y j kej "uki pkhkgu "y cv j cr r kpguu" ku "o qtg" y cp'r wtg" cpko cn'r rgcuwtgOC pf "gplq { o gpv'ö h'y j cvA'Qh'y j g" õi qqf .ö c "y qtf "y cv "K'y kpm" Y gduvgt "uj qwrf "j cxg" ecr kcrk gf O'V j g" qqf O'Y g"y cpv'vq "hggn i qqf "dwhqt" y g"tki j vtgcuqpuOC tkuvqvg" y qwrf "j cxg" cr r tqxgf "qh'y cv0" J cr r kpguu" ku'c xkt wvqwu'cevkxkv{ "qh'y g'uqwnö'j g'uckf OC "xkt wvqwu'rhg." kp" qy gt y qtf u "ku'c'j cr r { 'rhkgO

Y g'j wo cpu''ctg''etgcwtgu''qh''y g''ncuv'hkxg''o kpwgu0Kp''qpg''uwxf {.''r gqr ng''y j q''hqwpf c "f ko g "qp "y g "r cxgo gpv''c "hgy "o kpwgu "dghqtg "dgkpi "s wgtkgf "qp "y g "j cr r kpguu s wguvkqp''tgr qtvgf "j ki j gt''ngxgnu''qh''ucvkuhcevkqp''y kij "y gkt''qxgtcm''nkxgu''y cp''y qug''y j q f kf "pqv''hkpf "c "f ko g0'Tgugctej gtu"j cxg''vtkgf "vq "i gv''ctqwpf "y ku "s wktm'qh''y g "j wo cp

ru{ej g''y tqwi j ''uqo gyj kpi ''ecmgf ''y g''gzr gtkgpeg/uco rnkpi ''o gyj qf 0'Vj g{ ''uvtcr ''nkwng Rcm ''Rkmqvónkmg''f gxkegu''vq''tgugctej ''uwdlgewu''cpf ''y gp''r kpi ''y go ''o c{dg''c''f q| gp''vko gu c''f c{0'Ctg''{qw'j crr { ''pqy A'Y j cv''cdqw''pqy A'J gtg.''y qwi j .''y g''J gkugpdgti ''rtkpekrng tgctu''kwu''j gcf 0'Vj g''o gtg''cev''qh''qdugtxkpi ''uqo gyj kpi ''cnwgtu''kv0'Cm''qh''y cv''r kpi kpi .''kp qyj gt'y qtf u.''o ki j v'chhgev'y g''uwdlgewø''j crr kpguu0

Cnıq. "o quv'r gqr ıg "y cpv'vq "r tgugpv'c "j cr r { "hceg "vq "yi g "y qtıf 0 "Vj cv'gzr ıclıpu "y j { r gqr ıg "eqpukuygpvı("tgr qtv"j ki j gt "j cr r kpguu "ngxgnı"y j gp "yi g{ "ctg "cungf "kp "hceg/vq/hceg "kpvgtxkgy u "tcvj gt "yi cp "kp "o ckr/kp "uwtxg { u0 Cpf "y g "tgr qtv'gxgp "j ki j gt "j cr r kpguu ngxgnı "kh'yi g "kpvgtxkgy gt "ku"c "o go dgt "qh'yi g "qr r qukvg "ugz 0 "kpuvkpevkxgn(. "y g "mpqy "yi cv j cr r { 'ku'ugz { 0} }

Uq''cuuwo kpi ''y cv''y gug''j cr r kpguu''uwf kgu''ctg''tgcuqpcdn{ ''ceewtcvg.''y j cv''j cxg''y g{ hqwpf A'Y j q''ku''j cr r {A'Cpf ''j qy ''f q''Klqkp''y go A''Vj ku''ku''y j gtg''T ww'Xggpj qxgp''cpf j ku''f cvcdcug''eqo g''kpvq''r rc{0}

 $\label{eq:control_co$

K'r cwug "vq "vcng "kp "y g "o qo gpv0'Qp "y gug "eqo r wgtu. "tki j v"kp "htqpv"qh"o g. "ku j wo cpkx $\{$ øu"ceewo wrcvgf "mpqy rgf i g"qh"j cr r kpguu0'Chygt "xktwcm $\{$ "ki pqtkpi "y g'uwdlgev hqt"f gecf gu. "uqekcn"uekgpvkuvu"ctg"pqy "o cmkpi "wr "hqt "rquv'vko g. "ej wtpkpi "qwv'tgugctej r cr gtu"cv'c"r tqf ki kqwu'tcvg0'J cr r $\{$." $\{$ qw'o ki j v'uc $\{$."ku'vj g'pgy "ucf $\{$ 0

Vj g"tgugctej "hkpf kpi u"ctg"cngtpcvkxgn("qdxkqwu"cpf "eqwpvgt/kpwkxkxg. "gzr gevgf cpf "uwtrtkukpi 0"Kp"o cp{ "ecugu. "vj g"hkpf kpi u"xcnkf cvg"vj g"i tgcv'vj kpngtu"qh"egpwtkgu r cuvô cu"kh'vj g"cpekgpv'I tggmu"pggf "xcnkf cvkqp0'J gtg"ctg"c'hgy "qh"vj g"hkpf kpi u. "kp"pq r ctvkewrct"qtf gt0

Gz vtqxgtvu"ctg"j crrkgt "vj cp "kpvtqxgtvu="qr vko kuvu"ctg"j crrkgt "vj cp "r guuko kuvu= o cttkgf "r gqr ng"ctg"j crrkgt "vj cp"ukpi ngu. "vj qwi j "r gqr ng"y kaj "ej knf tgp"ctg"pq"j crrkgt vj cp"ej knf nguu"eqwr ngu="T gr wdrkecpu"ctg"j crrkgt "vj cp"F go qetcvu="r gqr ng"y j q "cwgpf tgrki kqwu"ugtxkegu"ctg"j crrkgt "vj cp"vj qug"y j q"f q"pqv="r gqr ng"y kaj "eqmgi g"f gi tggu"ctg j crrkgt "vj cp"vj qug"y kaj qww. "vj qwi j "r gqr ng"y kaj "cf xcpegf "f gi tggu"ctg"nguu"j crr { "vj cp vj qug"y kaj "lwuv"c"DC="r gqr ng"y kaj "cp"cevkxg"ugz "nkhg"ctg"j crrkgt "vj cp"vj qug"y kaj qww= y qo gp"cpf "o gp"ctg"gs wcm("j crr{"vj qwi j "y qo gp"j cxg"c"y kf gt "go qwkqpcn"tcpi g= j cxkpi "cp"chhckt "y km'o cmg"{ qw'j crr { "dw'y km'pqv'eqo r gpucwg"hqt "vj g"o cuukxg"nquu"qh j crrkpguu"y cv"{ qw'y km'kpewt "y j gp"{ qwt "ur qwug"hkpf u"qw'cpf "ngcxgu"{ qw="r gqr ng"ctg ngcuv"j crr { "vj cp" y qug y kaj "vq "y qtm="dwu{" r gqr ng"ctg"j crrkgt "vj cp" y qug y kaj "vqq"hkwng"vq"f q="y gcnaj { "r gqr ng"ctg"j crr kgt "vj cp"r qqt"qpgu."dw"qpn("urki j vn(0)

Uq"y j cv'uj qwrf "y g"f q"y ksj "vj gug"hkpf kpi uA'I gv'o cttkgf "dwv'f qpøv'j cxg"nkf uA'Uvctv i qkpi "vq "ej wtej "tgi wrctn{ A"F tqr "qww"qh"vj cv"Rj F "r tqi tco A"P qv"uq "hcw0"Uqekcn

uekgpvknu'j cxg"c"j ctf "vko g"wptcxgrkpi "y j cv'vj g{"ecmlötgxgtug"ecwucrkv{ö"cpf "y j cv'vj g tguv'qh'wu'ecm'vj g"ej kengp/cpf/gi i "r tqdrgo 0"Hqt "kpuvcpeg."j gcnyj { "r gqr rg"ctg"j cr r kgt vj cp"wpj gcnyj { "qpgu="qt "ku"kv'vj cv'j cr r { "r gqr rg"vgpf "vq"dg"j gcnyj kgt A'O cttkgf "r gqr rg ctg"j cr r { = qt "o c{dg"j cr r { "r gqr rg"ctg"o qtg"rkngn{ "vq"i gv'o cttkgf A'Køu"vqwi j "vq"uc{0 Tgxgtug"ecwucrkv{ "ku"vj g"j qdi qdrkp"vj cv'o cngu"o kuej kgh"kp"o cp{ "c"tgugctej "r tqlgev0

 $Y\ j\ cv''K'tgcm\{\ ''y\ cpv''vq''npqy\ .\ ''y\ qwij\ .\ ''ku"pqv''y\ j\ q''ku"j\ crr\ \{\ ''dw''y\ j\ gtg''y\ g\{\ ''ctg\ j\ crr\ \{\ o\ cpf\ ''y\ j\ \{0Xggpj\ qxgp''uki\ j\ u"y\ j\ gp''K'cum'cdqw''y\ ku"cpf\ ''r\ qwtu"cpqy\ gt\ ''ewr\ ''qh\ vgc0'J\ gtg. ''y\ j\ eg'''tkenkgt0'Ecp"y\ g"tgcm{"uc{"y\ j\ kej\ ''eqwpvtkgu. ''y\ j\ kej\ r\ gqr\ rgu.\ ''ctg"j\ crr\ kgt''y\ cp\ ''qvj\ gtuA''J\ cu"o\ \{\ ''ugctej\ ''hqt\ ''y\ g"y\ qtrf\ øu"j\ crr\ kguv''r\ rcegu\ gpf\ gf\ ''dghqtg'kv'dgi\ kpuA$

Cm'ewnwtgu'j \cos 'c''y qtf 'hqt'j $\operatorname{crr} \operatorname{kpguu}$."cpf 'uqo g'j $\operatorname{cxg'}$ o $\operatorname{cp} \{$ 'y qtf u0'Dw'f $\operatorname{qgu'}$ y g Gpi nkuj "y qtf "õj $\operatorname{crr} \operatorname{kpguu}$ ö" o gcp "y g"uco g"cu" y g"Htgpej " $\operatorname{dqpj} \operatorname{gwt}$ " qt "y g"Ur $\operatorname{cpkuj} \operatorname{lgnleh} f \operatorname{cf}$ "qt "y g"Ctcdle " $\operatorname{ucj} \operatorname{ccf} \operatorname{cA}$ " Kp" qy gt "y qtf u. "f qgu " j $\operatorname{crr} \operatorname{kpguu}$ " vtcpurcvgA" Vj gtgøu uqo g"gxhf gpeg " y $\operatorname{cv'}$ y g"cpuy gt "ku" { gu 0'Vj g"Uy kuu" tgr qtv" gs wcn" ngx gnu" qh" j $\operatorname{crr} \operatorname{kpguu}$ y j gy gt "y g{ "vcng" y g'uwtxg{ u"kp" Htgpej ."I gto cp . "qt "Kcnkcp." y g"eqwpvt { $\operatorname{\emptyset}$ u" y tgg" o ckp rcpi wci gu 0

Cm"ewwtgu"xcnwg"j crrkpguu."dw/'pqv''q"y g"uco g"f gi tgg0'Gcuv'Cukcp"eqwpvtkgu ugpf "vq"go rj cukt g"j cto qp{"cpf "hwhknkpi "uqekgvcn"qdrki cvkqpu"tcyj gt "y cp"kpf kxkf wcn eqpvgpvo gpv="r gtj cr u"pqv'eqkpekf gpvcm(."vj gug"eqwpvtkgu"cnq"tgr qtv'mqy gt "ngxgnu"qh j crrkpguu."y j cvku"dggp "ecmgf "vj g"Gcuv'Cukcp"J crrkpguu"I cr."y j kej "uqwpf u"vq"o g nkng"uqo g"uqtv'qh'Ej kpgug"I tcpf "Ecp{qp0'Vj gp"yi gtg"ku"yi g"ouqekcn"f guktcdkrk{"dkcu0o Vj g"eqpegtp"j gtg"ku"yi cv'r gqrng"cpuy gt "vj g"j crrkpguu"uwtxg{u"pqv'htqo "vj gkt"j gctv'dw kp"y c{u"vj cv'vj gkt"uqekgv{"y qwrf"crrtqxg"qh0'Vj g"Lcrcpgug."hqt"kpuvcpeg."ctg"hco qwun{ugrh/ghrcekpi."chtckf "vq"dg"vj g"rtqxgtdkcn"pckn'vj cv'uvkemu"qw="vj g{"ctg"cnuq."tgrcvkxg"vq vj gkt"y gcnyi."pqv'xgt{"j crr{0'Krkxgf"kp"Icrcp"hqt"{gctu"cpf"pgxgt"i qv'wugf"vq"vj g"uki j vqh"Icrcpgug"y qo gp "eqxgtkpi "vj gkt "o qwyi u"y j gp "vj g{ "ncwi j gf "qt "uo krgf."cu"kh cuj co gf "qh'vj gkt"i ngg0

 $Y\ g"Co\ gtkecpu."qp"ij\ g"qij\ gt"j\ cpf."y\ gct"qwt"j\ cr\ r\ kpguu"qp"qwt"urggxgu"cpf."kh\ cp{ij\ kpi."ctg"i\ wkm{"qh"kphrc\kpi "qwt"eqp\vgpvo\ gpv"kp"qtf\ gt"\q"ko\ r\ tguu0J\ gtg"ku"y\ j\ cv'c\ Rqnkuj "ekk\ gp"nkxkpi "kp"ij\ g"Wpkgf"Uc\vgu"\qnf"'y\ g"y\ tkgt"Ncwtc"Mnqu"Uqnnqn"cdqww\ Co\ gtkecpu\cefoY\ j\ gp'Co\ gtkecpu'uc{"kv'y\ cu''}\ tgcv."Knpqy "kv'y\ cu''i\ qqf\ 0"Y\ j\ gp''y\ g{"uc{"kv'y\ cu''qnc{."Knpqy "kv'y\ cu''dcf\ 0"}}\ y\ cu''lcf" ("kv'y\ cu''qnc{."Knpqy "kv'y\ cu''dcf\ 0"S)}\ y\ cu''lcf" ("kv'y\ cu''qnc{."Knpqy "kv'y\ cu''qnc{."Knpqy "kv$

Vj ku'ku'i qkpi ''vq''dg''vqwi j 0'Vj g''cvrcu''qh''drkuu. ''kh''qpg''gzkuvu. ''y qpøv''dg''gcu{ ''vq''tgcf 0 Køu''nkng''vj cv''etwo r ngf ''o cr ''ukwkpi ''kp''{qwt''i mxg''eqo r ctvo gpv0'Dw''K'y cu''f gygto kpgf vq''r myy ''cj gcf .''eqpxkpegf ''vj cv'y j kng''y g''o c{ ''pqv''dg''cdng''vq''f khhgtgpvkcyg''hkpg''uj cf gu qh''j crr kpguu''co qpi ''eqwpvtkgu. ''uwtgn{ ''y g''ecp''uc{ ''vj cv''uqo g''eqwpvtkgu''ctg''j crr kgt''vj cp qvj gtu0

Xggpj qxgp'i kxgu'o g'eqo r ngvg'ceeguu'vq'j ku'f cvcdcug'cpf 'y kuj gu'o g'nwem'dww'hktuv'j g y ctpu'o g $\langle \tilde{0} \rangle$ qw'o c $\langle \tilde{0} \rangle$ qw'hkpf $\langle \tilde{0} \rangle$

õY j cv'f q"{qw'o gcpAö

Vj g"j crrkguv'r megu. "j g"gzr mkpu. "f qpøv'pgeguuctkn{ "hkv'qwt "r tgeqpegkxgf "pqvkqpu0 Uqo g"qh"vj g"j crrkguv'eqwpvtkgu"kp"vj g"y qtnfô Kegncpf "cpf "F gpo ctm"hqt "kpuvcpegô ctg "j qo qi gpgqwu. "uj cwgtkpi "vj g"Co gtkecp "dgnkgh"vj cv"vj gtg "ku "uvtgpi vj. "cpf j crrkpguu. "kp"f kxgtukx{ 0'Qpg'hkpf kpi. "y j kej "Xggpj qxgp'lwuv'wpeqxgtgf. "j cu'o cfg'j ko xgt { "wpr qr wnct"y kyj "j ku'hgnqy "uqekqnqi knw0'J g"hqwpf "vj cv'kpeqo g'f knvtkdwkqp"f qgu

pqv'rtgf kev'j crr kpguu0'Eqwpvtkgu"y kj "y kf g"i cru"dgwy ggp"vj g"tkej "cpf "rqqt"ctg"pq nguu"j crr { "vj cp"eqwpvtkgu"y j gtg"vj g"y gcn
j "ku"f kuvtkdwgf "o qtg"gs wcm{0'Uqo gvko gu. vj g{"ctg"j crr kgt0

õO { "eqngci wgu"ctg"pqv"co wugf .ö"uc{u"Xggpj qxgp0'õkpgs wcnkv{ "ku"dki "dwukpguu j gtg"kp"vj g"uqekqmi { "f gr ctvo gpv0Gpvktg"ectggtu"j cxg"dggp"dwknv'qp"kv0ö

K'ceegr v'j ku''cf xkeg''r qrksgn{ "dww'y kpmlj g''o wuw'dg''gzci i gtcvkpi "cdqww'y g''f cpi gtu y cv''rkg''cj gcf 0'K'co "y tqpi 0'Nqqnkpi "hqt''y g''y qtnføu''j cr r kguw'r rcegu''ecp''o cmg''cp{qpg o kugtcdrgô qt "cv''y g'''gcuv''i kxg''y go "c "ur rksvkpi "j gcf cej g0'Y ky "gcej "erkem''qh''y g o qwug. "K'gpeqwpvgt "o {uvgtkgu "cpf "cr r ctgpv''eqpvtcf kevkqpu0''Nkmg''y kx<''O cp{ "qh''y g y qtnføu''j cr r kguv''eqwpvtkgu "cnıq "j cxg''j ki j "uvvkekf g''tcvgu0''Qt "y ku''qpg<''Rgqr rg''y j q cwgpf ''tgrki kqwu''ugtxkegu''tgr qtv''dgkpi "j cr r kgt''y cp''y qug''y j q''f q''pqv.''dww'y g''y qtnføu j cr r kguv''pcvkqpu''ctg''ugewrct0'Cpf . "qj . "y g''Wpksgf "Uvcvgu. "y g''tkej guv. "o quv''r qy gthwn eqwpvt { "kp "y g''y qtnf . "ku''pq "j cr r kpguu''uwr gtr qy gt0'O cp{ "qy gt "pcvkqpu''ctg" j cr r kgt y cp''y g''ctg0

O { "fc { u"kp "Tqwgtf co "hcm"kpvq"c"r ngcucpv"tqwkpg0"K"j cxg"dtgcmhcuv"cv"yj g"j qwgn r gtj cr u"kpf wri g"kp"c"dk/"qh"kpvgt "eqwtug. "vj gp"tkf g"yj g"twdy c { "vq"yj g"Y qtrf "F cwdcug qh"J cr r kpguu0"Vj gtg. "Kukhv'yj tqwi j "vj g"tgugctej "r cr gtu"cpf "vj g"f cw. "mqmkpi "hqt"o { gnwukxg"cwcu"qh"drkuu0"Kp"vj g"gxgpkpi u. "Ki q"vq"o { "ech?" "K"pgxgt"f q"ngctp"kwu"pco g+. y j gtg"Kf tkpm'y cto "dggt. "uo qng"rkwrg"eki ctu. "cpf "r qpf gt"vj g"pcwttg"qh"j cr r kpguu0"Køu c"tqwkpg"vj cv"kpxqnxgu"o wej "eqpvgo r ncwkqp. "o qf gtcvg"co qwpwu"qh"kpvqzkecpw. "cpf xgt { "rkwrg"cewcn"y qtm0"Kv"ku. "kp "qvj gt "y qtf u. "c"xgt { "Gwtqr gcp "tqwkpg0"Køo "i qkpi pcvkxg0

Hqt'uqo g''tgcuqp. 'Kf gekf g''q'uvctv'cv''y g''dqwqo ''qh''y g''j crrkpguu''rcf f gt''cpf ''y qtm o { "y c{ "wr 0"Y j kej "eqwpvtkgu''ctg"'y g''rgcuv''j crr { A"P qv''uwtrtkukpi r{. "o cp{ "Chtkecp pcvkqpu''hcm''kpvq''y ku''ecvgi qt{ 0'Vcp| cpkc. "Ty cpf c. "cpf ''\ ko dcdy g''ctg''pgct''y g''xgt { dqwqo "qh''y g''j crrkpguu''y gm0'C ''hgy "Chtkecp "eqwpvtkgu. "uwej "cu''I j cpc. "o cpci g''vq cej kgxg''o kf frkpi "rgxgnu''qh''j crrkpguu. "dw''y cvau''cdqwv''kx0'Vj g''tgcuqpu''uggo "qdxkqwu0 Gzvtgo g''r qxgtv{ "ku''pqv'eqpf wekxg''vq''j crrkpguu0'Vj g''o { y "qh''y g''j crr { . "pqdrg''ucxci g ku''lwuv'y cvc''o { y 0'Kf'qwt''dcuke''pggf u''ctg''pqv'o gv.''y gøtg'pqv'rkngn{ "vq''dg''j crr { 0

Ewtkqwurf. "K'hkpf "cpqy gt "devej "qh"pevkqpu"uwen'ev'y g "dqwqo "qh"y g "j er r kpguu ur gevtwo <'y g 'hqto gt 'Uqxkgv'tgr wdrkeuô Dgretwu. "O qrf qxc. "Wntekpg. "W dgrikurep. "epf e'f q| gp"qyj gtu0

Ctg"f go qetcekgu"j crrkgt "y cp"f kewvqtuj kruA"P qv"pgeguuctkn(0"O cp{ "qh"y qug hqto gt"Uqxkgv"tgr wdrkeu"ctg"s wcuk/f go qetcekgu="egtvckpn("y g{ "ctg"htggt "pqy "y cp"kp Uqxkgv"vko gu. "{gv"y gkt "j crrkpguu"rgxgnu"j cxg"f getgcugf "ukpeg"y g "eqmcrug"qh"y g Uqxkgv"Wpkqp0"Tqp"Kpi ngj ctv."c"rtqhguuqt "cv"y g"Wpkxgtukx{ "qh"O kej ki cp. "j cu"ur gpv o quv"qh"j ku"ectggt "uwxf {kpi "y g"tgrcvkqpuj kr "dgw ggp"f go qetce{ "cpf "j crrkpguu0"J g dgrkgxgu "y cv" y g "ecwucrkx{ "hrqy u "y g "qy gt "y c{="f go qetcekgu "f qpøv"rtqo qvg j crrkpguu."dw"j crr{ "rncegu"ctg"o qtg"rkngn{ "vq "dg"f go qetcvkeô y j kej . "qh"eqwtug. f qgu"pqv'dqf g'y gmlhqt"Kcs 0

 $Y\ j\ cv'cdqw''y\ g'y\ cto\ "cpf\ "uwpp{ "r\ rcgu."yj\ qug"'tqr\ kecn'r\ ctcf\ kugu''yj\ cv'y\ g''cuuqekcvg\ y\ kj\ "j\ cr\ r\ kpguu''cpf\ "r\ c{ "i\ qqf\ "o\ qpg{ "vq"xcecvkqp"kpA"KV'wtpu"qwv'yj\ cv'yj\ g{ "ctg"pqv'uq\ j\ cr\ r{ 0'Hklk"Vcj\ kk"'yj\ g''Dcj\ co\ cuô\ yj\ g{ "cm'hcm'kpvq"yj\ g"o\ kf\ f\ rg''rcvkwf\ gu"qh''j\ cr\ r\ kpguu0\ J\ cr\ r{ "eqwpvtkgu"vgpf\ "vq"dg"yj\ qug"kp"vgo\ r\ gtcvg"enko\ cvgu."cpf\ "uqo\ g"qh''yj\ g"j\ cr\ r\ kguvô\ Kegrepf\ ."hqt'kpuvcpegô\ ctg'f\ qy\ ptki\ j\ v'eqnf\ 0$

Dgrkgxg"kv"qt"pqv."o quv'r gqr rg"kp"yi g"y qtrf "uc{"yi g{"ctg"j cr r{0'Xktwcm{"gxgt{eqwpvt{"kp"yi g"y qtrf "ucqtgu"uqo gy j gtg"dgw ggp"hkxg"cpf "gki j v'qp"c"\gp/r qkpv'uecrg0 Vj gtg"ctg"c"hgy "gzegr vkqpu<"Vj g"uwngp"O qrf qxcpu"eqpuku\gpvn{"ueqtg"cdqw"607."cpf hqt"c"dtkgh'r gtkqf "kp"3; 84"yi g"ekkl gpu"qh'yi g"F qo kplecp"T gr wdrke"eqwrf "o wu\gt"qpn{"c 308."yi g"ny guv'rgxgn'qh'j cr r kpguu"gxgt"tgeqtf gf "qp"yi g"r rcpgv0'Dw."cu"Kluckf ."yi gug"ctg tctg"gzegr vkqpu0O quv'qh'yi g"y qtrf "ku'j cr r{0

 $Y \ j \ \{ \ "f \ qgu" \ ij \ ku" \ eqo \ g"cu" \ uwej \ "c"uwtr \ tkugA" \ Vy \ q"v \ r \ gu" \ qh"r \ gqr \ rg. "K" \ ij \ kpm "ctg" \ vq \ dro \ g \ ''lqwtpcrkuvu" \ cpf \ ''r j \ krquqr j \ gtu0" \ Vj \ g"o \ gf \ kc. "qh"y j kej "K'co "c"ewr \ cdrg"o \ go \ dgt. \ tgr \ qtv. "cu"c" \ "twg. "qpn \ "dcf "pgy u \ ''y \ ctu. "hco \ kpg. "yj g"ncvguv" \ J \ qm \ y \ qqf "eqwr \ rgøu \ ko \ r \ rqukqp0" \ Kf \ qpøv'o \ gcp "vq" \ dgrkwg" \ y \ g"tqwdrgu" \ kp" \ y \ qtrf. "cpf "I \ qf "mpqy u" \ K"j \ cxg \ o \ cf \ g"c" \ qqf "hkxkpi "tgr \ qt \ kp" \ y \ g"lqwtpcrkuvu" \ f \ q"r \ ckpv'c" \ f \ kuvqtygf "r \ kewt \ g0$

 $\label{thm:continuous} Vj\ g"rj\ kmuqrj\ gtu."yj\ qwij."ctg"yj\ g"tgcn"ewrtkuô\ yj\ g"dtqqf\ kpi\ "yj\ kg"i\ w{u"htqo}\ Gwtqr\ g0'Vj\ g{ "vgpf\ gf\ "vq"y\ gct "cm"drcem"uo\ qng"vqq"o\ wej."cpf\ "j\ cf\ "vtqwdng"i\ gwkpi\ f\ cvgu0'Uq"yj\ g{ "j\ wpi\ "qwv."cmpg. "kp"ech² u. "r\ qpf\ gtgf\ "yj\ g"wpkxgtug."cpf\ ô\ uwtr\ tkug#ô\ eqpenxf\ gf\ "kv"ku"cp"wpj\ crr{ "r\ rceg0'Qh"eqwtug"kv"ku0'Vj\ cv'ku. "kh"{qw"j\ crr\ gp"vq"dg"c\ mpgn{.}"dtqqf\ kpi\ ."r\ cuv{/unkppgf\ "yj\ kg"i\ w{0'Vj\ g"j\ crr{ "r\ gqr\ ng"qh\ "uc{.}"gkij\ wgpyj/egpwt{ "gwtdqf\ kpi\ "y\ gtg"dwt{"dgkpi\ "j\ crr{.}"pqv"y\ tkkpi\ "mpi\ ."tco\ dnkpi\ "f\ kcvkdgu\ kpvgpf\ gf\ "vq"vqt\ wtg"uqo\ g"pqv{ gvdqtp"eqmgi\ g"uwf\ gpv'kp"Dnqo\ kpi\ wp"yj\ q"pggf\ u"vqr\ cuu"Rj\ knquqrj\ {"323"kp"qtf\ gt"vq"i\ tcf\ wcvg0}$

Y qtuv'qh'cm'y cu''Htgwf 0'Y j krg''pqv'vgej plecm{"c"dtqqf kpi "r j krquqr j gt. "Htgwf "f kf o wej "vq"uj cr g"qwt "xkgy u"qp"j cr r kpguu0J g"qpeg"uckf <õVj g"kpvgpvkqp"vj cv'O cp"uj qwf dg"j cr r {"ku"pqv'kp"vj g"r rcp"qh"Etgcvkqp0b"Vj cv'ku"c"tgo ctmcdrg"uvcvgo gpv. "gur gekcm{eqo kpi "htqo "c"o cp"y j qug"kf gcu'hqti gf "vj g"hqwpf cvkqp"qh"qwt "o gpvcn'j gcnvj "u{ uvgo 0 Ko ci kpg "kh"uqo g"f qevqt "kp" wtp/qh'vj g/egpwt {"Xkgppc"j cf "f gerctgf <õVj g"kpvgpvkqp vj cv'O cp"uj qwrf "j cxg"c"j gcnvj {"dqf { "ku"pqv'kp"vj g"r rcp"qh"Etgcvkqp0b"Y gøf "r tqdcdn{mem'j ko "wr ."qt "cv'rgcuv'uvtkr "j ko "qh'j ku"o gf kecn'rkegpug0Y g"egtvckpn{"y qwrf pøv'dcug qwt"gpvktg'o gf kecn'u{ uvgo "qp"j ku"kf gcu0[gv'vj cv'ku"gzcevn{"y j cv'y g"f kf "y kvj "Htgwf 0

 $\begin{tabular}{ll} Ukm "o quv'r gqr ng"ctg"j crr {A'Kv'f qgupøv'ukv'tki j v'y kyj "o g0'Køo "c"r gtuqp."cpf "Køo pqv"r ctvkewrctn{ "j crr{0"Y j kej "i qv"o g"vj kpmkpi <"Y j gtg"f kf "K'hcm"kp "Xggpj qxgpøu eqpuvgmcvkqp"qh"j crr kpguu'f cvcA'Kb'Kco "j qpguv."cpf "Ko ki j v'cu'y gm'dg'kh'Køo "vcmkpi vj g"vtqwdng"vq"y tkvg"vj ku. "Køf "uc{"Ky cu'c"ukz0"Vj cv'o cngu"o g"eqpukf gtcdn{ "nguu"j crr { vj cp "o { "hgmqy "Co gtkecpu. "dw''ceeqtf kpi "vq "vj g"Y F J "Køf "hggn"tki j v'cv"j qo g"kp Etqcvkc0 } \end{tabular}$

Køo "kperkpgf "vq "ci tgg "y kyj "rkpi wkuv"cpf "hgmqy "ewto wf i gqp "Cppc "Y kgt| dkemc. y j q. "y j gp "hcegf "y kyj "vj ku "xgt { "uco g "emko "vj cv"o quv'r gqr ng "ctg "tgcuqpcdn{ "j cr r { tgr rkgf 'y kyj "qpg "uko r ng "s wguvkqp < \sim Y j q" \sim tg "vj qug "tgr qt vgf n{ "j cr r { "r gqr ng Aö

 $Y\ j\ q''l pf\ ggf\ 0'O\ \{\ ''j\ gcf\ ''j\ wtw0'J\ cxg''K'go\ dctngf\ ''qp''c''hwktg''o\ kuukqp''vq''hlpf\ ''yj\ g\ y\ qtnf\ vu''j\ crr\ kguv'r\ ncegu\A''Vj\ gp''K'pq\keg''yj\ cv''qpg''eqwpvt\ \{\ ''ueqtgu''eqpukuvgpvn\{\ ''j\ ki\ j\ ''qp\ yj\ g''j\ crr\ kpguu''uecngô\ pqv''pwo\ dgt\ ''qpg''dw''f\ ctpgf\ ''enqug0''K'''cnuq''j\ crr\ gpu''vq''dg''yj\ g\ eqwpvt\ \{\ ''K'co\ ''xkukkpi\ ''cv'yj\ ku''xgt\ \{\ ''o\ qo\ gpv0\ \}$

K'tgyktg"'vq"o {"ech?."qtf gt"c"dggt."cpf "r qpf gt"F wej "j cr r kpguu0'Y j {"uj qwrf" yj g P gyj gtrcpf u."c"hrcv'cpf "pqpf guetkr v'eqwpvt{."dg"uq"j cr r {A'Hqt "uvct vgtu." yj g'F wej "ctg Gwtqr gcp. "cpf "yj cv"o gcpu "yj g{ "f qpøv"j cxg "vq "y qtt { "cdqwv"rqukpi "yj gkt "j gcnj kpuwtcpeg."qt "hqt" yj cv'o cwgt "yj gkt "lqd0'Vj g"uvcvg"y km'vcng"ectg"qh" yj go 0'Vj g{ "i gv'c i c| kmkqp"y ggmu"qh'xcecvkqp"gcej "{gct"cpf."dgkpi "Gwtqr gcp."ctg"cnq"gpvkxrgf "vq."cv'pq gzvtc"equv."c "xci wgn{ "uwr gtkqt "cwkwf g"vqy ctf "Co gtkecpu0'F qgu"uo wi pguu"rgcf "vq j cr r kpguuA'Ky qpf gt."ukr r kpi "o { "Vtcr kuvg"dggt0P q." yj gtg'o wuv'dg"uqo gyj kpi "gnug0

Vqrgtcpeg#"Vj ku"ku"yj g"qtki kpcn"õf qpøv"vtgef "qp "o gö"pcvkqp0C "pcvkqp"y j gtg. "kv uggo u "yj g"cf wmu"ctg"qw''qh"vqy p"cpf "yj g"vggpci gtu"ctg"kp "ej cti g0P qv'lww'hqt "yj g y ggngpf ."gkj gt0C m'qh'yj g'vko g0

 $\label{thm:conditional} Vj\ g'F\ wej\ 'y\ km''qngtcvg''cp\{y\ kpi\ ."gxgp"kpvqngtcpeg0'Kp"'y\ g''r\ cuv''hgy\ ''f\ gecf\ gu''y\ g\{y\ cxg''y\ gneqo\ gf\ ."y\ kyi\ ''qr\ gp"'cto\ u. "ko\ o\ ki\ tcpvu''htqo\ ''ctqwpf''y\ g''y\ qtnf\ ."kpenxf\ kpi\ ''y\ qug\ htqo\ ''pcvkqpu''y\ cv''f\ qpøv''qngtcvg''y\ kpi\ u''nkng''tgrki\ kqwu''htggf\ qo\ ''cpf\ ''y\ qo\ gp"y\ j\ q"y\ qtm\ qt"'f\ tkxg"'qt"uj\ qy\ ''y\ gkt''hcegu0'F\ wej\ ''vqngtcpeg"eqo\ gu''cv'c''equv.''cu''y\ g''o\ wtf\ gt\ ''qh''y\ g\ hkno\ o\ cngt\ ''Vj\ gq\ ''xcp\ ''I\ qi\ j\ ''d\{\ ''c\ ''O\ wurko\ ''gzvtgo\ kuv''j\ ki\ j\ rki\ j\ vgf\ 0''Dw''Xggpj\ qxgpøu\ tgugctej\ ''uj\ qy\ u''y\ cv''qngtcpv'r\ gqr\ rg''ygf'' ''q''dg''j\ cr\ r\{0\$

 $Y\ j\ cv''gzcevn{\ ''f\ qgu''F\ wej\ ''vqngtcpeg''nqqm''nkng.\ ''lp''cp''gxgt{\ f\ c{\ ''y\ c{\ A''Vj\ tgg''y\ lepi\ u\ eqo\ g''vq''o\ lepf''t\ twi\ u.''r\ tquvkwwkqp.''cpf''e{\ enkpi\ 0''kp''y\ g''P\ gyj\ gtncpf\ u.''cm''y\ tgg''cevkxkkgu\ ctg''ngi\ cn')Cm''y\ tgg''ecp''gcukn{\ ''ngcf''vq''j\ cr\ r\ kpguu.\ ''r\ tqxkf\ gf'''y\ cv''egtvckp''r\ tgecwkqpu''ctg\ vcngp0Y\ gctkpi''c''j\ gm\ gv'y\ j\ krg''e{\ enkpi\ .''hqt''kpuvcpeg0}$

Kʻpggf gʻf "\q"kpxguvki cvg"qpg"qh'\j gug"ce\kxkkgu. "wr "enqug. "kp"qtf gt "\q"i gv'cv'\j g"j gctv qh'F wej "j crr kpguuʻʻ0'Dw'y j kej "qpgA'E {enkpi "ku'egtvckpn{"y qt\j y j krg. "cpf "I qf 'mpqy u y g"F wej "mxg"\j gkt "dke {engu. "dw'kv'y cu'ej km{"qwukf g. "vqq "ej km{"vq"i gv'qp"c "dkng0 RtquvkwkqpA''Vj cv'ce\kxk{"vcngu"r nceg"kpf qqtu. "wuwcm{"uq"j g"y gc\j gt "y qwrf p\landv'dg"c hce\qt0'Cpf "kv'engctn{"o cngu"uqo g"r gqr ng"j crr {0'Dwv'\j gtg"y cu'\j g"kuuwg"qh"o {"y khg0 Uj g"j cu'uwr qt\gf"o {"j crr kpguu'tgugctej ."wr "\q"c"r qkpv."cpf "uqo g\j kpi "\qnf"o g"\j cv gpi ci kpi "\j g'ugtxkegu"qh'c"F wej "r tquvkwwg"nkgu"dg {qpf "\j cv'r qkp\v0

Uq "f twi u "kv'ku0'Uqhv'f twi u "o ctklwcpc "cpf "j cuj kuj . "ctg "rgi cn''kp "y g 'P gyj gtrcpf u0 Vj g{ "ctg "ugtxgf "kp "eqhhgg "uj qr u "y j kej "ctgpøv't gcm{ "eqhhgg "uj qr u "cv'cm'dw'f twi "f gpu0 õEqhhgg "uj qr ö'uqwpf u'o qtg't gur gewcdrg "y cp "õf twi "f gp.ö' yj qwi j 0

 $\label{eq:composition} Dw'y\ j\ kej\ "qpg"uj\ qwf\ "K'vt\ \{A"Vj\ gtg"ctg"uq"o\ cp\{\ "vq"ej\ qqug"htqo\ 0'Kp"Tqwgtf\ co\ .$ $gxgt\{\ "vj\ ktf\ "qt\ "hqwtvj\ "uvqtghtqpv."kv"uggo\ u.\ "ku"c\ "õeqhhgg"uj\ qr\ 0b"Ko\ "vgo\ r\ vgf\ "d\{\ "qpg\ ecmgf\ "Um{\ "J\ ki\ j\ ."dw'vj\ g"pco\ g"uggo\ u"vqq"000'qdxkqwu0'Qvj\ gtu'mqm'vqq"j\ kr\ 0'K'j\ cxgpøw\ i\ qwgp"j\ ki\ j\ "ukpeg"o\ {\ "lwpkqt"{\ gct"kp"eqmgi\ g0'Kf\ qpøw'y\ cpv'vq"o\ cng"c"hqqn'qh'o\ {\ ugnh0}}$

 $\label{thm:condition} Vj\ gp\ "K"\ ur\ qv\ "k0"\ Vj\ g\ "Crr\ j\ c\ "Dmpf\ kg\ "Eqhhgg\ "Uj\ qr\ 0"\ K\ u''\ r\ gthge\ v0"\ Dgukf\ gu\ "y\ g\ kttgukukukdrg\ "pco\ g."\ y\ j'\ g''\ cmq''qhhgtu''xgp\kre\kqp."cp''qr\ gp''y\ kpf\ qy\ ."y\ j\ kj\ ''ku\ c\ "f\ ghlpksg"r\ nxu0'\ K'r\ tguu''c\ "dw'\ |\ gt\ "y\ gp''y\ cmn''wr\ "c\ "pcttqy\ "uvcktecug0'\ Kpukf\ g. "y\ gtgxu''c\ hqudcm''vcdrg''cpf\ "c\ "eqqrgt\ "hkrgf\ "y\ kj\ "qtcpi\ g''Hcpvc''cpf\ "Eqng."cu''y\ gm''cu''r\ rgpv\{\ ''qh\ Upkengtu''cpf\ "O\ (\ O\ xu\ ''hqt\ "y\ g''o\ wpej\ kgu."pq''f\ qwd\0'\ Kxo\ "uwtrtkugf\ "vq''ugg''cp''cewcn\ eqhhgg''o\ cej\ kpg''kp''y\ ku''eqhhgg''uj\ qr\ ."dw''k\''nqmu''nkng''k\''j\ cup\no'\'dggp''wugf''kp''o\ qpvj\ u0'C\ rtqr\ ."Keqpenxf\ g0$

 $\label{eq:continuous} Dcf "3; 92u"o wuke "ku"r rc { kpi . "cpf "c "rkwrg "vqq "rqwf r(0"Qp "qpg "y cm "K'pqvkeg "c r ckpvkpi "vj cv'nqnu"rkng "kv'y cu"f qpg "d { "c "vcrgpvgf "ukz vj /i tcf gt0 "kp "vj g "hqtgi tqwpf "ku"c ect "vj cv'j cu"lwuv'r rqy gf "kpvq"c "vtgg. "y kyj "undf "o ctmu"vtckrkpi "qlh"vqy ctf "vj g"j qtk| qp0 Wpf gtpgc vj "ku'y tkwgp < 5 Uqo g'tqcf u"qpn("gzkuv'kp"f twi i gf "o kpf u6 "kgo "pqv'uwtg"kh'vj ku ku'o gcpv'cu"c"y ctpkpi "cdqwv'y gug"tqcf u"qt"cu"cp"gpf qtugo gpv'qh'vj go 0$

 $\label{thm:condition} Gxgt\{qpg"j\ gtg"uggo\ u"vq"dg"c"tgi\ wrct. "gzegr\ v."qh"eqwtug. "hqt "o\ g0"Ko "kpuvcpvn{vcpur qtvgf "dceni'vq"o { "eqnrgi\ g"f\ qto "tqqo "kp"P\ gy "Lgtug{0Vt{kpi "vq"dg"eqqn"vt{kpi "vq hki'kp. "dw'hckrkpi "o\ kugtcdn{0} } }$

 $\label{lem:cp-def} Cp "qrkxg/umkppgf" o cp "eqo gu" qxgt "vq "o g"cpf." lp "dtqngp "Gpi rkuj." gzr rckpu" yj g o gpw0Vqf c { "vj g { "ctg" hgcwtkpi "Vj ck'o ctkl wcpc." j g"uc { u. "cu"kh" f guetkdkpi "vj g"uqwr "f w lqwt." cu'y gm'cu' y q"v { r gu"qh" j cuj kuj < O qtqeecp"cpf "Chi j cp0 }$

Kợo "cv'c "nquu0"Cq "Kf q "y j cv'K'cny c $\{u'fq'y j gp''y j gp''y g''o gpw'r tqxgu''qxgty j gmo kpi <math>0$ "K cuni'y g'y cksgt 'hqt "j ku't geqo o gpf ckqp0

õFq"{qw'r tghgt 'uvtqpi ''qt''o knf Aö''j g''cumu0

õO krf Øö

õVj gp''Ky qwf 'f ghkpkgn('i q'y kj 'yj g'O qtqeecp0ö

Kj cpf "j ko "c'hkxg/gwtq"pqvg"*cdqw'ukz "f qmctu+."cpf "j g"j cpf u"o g"c'dci i kg"y kyj "c ej cmf "dtqy p'urcd''y g'uk g'qh'c'r quvci g'uvco r 0

Kj cxg"cduqnwgn("pq"kf gc"y j cv"vq"f q"y ky "ks0

 $\label{thm:composition} Hqt "c" o qo gpv. "Ko" "vgo r vgf" "q" ecm" o { "qrf" eqmgi g" tqqo o cvg. "Tww{ "Hkuj mkpf 0 Tww{ "y qwrf" mpqy "y j cv' q" fq0" J g" y cu" cny c { u" y g" eqqn" qpg0 Tww{ "j cpf ngf" c" dqpi y g" y c { "[q/[q"O c"j cpf ngu" c" egmq0 Ko" "uwtg" Tww{ "ku" c" eqtr qtcvg" ncy { gt" pqy . "rkx kpi kp" y g" uwdwtdu" y kj "hqwt" nkf u. "dww' uwkm "K'dgv' j g" y qwrf" mpqy "y j cv' vq" fq" y kj "y ku ej wpm'qh' O qtqeecp" j cuj 0$

Cu"lh"qp"ewg. "Nkpf c"Tqpuvcf v"r kr gu"wr 0 $\frac{1}{2}$ qw $\frac{1}{2}$ qqf . " $\frac{1}{2}$ qw $\frac{1}{2}$ qqf . " $\frac{1}$

K'dtkghn("eqpukf gt "uy cmqy kpi "y g"j cuj "cpf "y cuj kpi "kv"f qy p "y kyj "c "Rgr uk"dww yi kpm"dgwgt "qh"yi cv"kf gc "cpf "lww"hwo drg"y kyj "yi g"j cuj "kpuvgcf . "vt { kpi "vq "mqm"cu j gm rguu "cu "r quukdrg. "y j kej "wpf gt "yi g "ektewo uvcpegu "eqo gu "pcwtcm(0" Hkpcm(. "c dgctf gf "o cp"y gctkpi "c "rgcvj gt "lcengv"vcmgu"r kv{ "qp "o g0"Y kyj qwv"uc { kpi "c "y qtf . "j g vcmgu "yi g "j cuj "kp "j ku "j cpf u "cpf "etwo drgu "kv"rkng "hgvc "ej ggug0"Vj gp "j g "wptqmu "c eki ctgwg. "c "tgi wrct "eki ctgwg. "cpf "kpugt w "yi g"j cuj 0"Chvgt "c "hrwgpv'uj cng. "rkem "cpf "vcr . j g"j cpf u "yi g'pqy "j cuj /kphwugf "eki ctgwg"dcem'vq"o g0

Kyj cpm'j ko 'cpf 'rki j v'wr 0

C "hgy "qdugtxcvkqpu0"Hktuv"qh"cm "Kfq"tgeqo o gpf "vjg"O qtqeecp0"K/"ku "kpfggf"c uo qqvj "uo qng0"Ugeqpf."cv"ngcuv"j cnh"vjg"hwp"qh"gpi ci kpi "kp"kmkek/"cevkxkv{ "ku"vjg"kmkekv r ctv"cpf "pqv"vjg"cevkxkv{ "r ctv"0"Kp"qvjgt"y qtf u. "uo qnkpi "j cuj "ngi cm("kp"Tqwgtf co "ku pqv"pgctn("cu"o wej "hwp"cu"fqkpi "kv"kmkekn("kp"{qwt "eqngig"fqto "tqqo "y kj "Twuv{ Hkuj mkpf. "mpqy kpi "vj cv"cv"cp{ "o qogpv"{qw"o kij v'i gv"ecwij v0

 $\label{thm:condition} \begin{tabular}{l} $Ukm"Kco" hggrkpi" i' qqf 0P q'r ckp0Cpf."cu''y g''O qtqeecp" ugwrgu" kpvq''o { "egtgdtcn eqtvgz." Ky qpf gt<"Y j cv'kh'Kuvc{gf "rkmg" y ku''cm'qh''y g''ko gA'Y qwrf pøv'Kdg'' j cr r { "cm'qh y g''ko gA''Keqwrf "gpf "o { "ugctej "hqt "y g''y qtrf øu'' j cr r kguv''r rcegu" tki j v''j gtg. "cv''y g Crr j c"Drqpf kg" Eqhhgg" Uj qr "kp" Tqwgtf co 0'O c{dg''y ku''ku''y g'' j cr r kguv''r rceg''kp''y g y qtrf 0 }$

 $\label{thm:continuous} Vj\ g"rj\ knquqrj\ gt\ "Tqdgtv'P\ q|\ kem"j\ cf\ "uqo\ gvj\ kpi\ "vq"uc{"qp"vj\ g"uwdlgev0'P\ qv'cdqwv\ vj\ g"Crrj\ c"Dnqpf\ kg."yj\ kej\ "Kf\ qwdv''j\ gxu'lntgs\ wgpvgf\ ."pqt"cdqww'O\ qtqeecp"j\ cuj\ ."yj\ kej\ j\ g"o\ c{"qt"o\ c{"pqv"j\ cxg"uo\ qngf\ 0'Dw''P\ q|\ kem"f\ kf\ "vj\ kpm"nqpi\ "cpf\ "j\ ctf\ "cdqww''yj\ g\ tgrcvkqpuj\ kr\ "dgw\ ggp"j\ gf\ qpkuo\ "cpf\ "j\ crr\ kpguu0J\ g"qpeg"f\ gxkugf\ "c"vj\ qwi\ j\ v'gzr\ gtko\ gpv\ ecmgf\ "vj\ g'Gzr\ gtkgpeg'O\ cej\ kpg0$

Ko ci kpg " yi cv" õuwr gtf wr gt "pgwtqr u{ej qmi knuö "j cxg "hki wtgf "qw"c "y c{ "vq unko wrcvg"c "r gtuqp¢u"dtckp "kp"qtf gt "vq"kpf weg "r ngcuwtcdng "gzr gtkgpegu0"K¢u"r gthgevn{ uchg. "pq "ej cpeg "qh"c "o chwpevkqp. "cpf "pqv"j cto hwn"vq "{qwt "j gcn yi 0"[qw"y qwf gzr gtkgpeg "eqpuvcpv'r ngcuwtg "hqt "yi g"tguv'qh"{qwt "nkhg0"Y qwrf "{qw'f q "kvA"Y qwrf "{qw r nxi "kpvq"yi g'Czr gtkgpeg'O cej kpgA

Kh"pqv."cti wgf "Pq|kem"yj gp"{qwøxg"lwuv"rtqxgf "yj cv"yj gtg"ku"o qtg"vq"nkhg"yj cpr ngcuwtg0'Y g"y cpv"vq"cej kgxg"qwt"j crr kpguu:"cpf "pqv"lwuv'gzr gtkgpeg"kv0'Rgtj cru"y g gxgp "y cpv"vq "gzr gtkgpeg "wpj crr kpguu. "qt "cv"ngcuv"ngcxg "qr gp "yj g "r quukdkrkv{ "qh wpj crr kpguu."kp"qtf gt"vq"vtwn{"crr tgekcvg"j crr kpguu0

 $Tgi\ tgwcdn{``K'hlpf''o \{ugrh''lp''ci\ tggo\ gpv''y\ kj\ ''P\ q|\ ken0''K'y\ qwrf''pqv''r\ nwi''o \{ugrh\ lpvq''j\ g''Gzr\ gtkgpeg''O\ cej\ kpg. "cpf''yj\ gtghqtg''K'y\ km''pqv''dg''tgnqecvkpi''vq''yj\ g''Crrj\ c\ Dnqpf\ kg''Eqhhgg''Uj\ qr\ 0'Y\ j\ kej'''ku''c''uj\ co\ g0'F\ kf'''K'o\ gpvkqp''j\ qy''uo\ qqvj'''yj\ g''O\ qtqeecp\ j\ cuj''kuA$

 $\label{thm:condition} Vj\ g"pgzv'o\ qtpkpi\ ."o\ \{"o\ kpf\ "O\ qtqeecp/htgg."Ko\ cng"o\ \{"f\ ckn{"tkr\ "vq"y\ g"Y\ F\ J\ 0"K\ o\ gpvkqp"o\ {"rkwrg"gzr\ gtko\ gpv'vq"Xggpj\ qxgp0"J\ g"crrtqxgu."qh"eqwtug0"Kp"hcev."y\ j\ gp"K\ j\ cf\ "hktuv'r\ qkpvgf\ "qwv'yj\ cv'o\ cp{"qh"yj\ g"cevkxkkgu"yj\ cv'yj\ g"F\ wej\ "gpi\ ci\ g"kp"tgi\ wrctn{"tquvkwkqp"cpf\ "f\ twi\ u."y\ qwrf\ "i\ gv'o\ g"cttguvgf\ "kp"yj\ g"Wpkgf\ "Uvcvgu."j\ g"lwuv\ uo\ krgf\ "un{n}"cpf\ "uckf."oKhpqy\ 0Gplq{0}$

Xggpj qxgp "uc{u "yj g "f cvcdcug "o ki j v"r tqxkf g "uqo g "cpuy gtu "vq "yj g "ci g/qnf s wguvlqp<"Ku"r ngcuwtg "yj g "uco g "cu"j cr r kpguuA"Chygt "c "hgy "f ki kxcn"f gvqwtu. "K'hkpf "c r cr gt "yj cv'Xggpj qxgp"j ko ugrh"y tqvg0'Kyu"ecmgf "õJ gf qpkuo "cpf "J cr r kpguu0i "K'tgcf yj g'cduvtcev0

$$\label{eq:continuity} \begin{split} &\delta V_j \text{ g "t grc kqp "dgw ggp "j cr r kpguu"cpf "eqpuwo r kqp "qh"uwlo wrcpu "hqmqy u "cp kpxgt vgf "Wewtxg0"Ur qkn"ur qt wu"cpf "i w| ngtu"ctg "nguu"j cr r { "ij cp"o qf guv"eqpuwo gtu00 Kp"qyj gt "y qtf u "cu"yj g"cpekgpv"I tggmu"eqwpugrgf "c"hgy "yj qwucpf "{ gctu"ci q . "gxgt { yj kpi kp "o qf gtc kqp0"K'tgcf "qp "cpf "ngctp "yj cv"õugxgtcn"uwwf kgu"j cxg "qdugtxgf "c"r qukkxg eqttgrc kqp "dgw ggp "r gto kuukxg "cwkwwf gu "vqy ctf u "ugz "cpf "r gtuqpcn"j cr r kpguu00 Rt guwo cdn(. "yj gug"r gto kuukxg "j cr r { "r gqr ng"ctg"pqv'yj g"uco g"j cr r { "r gqr ng"y j q"ctg cwgpf kpi "ej wtej "tgi wrctn(0"Cu"hqt"f twi u "c"3; ; 7"uwwf { "hqwpf "vj cvô pq"uwtr tkugô wug qh"j ctf "f twi u "vgpf u"vq "f getgcug"j cr r kpguu"qxgt "vko g0"Dwv'y j cv'cdqwv'uqhv'f twi u "rkng. uc{. 'O qtqeecp"j cuj A'KV'wtpu'qwv'yj cv'yj gtg"j cu'dggp "hxwg"tgugctej "kp"yj ku"ctgc0} \end{argument}$$

 $\label{lem:condition} J~qy~"cdqww''j~cv."'K'yi~kpm''uy~kxgrkpi~"cy~c {~"htqo~"vj~g"eqo~r~wgt~"o~qpkqt0'Ncuv'pki~j~v.~cv''yi~g"Crr~j~c"Drqpf~kg"Eqhhgg"Uj~qr~."qp"vj~g"xgt {~"htuv''rgi~"qh"o~{~"lqwtpg{~."Ky~cu''gpi~ci~gf~kp"ewwkpi~/gf~i~g"j~cr~r~kpguu't~gugctej~0'Y~j~q''npgy~A}$

Køu"o {"neuv"f c{"kp"Tqwgtf co 0C"hqti gwcdng"ek{"dwv"qpg"vj cv"Ky km"o kuu"pqpgvj gnguu0 Køu"vko g"vq"uc{"i qqf d{g"vq"Xggpj qxgp."cpf "Kco "pgxgt"i qqf "cv"i qqf d{gu0'Kvj cpm"j ko hqt"cm"qh"j ku"j grr ."hqt"cm"qh"j ku"drkuuhwn"f cvc0'Vj gp."cno quv"cu"cp"chvgtvj qwi j v."Kr cwug cv"vj g"f qqt"cpf "uc{."õK'o wuv"dg"y qpf gthwn'y qtmkpi "kp"vj g"hkgnf "qh"j cr r kpguu"uwvf kgu0o

Xggpj qxgp'hqqmu'r gtr ngzgf 0°6Y j cv'f q''{ qw'o gcp A°o

 $\label{eq:continuity} \begin{tabular}{l} \begin{t$

 \tilde{q} gu. "dww'kv''f qgupøv''o cwgt "vq "o g "kh"r gqr rg "ctg "j cr r { "qt "pqv. "cu "rqpi "cu "uqo g r gqr rg''ctg''j cr r kgt "vj cp''qvj gtu0Kecp''uvkm'et wpej "vj g''pwo dgtu0io

Klww'ucpf "j gtg"hqt"c"o qo gpv."uwppgf 0J gtg"Kj qwi j v'Xggpj qxgp"y cu"c"hgmqy vtcxgrgt."c"eqo tcf g"kp"j g"j wpv'hqt"j crr kpguu."dw'kv'wtpu"qw''j cv."cu"j g{ "uc{ "kp"j g Uqwj ."j g"j cu"pq"f qi "kp"j ku"j wpv0'Qt."kh"{qw'r tghgt."Xggpj qxgp"kupøv'c"r rc{gt"kp"j g j crr kpguu"i co g="j gøu"j g"tghgtgg. "nggr kpi "ueqtg0'Cpf ."nkng"cp{ "i qqf "tghgtgg. "kv o cwgtu"pqv'qpg"y j kv'vq"j ko "y j q"y kpu"j g"i co g0'J crr kpguu"qt"f gur qpf gpe{."kwu"cm y g"uco g0'Cu"npi "cu"qpg"ukf g"r tgxcku0

Vj cv'ku. "Kuwr r qug. "vj g"y j qrg"r qkpv'qh'vj ku"pgy ."f kur cuukqpcvg"uwf { "qh'j cr r kpguu0 Xggpj qxgp "cpf "vj g "qvj gt "drkuuqrqi kuvu"f gur gtcvgn{ "y cpvgf "cecf go kc "vq "vcng "vj gkt f kuekr rkpg "ugtkqwur(. "rguv" vj g{ "dg "f kuo kuugf "cu "P gy "Ci g "hcf f kuvu0" Vj g{ "j cxg uweeggf gf ."dw'K'y qpf gt "cv'y j cv'equv0' Kp" vj gkt "y qtrf ."j cr r kpguu"ku "tgf wegf "vq" {gv cpqvj gt "uvcvkurke. "f cvc "vq "dg "urkegf . "f kegf . "r ctugf . "twp "vj tqwi j "vj g "eqo r wgt . "cpf . wnko cvgr(. "kpgxkvcdr(. "tgf wegf "vq "ur tgcf uj ggwu0' Cpf "K'ecpøv" vj kpm'qh"cp{ vj kpi "rguu

j crr { ''y cp''c''urtgcf uj ggv0

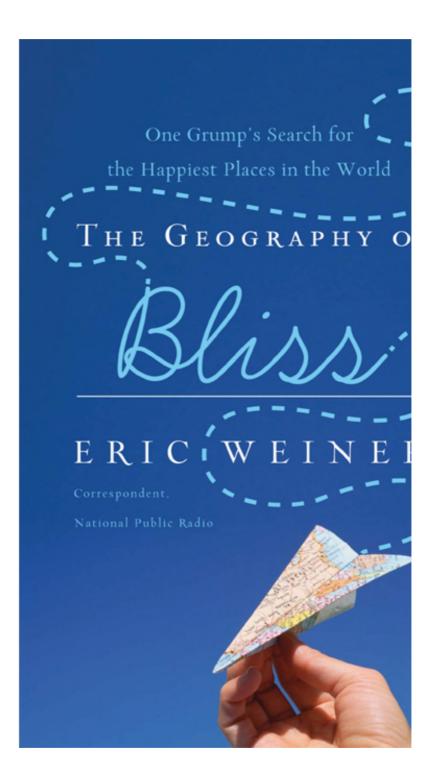
K't gcrk g "yi cv"o { "xkukv" vq "yi g "Y F J "y cu "c "hkpg "uvctv"dw" cp "kpeqo r ngvg "qpg0 P qy j gtg "co qpi "yi g "gki j v"yi qwucpf "uwwf kgu "cpf "t gugctej "r cr gtu "f kf "K'hkpf "cp { o gpvkqp "qh"yi g "j cr r kpguu "c "pcvkqp "f gtkxgu "htqo "ku "ct vu. "yi g "r ngcuwt g "ceet wgf "d { j gct kpi "c "r ct vke wrct n{ "nqxgn{ "r qgo "t gcf "cmwf "cpf "y gm "qt "d{ "y cvej kpi "c "f ct pgf i qqf "o qxkg. "ceeqo r cpkgf "d{ "c "wvd "qh"r qr eqtp. "pq "dwwgt 0"P qt "f qgu "yi g "f cwdcug t gxgcn"cp { yi kpi "cdqww"yi g "kpxkukdng "yi t gcf u "yi cv"dkpf "c "hco kn{ 0"Uqo g "yi kpi u "ctg dg { qpf "o gcuwt kpi 0

 $\label{thm:continuity} $$ Uq''Keqpuntwev'o { "cvrcu"qh'drhun."o { "tqcf"o cr"qh'j crr kpgun."dcugf "r ctvn{ "qp"T www Xggpj qxgpøu"f cvcdcug "cpf" r ctvn{ "qp"o { "qy p"j wpej gu0"Tkej "qt "r qqt. "j qv'qt "eqnf . f go qetce{ "qt "f kevcvqtuj kr . "kv'o cwgtu"pqv0'Ky km'hqmqy "vj g"j crr kpgun"uegpv'y j gtgxgt kv'ngcf u0 $$$

 $Y \; kj \; "o \; \{ "cvrcu" kp" j \; cpf \; ." K' dqctf "vj \; g" tckp" cv' Tqwgtf \; co \; "Egpvtcr0' Cu" vj \; g" tckp" dgi \; kpu vq "tqm" cpf "vj \; g" F wej "eqwpvt { ukf g "i rkf gu" d{ . "K'hggn" cp "wpgzr gevgf "ugpug "qh" tgrkgh0 Htggf qo "gxgp0' Htggf qo "htqo "y j cvA' K'ecpøv' ko ci kpg0' O { "xkukv'y cu'hkpg0' K'f tcpm' uqo g i qqf "dggt." uo qngf "uqo g'hkpg" j cuj . "cpf "gxgp' rgctpgf" c"vj kpi "qt" vy q" cdqwv' j cr r kpguu0$

Vj gp"k/f cy pu"qp"o g0Htggf qo "htqo "cm"yj cv'000htggf qo 0Vqngtcpeg"ku"i tgcv."dw vqngtcpeg"ecp "gcukn{ "unkf g"kpvq"kpf khhgtgpeg. "cpf "yj cvzu"pq"hwp"cv'cm0'Dgukf gu. "K'ecpøv nkxg"y kyj "uq"o wej "uncen0'Ko "vqq"y gcm0'Ky qwnf pøv'mpqy "y j gp"vq"uvqr 0'Kh'Ko qxgf "vq J qmcpf. "{qwxf "r tqdcdn{ "hkpf "o g"c "hgy "o qpvj u "ncvgt. "gpi whgf "kp "c "enqwf "qh O qtqeecp"j cuj ."c"j qqngt"wpf gt"gcej "cto 0

 $Pq. "vj g"F wej "y c{ "ku"pqv"hqt "o g0"Rgtj cr u"o { "pgzv"f guvkpcvkqp"ku"vj g"qpg0"Koo j gcf kpi "vq"c"eqwpvt{ "y j gtg"vj g"vtckpu"twp"qp"vko g. "vj g"uvtggvu"ctg"ergcp. "cpf "vqrgtcpeg. rkng "gxgt{ vj kpi "gnug. "ku "f qrgf "qww"ectghwn{ . "kp "o qf gtcvkqp0" K"co "j gcf kpi "vq Uy kv| gtrcpf 0} }$



Eqr {tki j v'Í '422: 'd{ 'Gtke'Y gkpgt

 $\label{lem:continuous} Cmltki j wl'tgugtxgf 0 Gzegr v'cu'r gto kwgf "wpf gt" y g"WU0 Eqr {tki j v'Cev'qh'3; 98."pq r ctv'qh'y ku'r wdrkecwqp" o c { "dg" tgr tqf wegf . "f kwtkdwgf . "qt" 'tcpuo kwgf "kp" cp { 'hqto qt" d{ "cp { "o gcpu."qt" uvqtgf 'kp" c"f cvcdcug" qt 'tgvtkgxcn'u {uvgo . "y ky qwv'y g"r tkqt y tkwgp" r gto kunkqp" qh'y g"r wdrkuj gt0 }$

Vy grkg
J cej gwg'Dqqm'I tqwr 'WUC
459'Rctm'Cxgpwg
P gy '[qtm'P['32239

Xkuk'qwt'Y gd'ukg'cv'<u>y y 0 cej gwgDqqml tqwr WUC0eqo</u>0

Vy grkg'ku'cp'ko rtkpv'qh'I tepf 'Egpvten'Rwdrkij kpi 0

Vj g'Vy grxg'pco g'cpf 'mi q'ku'c'\tcf go ctm'qh'J cej gwg'Dqqm'I tqwr 'WUC.'Kpe0

Hktuv'gDqqm'Gf kklqp<'Lcpwct { '422: KLDP /35<'; 9: /2/668/73329/2

Eqpygpw

Kovtqf wevkqp

Ej cr vgt "3 < VJ G"P GVJ GTNCP F U < J cr r kpguu "Ku"c "P wo dgt

- Ej cr vgt '4<'UY KV\ GTNCPF<'J cr r kpguu''Ku''Dqtgf qo
- Ej cr vgt '5 < DJ WCP < J cr r kpguu 'Ku'c 'Rqnke {
- Ej cr vgt '6<'SCVCT<'J cr r kpguu'Ku'c'Y kppkpi 'Nqwgt { 'Vkengv
- Ej cr vgt '8<'O QNF QXC<'J cr r kpguu''Ku''Uqo gy j gt g''Gnug
- Ej cr vgt '9<'VJ CKNCPF<'J cr r kpguu''Ku''P qv''Vj kpmkpi
- Ej cr vgt": <'I TCCV"DTKVCKP <'J cr r kpguu'Ku'c"Y qtm'kp''Rtqi tguu
- Ej cr vgt"; <**KP** F KC<**J** cr r kpguu'**K**i'c'Eqpvtcf kevkqp
- Ej cr vgt '32 CO GT KEC J cr r kpguu' Ku' J qo g

GRKNQI WG

Cempqy ngf i o gpw

Cdqw'y g'Cwj qt

Ko''y gug'f c{u''qh'y ctu''cpf 'two qtu''qh'y ctu.''j cxgpw''{qw''gxgt 'ftgco gf qh'c''rrceg''y j gtg''y gtg''y cu''rgceg''cpf ''ugewtk\{.''y j gtg''nkxkpi ''y cu''pqv c''ustwi i rg''dw''c''rcuskpi 'f grki j vA

ô Nquy'J qt k qp. 'f ktgevgf 'd{ ''Htcpm'Ecrtc.'3; 59

Kovtqf wevkqp

P qv'nqpi "kpvq"qwt "lqwtpg{. "F tgy "i tgy "pgtxqwu0'J g"r rgcf gf "y kj "o g"vq"wtp dcem"dw'Kkpukrgf "y g"r tguu'qp. "r tqr gngf "d{ "cp"kttgukrkdrg"ewtkqukv{ "cdqw'y j cv'rc{ cj gcf 0'F cpi gt A'O ci ke A'K'pggf gf "vq"npqy . "cpf "vq"y ku"f c{ "Køo "eqpxkpegf "K'y qwf j cxg"tgcej gf "y j gtgxgt "kv'y cu"Ky cu"kt {kpi "vq"tgcej "j cf "y g"Dcnko qtg"Eqwpv{ "Rqrkeg pqv"eqpenxf gf . "ko r wnukxgn{ "K''y qwi j v"cv"y g "vko g. "y cv"y g "uj qwrf gt "qh"c "o clqt y qtqwi j lctg"y cu"pq"r rceg"hqt "c"eqwr rg"qh'hkxg/{gct/qrf u0}

Uqo g"r gqr rg"ces wktg" yi g"vtcxgn"dwi 0"Qyi gtu"ctg"dqtp "y kyi "ko"O { "chhrlevkqp. "kh yi cvou" y j cv"kv"ku. "y gpv"kpvq "tgo kuukqp "hqt "o cp{ "{gctu "hqmqy kpi "o { "cdqtvgf gzr gf kklqp" y kyi "F tgy 0"K/"tguwthcegf "chrot "eqmgi g" y kyi "tgpgy gf "hwt{0"Kf gur gtcvgn{ y cpvgf "vq"ugg" yi g" y qtrf." r tghgtcdn{ "qp"uqo gqpg"gnugou" f ko g0"Dw/"j qy A"K"j cf "pq o ctngvcdrg"unkmu. "c"uwpvgf "ugpug"qh"o qtcrkx{."cpf "c"i nqqo { "f kur qukxkqp0"Kf gelf gf vq"dgeqo g"c"lqwtpcrkuv0

 $\label{eq:cullive} Cullet Cullet Culling Cullet C$

Vj g{ 'ecp'cniq'dg'c'tgcn'dwo o gt0

Y j cv'kh "K'y qpf gtgf . "K'ur gpv'c" { gct "vtcxgrkpi "y g "i mdg. "uggnkpi "qw"pqv"y g y qtrføu"y gm'vtqf f gp "vtqwdrg"ur qui'dww "tcvj gt. "kui "wpj gtcrf gf "j cr r { "r rceguA''Rrcegu y cv'r quuguu. "kp"ur cf gu. "qpg"qt "o qtg"qh"y g"kpi tgf kgpwi'y cv'y g"eqpukf gt "guugpvkcri'vq y g"j gctv{ "uvgy "qh"j cr r kpguu<'o qpg{ . "r rgcuwtg. "ur ktkwcrk{ . "hco kr{ . "cpf "ej qeqrcvg. co qpi "qvj gtuO'Ctqwpf "vj g'y qtrf . "f q| gpu"qh"y j cv'khu"r rc{ "vj go ugrxgu"qwi'gxgt { "f c{0 Y j cv'kh"{qw'rkxgf "kp"c"eqwpvt{"vj cv'y cu'hcdwrqwun{"y gcnj { "cpf "pq"qpg"r ckf "vczguA Y j cv'kh"{qw'rkxgf "kp"c "eqwpvt { "y j gtg"hckrwtg"ku'cp "qr vkqpA'Y j cv'kh"{qw'rkxgf "kp"c eqwpvt{"uq"f go qetcvke "vj cv'{qw'xqvgf "ugxgp"vko gu"c"{gctA'Y j cv'kh"{qw'rkxgf "kp"c eqwpvt{"y j gtg"gzeguukxg"y kpmkpi "ku'f kweqwtci gf AY qwrf "{qw'dg"j cr r { "vj gpA

Vj cvzu"gzcevn{ "y j cv"K"kpvgpf gf "vq"hkpf "qwv."cpf "y g"tguvnv"qh"y ku "cf o kwgf n{ j ctgdtckpgf "gzr gtko gpv'ku'y g"dqqm'{qw'pqy "j qrf "kp"{qwt"j cpf u0}

Ky cu"dqtp"kp"yj g'[gct"qh"yj g"Uo krg{ "Hceg<"3; 850"Vj cvxu"y j gp"c"i tcr j ke "f guki pgt htqo "Y qtegurgt. "O cuucej wugwu. "pco gf "J ctxg{ "Dcm"kpxgpvgf "yj g"pqy /wdks wkxqwu i tkppkpi "{ gmqy "i tcr j ke0"Qtki kpcm{. "Dcmxu"etgcvkqp"y cu"f guki pgf "vq"ej ggt"wr "r gqr ng y j q "y qtmgf "cv "qh"cm"r reegu. "cp "kpuwtcpeg "eqo r cp{. "dw"kv"j cu "ukpeg "dgeqo g u{pqp{o qwu'y kyj "yj g'htqyj {."s wkpvguugpvkcm{'Co gtkecp"dtcpf "qh"j cr r kpguu0

Dcnøu"ej ggt { "keqp"pgxgt "y qtngf "ku"o ci ke "qp"o g0'K'co "pqv'c"j cr r { "r gtuqp. pgxgt "j cxg"dggp0'Cu"c"ej krf. "o { "hcxqtkg"Y kppkg/yj g/Rqqj "ej ctcevgt "y cu"Gg{qtg0 Hqt "o quv'qh"j wo cp"j kuvqt{."K'y qwrf "j cxg"dggp"eqpukf gtgf "pqto cn0'J cr r kpguu. "kp yj ku"rklg. "qp "yj ku"gctyj . "y cu"c "r tkļ g"tgugtxgf "hqt "yj g"i qf u"cpf "yj g"hqtwpcvg "hgy 0 Vqf c{. "yj qwi j . "pqv'qpn("ku"j cr r kpguu"eqpukf gtgf "r quukdng "hqt "cp { qpg "vq "cwckp. "kv'ku gzr gevgf 0'Vj wu"K"cpf "o krkqpu"qh"qvj gtu. "uwhlgt "htqo "yj g"wpks wgn{ "o qf gtp"o crcf { yj cv'j kuvqtkcp "F cttkp"O eO cj qp"ecmu"õyj g"wpj cr r kpguu"qh"pqv'dgkpi "j cr r { 0o"Ki'ku"pq hwp"cv'cm0

Cpf 'uq.'rkng''o cp{ "qyj gtu."Koxg''y qtngf "cv'koʻKpgxgt''o gv'c''ugrh'j grr 'dqqm'Kf kf pøv rkngʻOʻO { "dqqmij grh'ku'c''qy gtkpi ."\ggvgtkpi "o qpwo gpv''q"gzkngpvkcn'cpi uv."dtko o kpi y kij "dqqmi'kphqto kpi "o g''yj cv'j crr kpguu''rkgu''f ggr "kpukf g"qh''o gʻOʻKbʻ'Ko "pqv'j crr { . yj g{ "eqwpugn"yj gp''Ko "pqv'f ki i kpi 'f ggr "gpqwi j O

Vj ku"czkqo "qh"yj g"ugh/j grr "kpf wuxtkon"eqo r rgz "ku"uq "f ggr n{ "kpi tckpgf "cu"vq"dg ugh/gxkf gpv0'Vj gtgzu"qpn{ "qpg"r tqdrgo <"Køu"pqv"xtwg0'J cr r kpguu"ku"pqv'kpukf g"qh"wu dww'qww'yj gtg0'Qt."\q"dg"o qtg"r tgekug."\yj g"rkpg"dgw ggp"qww'yj gtg"cpf "kp"j gtg"ku"pqv'cu uj ctr n{ "f ghkpgf "cu"y g"yj kpm0

Vj g"revg"Dtkkuj /dqtp"r j krquqr j gt"Crep"Y cwu. "kp"qpg"qh"j ku"y qpf gthwn"rgewtgu qp "gcuvgtp"r j krquqr j {."wugf "vj ku"cpcrqi {<"õKh"K'f tcy "c"ekterg. "o quv'r gqr rg. "y j gp cungf "y j cv'K'j cxg"f tcy p."y km'uc{ "K'j cxg"f tcy p"c"ekterg"qt"c"f kue. "qt"c"dcm'lX gt { "hgy r gqr rg" y km"uc { "Kwg"f tcy p"c" j qrg" kp" y g" y cm "dgecwug" o quv'r gqr rg "vj kpm"qh" y g kpukf g "hktuv. "tcy gt "vj cp "vj kpmkpi "qh" y g"qwukf g0"Dw'cewcm { "vj gug "w q "ukf gu" i q vqi gyi gtô { qw'ecppqv'j cxg'y j cv'ku" kp" j gtgø'wprguu" { qw'j cxg'y j cv'ku" gtg@'ö

Kp"qyj gt"y qtf u."y j gtg"y g"ctg"ku"xkxcn'\q'y j q'y g"ctg0

D{ "ŏy j gtg.ö" [¾o "ur gcnlpi "pqv'qpn{ "qh'qwt "r j {ulecn'gpxktqpo gpv'dwv'cnq "qh'qwt ewnwtcn" gpxktqpo gpv0" Ewnwtg "ku "y g "ugc "y g "uy ko "kpô uq "r gtxculxg. "uq "cm' eqpuwo kpi .''y cv'y g'hckn'vq'pqvkeg' [ku "gzkuvgpeg' wpvkn'y g'uvgr "qwv'qh' [kv0] [Kv'o cwgtu'o qtg y cp'y g''y kpn0]

 $Y \; kj \; "qwt "y \; qtf \; u. "y \; g "uwdeqpuekqwun{"eqphrcvg"i \; gqi \; tcr j \; { "cpf "j \; cr r \; kpguu0"Y \; g \; ur \; gcm'qh'ugctej \; kpi "hqt"j \; cr r \; kpguu. "qh'hkpf kpi "eqpvgpvo gpv."cu"kh'vj gug"y gtg"nqecvkqpu kp"cp"cvxcu. "cewcn'r rcegu"vj cv'y g"eqwrf "xkukv'kh"qpn{"y g"j cf "vj g"r \; tqr gt "o cr "cpf "vj g tki j v'pcxki cvkqpcn'umkmu0Cp{qpg"y j q"j cu"vcngp"c"xcecvkqp"vq. "uc{. "uqo g"Ectkddgcp kurcpf "cpf "j cf "hrcuj "vj tqwi j "vj gkt "o kpf "vj g"wpkpxkygf "vj qwi j v'õK'eqwrf "dg"j cr r { j gtgö"npqy u'y j cv'Ko gcp0}$

 $\label{thm:limit} Nwtmlpi "lww'dgj lpf" yj g"ewtwlp" lku. "qh"eqwtug. "yj cv'wcpvcnkl lpi . "urkr r gt { "eqpegr v mpqy p"cu"r ctcf kug0 KV'j cu"dgi wkrgf "wu"j wo cpu"lnqt "uqo g"vko g"pqy 0'Rrcvq" lo ci lpgf yj g"Drguugf "Kurgu. "c"r rceg"y j gtg"j cr r lpguu "hrqy gf "rkng" yj g"y cto "O gf kvgttcpgcp y cvgtu0" Wpvkn" yj g"gki j vggpyj "egpwt{. "r gqr rg "dgrlgxgf" yj cv"dklrkecn"r ctcf kug. "yj g I ctf gp"qh" Gf gp. "y cu"c" tgcn"r rceg0 KV cr r gctgf "qp" o cr uô mecvgf . "ktqplecm{."cv'yj g eqphrwgpeg"qh'yj g"Vki tku'cpf 'Gwr j tcvgu'tkxgtu. 'kp'y j cv'ku'pqy "o qf gtp/f c{ 'Kcs 0}$

Gwtqr gcp"gzr mtgtu"r tgr ctgf "hqt "gzr gf kkqpu"kp"ugctej "qh"r ctcf kug"d{ "ngctpkpi Ctco cke." 'y g"ncpi wci g"Lguwu"ur qng0'Kugv'qw'qp"o { "lqwtpg{."o { "ugctej "hqt"r ctcf kug. ur gcnkpi "pqv''Ctco cke "dw"cpqvj gt "qduewtg"ncpi wci g. "'y g"o qf gtp "rkwti { "qh"drkuu ur qngp"d{ "'y g"pgy "cr quwgu"qh" 'y g"go gti kpi "uekgpeg"qh" j cr r kpguu0'K'dtwuj "wr "qp ygto u"rkng"õr qukkxg"chhgevö"cpf "õj gf qpke "cf cr vckqp0b"K'ectt { "pq"Dkdrg. "lww'c"hgy Napgn{ "Rrcpgv'i wkf gu"cpf "c"eqpxkevkqp" y cv "cu"J gpt { "O kngt"uckf. "õQpgau"f guvkpcvkqp ku"pgxgt"c"r nceg. "dw'c"pgy "y c{ "qh'uggkpi "'y kpi u0b"

 $\label{eq:continuous} Cpf "uq."qp"c "v{r kecm{ "uvgco { "f c{ "kp "O kco k"*kugrh"uqo g"r gqr rgøu"eqpegr v'qh r ctcf kug+"K'r cem'o { "dci u"cpf "f gr ctv'o { "j qo g"qp"y j cv'K'npqy "hwm'y gm'ku"c "hqqnøu gttcpf ."gxgt { "dkv'cu"hqqnkuj "cu"vj g"qpg"K'vtkgf "vq"r wm'qhh"cu"c "r gtkr cvgvke "hkxg/{ gct/qrf 0'Cu"vj g"cwj qt "Gtke"J qhhgt "r wv'kv."ŏVj g"ugctej "hqt"j cr r kpguu"ku"qpg"qh"vj g"ej kgh uqwtegu"qh'wpj cr r kpguu0`o"Vj cvøu'qnoc{0'Koo "cntgcf { "wpj cr r {0'Kj cxg"pqvj kpi "vq"nqug0} } ...}$

VJ G'PGVJ GTNCPFU

J crrkpguu'Ku'c'P wo dgt

Kku'c'hcev'qh'j wo cp''pcwtg''y cv'y g''f gtkxg''r ngcuwtg'htqo ''y cwj kpi ''qyj gtu''gpi ci g''kp r ngcuwtcdng ''cewt0''Vj ku''gzr nckpu''y g''r qr wnctk{ "qh''wy q "gpvgtr tkugu<''r qtpqi tcr j { "cpf ech² u0'Co gtkecpu''gzegn'cv'y g''hqto gt. ''dw''Gwtqr gcpu''f q''c''dgwgt''lqd''cv'y g''ncwgt0'Vj g hqqf "cpf "y g''eqhhgg"ctg''cno quv''dgukf g''y g''r qkpv0'Kqpeg''j gctf "qh''c "ech² "kp''Vgn'Cxkx y cv'f kur gpugf ''y kyj ''hqqf ''cpf ''f tkpn''cnqi gyj gt="kv'ugtxgf ''ewuvqo gtu''go r v{ ''r ncvgu''cpf ewr u''{ gv'ej cti gf ''tgcn'o qpg{0

Echł u"ctg" y gcvgtu" y j gtg" y g"ewrqo gt "ku"dqy "cwf kgpeg" cpf "r gthqto gt0 "Khkpf" c y qpf gthwri'qpg" c"drqenihtqo "o { "j qvgn'kp" f qy pvqy p" Tqwgtf co 0 "Ki'ku" uko wrcpgqwun{ rcti g"cpf" eq| { . "wr uecrg" cpf" twp/f qy p0 "P keg" y qqf" hrqtu. "dw' y g{ "rqqnn'rkng" y g{ j cxgpøv'dggp" r qrkuj gf "kp" { gctu0 "Køu" y g"nkpf" qh'r rceg" y j gtg" { qw'eqwrf" ur gpf" j qwtu pwtukpi "qpg"dggt." cpf "Kuwur gev'o cp{ 'r gqr rg' j gtg" f q" lww' y cv0

Kqtf gt "uqo gyj kpi "ecmgf" c"Vtcr kurg"dggt0'Køu" y cto 0P qto cm{."Kf qpø/'rkng" y cto dggt. "dw''K'rkng" y ku "dggt0'Cm" ctqwpf "o g"K'j gct "y g"r ngcucpv" ej qt vrg "qh"F wej 0'Kv uqwpf u"xci wgn{ "hco krkct." y qwi j "Kecpø/ko ci kpg" y j {0"Vj gp "k/f cy pu"qp" o g0F wej uqwpf u"gzcevn{ "rkng"Gpi rkuj "ur qngp" dcemy ctf 0'Knpqy "y ku "dgecwug" Køxg" j gctf "c" my qh" dcemy ctf "Gpi rkuj 0'Kp" y g"r tgf ki kscn" gtc. "Køf "gf k/" vcr g" hqt "o { "P RT "uvqt kgu" qp" c tggn' vq/tggn" vcr g"f gem" y g"uk g" qh" c"VX" ugv0'Kpxct kcdn{ . "y ku" y qwrf "gpvckn" r rc{kpi ugi o gpvu" qh" y g" vcr g"dcemy ctf 0'Cu" K'ukv'kp" y g" ech? . "y kyj "o { "rkwrg" eki ct "cpf "o { y cto "Vtcr kurg" dggt. "Ky qpf gt "kh" Kt geqtf gf "uqo gqpg" ur gcnkpi "F wej "cpf "r rc{gf "y cv dcemy ctf ."y qwrf "kv'uqwpf "rkng" tgi wrct "Gpi rkuj A

 $\label{eq:cull_continuous_conti$

yj g'Hrgpej 'ecm'nc'ej cuug'cw'dqpj gwr. 'yj g'j wpv'hqt'j crrkpguu0

Ur gekhecm(. "o { "rtg{ "ku"c "F wej "rtqhguuqt "pco gf "Tww"Xggpj qxgp<" y g i qf hcy gt "qh"j crr kpguu"tgugctej 0'Xggpj qxgp "twpu "uqo gyi kpi "ecmgf "y g "Y qtnf F cvcdcug"qh"J crr kpguu0'K/ku"pq"lqng0Xggpj qxgp"j cu"eqmgevgf ."kp"qpg"nqecvkqp." y g uwo "qh"j wo cp "mpqy ngf i g "cdqww"y j cv"o cngu "wu"j crr { . "y j cv"f qgu "pqv "cpf . "qh r ctvkewrct "kpvgtguv'vq"o g." y j kej "r ncegu"ctg" y g "j crr kguv0'Ki'y gtg'ku "kpf ggf "c'tqcf "o cr qh'j crr kpguu'qw'y gtg." cp"cvcu "qh'drkuu." y gp"TwwXggpj qxgp" y km'mpqy "cdqw'kv0

Krgcxg'y g'ecli?.'tgnwevcpvf..'cpf 'j gcf 'dcem'vq'o { "j qvgn'hqt 'f kppgt0Tqwgtf co 'ku pqv'c 'dgcwkhwi'ek{0'Ki'ku'i tc{"cpf 'f wm'y kj 'hgy "uki j wi'qh'kpvgtguv0'Ukm'Tqwgtf co øu o kz "qh"pcvkxg "F wej "cpf "ko o ki tcpvu. "o cp{ "qh"yi go "O wurko u. "rgcf u"vq "uqo g kpvgtguvkpi "lwzvcr qukkqpu0'Vj g''Engqr cvtc "Ugz "Uj qr ."yi g''y kpf qy "f kur rc{"qh"y j kej eqpukuru'qh"c "o gpci gtkg"qh"rcti g"cpf "creto kpi n{ "rkhgrkng"f krf qu "ku"qpn{ "qpg"drqem htqo "yi g''Rcnkurcp "Kurco ke "Egpvgt0'Cv'qpg"r qkpv "K'ecvej "c "y j khh"qh"o ctklwcpc. "yi g htci tcpv'ctqo c "qh"F wej "vqrgtcpeg<'ugeqpf j cpf "uvqng0Vy q"drqemu'rcvgt."Kugg"c"o cp r gtej gf "qp"c"rcf f gt. "j cpi kpi "c"i kcpv'{gmqy "emi "qp"c"uvqtghtqpv."y j krg"dgmy "y q O kf f rg"Gcuvgtp"o gp"i tggv'gcej "qyi gt "y kj "u{o o gvtkecn'r gemu"qp"yi g"ej ggn0'Kf qpøv mpqy "gzcevn{ "y j gtg"yi g{øtg"htqo ."dw"uqo g"qh"yi g"ko o ki tcpvu"j gtg"eqo g"htqo eqwpvtkgu'y j gtg"creqj qn'ku'kngi cn'cpf "y qo gp"ctg"eqxgtgf "htqo "j gcf "vq"vqg0'Kp"yi gkt cf qr vgf "j qo g. "o ctklwcpc "ku'rgi cn'cpf "uq"ku'r tquvkwwkqp0'P q'y qpf gt "Kupkhh'vgpukqp kp"yi g"ckt."o kpi rkpi "y kj "yi g'ecppcdku0

 $\label{thm:condition} Vj\ g"j\ qvgn"f\ lpkpi\ "tqqo\ "ku"uo\ cm\ "eq|\ \{0"Vj\ g"F\ wej\ "f\ q"eq|\ \{\ "y\ gm0"K"qtf\ gt\ "vj\ g\ cur\ ctci\ wu"uqwr\ 0"Kpu"i\ qqf\ 0"Vj\ g"y\ cksgt\ "engctu"o\ \{\ "dqy\ n"cpf\ "vj\ gp"uc\ u."\"oP\ qy\ "o\ c\ dg\ qw"y\ qwrf\ "lkng"uqo\ g"lpvgteqwtug0"b$

õGzewug''o gAö

$$\label{eq:control_posteq} \begin{split} & \tilde{o} \textbf{Kp} \textbf{vgteqwtug0} \textbf{i} \quad \textbf{qw'ecp''j} \ \textbf{cxg''kpvgteqwtug0} \textbf{i} \end{split}$$

Kớo "ý kpntkpi ."Y qy ."ý g"F wej "tgcm("ctg"c"r gto kuukxg"dwpej ."y j gp"k/f cy pu"qp o g"ý cv"j g"ku"ur gcntkpi "qh"uqo gý kpi "gnug"gp\ktgn(0"Kp\ygt "eqwtug0'Cu"kp"õdgw ggp eqwtugu0ö

õ[gu.ö'Kluc{.'tgrkgxgf 0°öVj cv'y qwrf ''dg''pkeg0ö

Cpf "uq "K'f q0'K'j cxg "kpvgt "eqwtug. "tki j v'vj gtg "kp "vj g "J qvgn"xcp "Y cnavo "f kpkpi tqqo 0'K'gplq{ "kv'xgt{"o wej . "vj ku "wpj wttkgf "f kpkpi "gzr gtkgpeg0'K'ukr "o { "dggt. "uvctg kpvq"ur ceg. "cpf . "kp "i gpgtcn "f q "pqvj kpi ô wpvkn'vj g"y cksgt "dtkpi u"vj g"i tkngf "ucno qp. kpf kecvkpi "vj cv. "hqt "pqy ."o { "kpvgt "eqwtug" ku "qxgt0

Ko "vj g"o qtpkpi . "K'vcng "vj g"uwdy c{ "vq "o { "J qn{ "I tckn<"vj g"Y qtff "F cvcdcug "qh J cr r kpguu. "qt "Y F J 0"P qto cm{ . "K'f q "pqv"cuuqekcvg "vj g "y qtf u "õj cr r kpguuö "cpf õf cvcdcug.ö'dw'vj ku'ku'f khtgtgpv0'Vj g"Y qtff "F cvcdcug"qh"J cr r kpguu'ku'vj g'ugewretkuvu cpuy gt "vq"vj g"Xcvkecp"cpf "O geec"cpf "Igtwucngo "cpf "Nj cuc."cm'tqnrgf "kpvq"qpg0"J gtg {qw'ecp. "y kj "vj g"enkem'qh"c"o qwug. "ceeguu"vj g"ugetgvu"qh"j cr r kpguu0"Ugetgvu"dcugf pqv'qp"gr j go gtcn'tgxgrcvkqpu"kp"uqo g"cpekgpv'f gugtv'dw'qp"o qf gtp"uekgpeg="ugetgvu kpuetkdgf "pqv'qp"r ctej o gpv'dw'qp"j ctf "f tkxgu="y tkwgp"pqv'kp"Ctco cke "dw'kp"vj g rcpi wci g"qh'qwt 'vko gu. "dkpct { "eqf g0

Ky cmic'hgy "drqemu'htqo "vj g'uwdy c{"cpf "co 'kpuvcpvn("f kucr r qkpvgf 0'Vj g'eqmgi g eco r wu"y j gtg"vj g"Y F J "ku"j qwugf "mqmu"o qtg"rkmg"c "uwdwtdcp "qhhkeg"r ctmi'vj cp "c egpvgt "qh"drkuu. "vj g"tgr qukvqt { "qh"j wo cpkx{øu"mpqy ngf i g"cdqww"j cr r kpguu0'K'vt { "vq uj twi "qhh'vj ku"hggrkpi 0'Chvgt "cm "y j cv'y cu"K'gzr gevkpi A"Vj g"Y kt ctf "qh"Q| A"Y km{

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K'y cm'f qy p"c "pqpf guetkr v'eqttkf qt "cpf "mpqem'qp"c "pqpf guetkr v'qhhkeg"f qqt0'C o cp"y kyj "c"F wej "ceegpv"{ gmu"hqt "o g"vq "gpvgt0'Vj gtg"j g"ku0Ft0'Hggni qqf "j ko ugrh0 TwwXggpj qxgp"ku'c"vko "o cp. "kp"j ku"gctn("ukz kgu. "Ki wguu0J g"j cu"c"ucm/cpf/r gr r gt dgctf "cpf "dtki j v."gngevtke"g{ gu0J g"ku'f tguugf "kp"cm'dncenô uv{ rkuj ."pqv'o qtdkf "dncen0 J g"nqmu"xci wgn("hco krkct."cpf "y gp "K'tgcrk{ g"y j {<"J g"nqmu"rkng"c"F wej "Tqdkp Y knrkco u."y kyj "y g"uco g"eqkngf "gpgti {"cpf "urki j vn{ "ko r kuj "i tkp0J g"ur tkpi u"htqo "j ku ej ckt "cpf "qhhgtu"j ku"j cpf "cpf "c "dwukpguu"ectf . "y j kej "tgcf u<"õT wwv'Xggpj qxgp. Rtqhguuqt "qh'J cr r kpguu'Uwf kgu0ò

J ku"qhhleg"nqmu"rkng"vj cv'qh"cp{"r tqhguuqt<"dqqmu"cpf "r cr gtu"gxgt{y j gtgô pqv gur gekcm{ "o guu{."dww"pqv'vj g"pgcvguv"qhhleg"Kxxg"gxgt"uggp. "gkj gt0'Eqpur kewqwur{. vj gtg"ku"pqv'c"uo krg{ "hceg"kp"uki j v0Xggpj qxgp"r qwtu"o g"c"ewr "qh"i tggp"\gc0'Vj gp"j g i tqy u'ukrgpv'cpf "y ckwu'hqt"o g"\q"\cm0

K"f qpøv"npqy "y j cv" vq "uc{0"Cu"c "lqwtpcrkuv. "Køxg "eqpf wevgf "j wpf tgf u "qh kpvgtxkgy u0"Køxg "kpvgtxkgy gf "nkpi u "cpf "r tgukf gpwu"cpf "r tko g "o kpkuvgtu. "pqv" vq o gpvkqp" j gcf u "qh" vgttqtkuv"qti cpk cvkqpu"rkng" J g| dqmcj 0[gv"ukvkpi "j gtg. "cetquu"ltqo yi ku"nkpf n("F wej "r tqhguuqt" y j q "nqqmu"rkng" Tqdkp" Y knkco u. "K'co "uwo r gf 0"Rctv"qh o g. "yi g"r ctv" yi cv"f gur gtcvgn("etcxgu"r gceg"qh"o kpf . "y cpvu"vq"uj qwv. "õFt0X ggpj qxgp. {qwøxg"etwpej gf "yi g"pwo dgtu. "{qwøxg"uwwf kgf "j crr kpguu" {qwt "gpvktg"r tqhguukqpcn nkhg="r ngcug"i kxg"kv"vq"o g0I kxg"o g'yi g"f co p'hqto wnc"hqt" j crr kpguu#ö

 $Dw'Kfqpøv'uc{"yi cv0'Kecpøv'uj cmg"{gctu"qh"vtclplpi ."yj lej "vgm"o g"vq"o clpvclpo { "f kuvcpeg"htqo "o { "uvvdlgev'cpf "pgxgt."gxgt "tgxgcn"vqq "o wej "cdqww'o { ugrh<math>0$ 'Køo rkng"yj g"qhh/f ww{ "eqr "yj q"ku"qww'vq"f lppgt"y kyj "j ku"hco kn{ "dww'ecpøv'uvqr "uecpplpi "yj g tguvcwtcpv'hqt"r qvgpvkcn'uj qqvgtu0

Uq "kpuvgcf "qh" wpdwtf gpkpi "o { "uqwn "K'tguqtv" vq "cp "qrf "vtkem" go r rq { gf "d { lqwtpcrkuvu" cpf "y qo gp" y j q" y cpv' vq" r w' c "f cvg" cv' gcug0' öF t0X ggpj qxgp.ö "K'hkpcm { uc { . "ōvgm' o g" cdqw' { qwtugrh0J qy "f kf" { qw' i gv'kpvq" y g" j crr kpguu "dwukpguuAö

Xggpj qxgp"rgcpu"dcent'kp"j ku"ej ckt."j cr r {"vq"qdrki g0"J g"eco g"qh"ci g"kp"yj g"3; 82u0 Gxgt {qpg"qp"j ku"eqmgi g"eco r wu"y cu"uo qnkpi "f qr g."y gctkpi "Ej g"I wgxctc"V/uj ktwcpf "vcmkpi "cdqww"yj g"i qqf "uqekgv{0"Xggpj qxgp"cnuq "uo qngf "r ngpv{ "qh"f qr g"dwf kf pøv'y gct"c"Ej g"I wgxctc"V/uj ktv="cpf "cu"hqt"yj qug"õi qqf "uqekgvkgu.ö"Gcuvgtp"Dmeeqwpvtkgu."Xggpj qxgp "hqwpf "yj go "y cpvkpi 0"Kpuvgcf "qh"lwf i kpi "c"uqekgv{"d{ "kuuuvgo ."j g"yj qwi j v "y j { "pqv"lwf i g"kv"d{ "kuu"tguwnuA"Y gtg "kuu"ekk kgpu"j cr r { A Xggpj qxgpøu"j gtq "y cupøv"Ej g"I wgxctc "dw"c "uqekcm{ "kpgr v"pkpgvggpy /egpwt { Dtkkuj "dcttkuvgt "pco gf "Lgtgo { "Dgpyj co 0"Dgpyj co "hco qwun "gur qwugf "yj g wkrkctkcp "r tkpekr ng. "õyj g"i tgcvguv"j cr r kpguu"qh"yj g"i tgcvguv"pwo dgt0ö"Xggpj qxgp y qwrf "j cxg"i ncf n{ "y qtp"c"Lgtgo { "Dgpyj co "V/uj ktv"j cf 'uwej "c"yj kpi "gzkuvgf 0

Xggpj qxgp"y cu"uwf {kpi "uqekqnqi {ô c"hkgrf "vj cv."cv"vj g"vko g. "o gcpv"qpn{ "vj g uwf {"qh"ukem'uqekgkgu."f {uhvpevkqpcn'qpgu0'Ku"ukurgt "f kuekr rhpg."r u{ej qnqi {."uwf kgf ukem"o kpf u0'Dw'pqv''{qwpi "Tww0'J g"y cu"kpvgtgurgf "kp"j gcnjj { "o kpf u"cpf "j cr r { r rcegu0'Qpg"f c{."c"dk/'vko kf "dw'f gvgto kpgf "pqpgvj grguu."Xggpj qxgp"mpqengf "qp"j ku cf xkuqtøu"f qqt "cpf "currgf "kh"j g"eqwrf "r rgcug"uwf { "j cr r kpguu0'J ku"cf xkuqt."c"uqdgt o cp"y kyj "uqrlf "cecf go ke"etgf gpvkcn."vqrf "j ko ."kp"pq"wpegtvckp"vgto u."vq"uj w'wr "cpf

pgxgt"o gpvkqp"yj cv"y qtf "ci ckp0J crrkpguu"y cu"pqv"c"ugtkqwu"uwdlgev0

Xggpj qxgp "rghv." ej curkugf "dww"ugetgvn("r rgcugf 0"J g "npgy "j g "y cu "qp "vq uqo gyj kpi 0'Kl'uq"j cr r gpgf ."vj qwi j "vj g"{ qwpi "F wej "i tcf wcvg"uwf gpvl'f kf pøv'npqy "cv yj g"ko g."eqwrf pøv'r quukdn("j cxg"npqy p."vj cv'ctqwpf "vj g"y qtrf "uqekcn'uekgpvkuvu"y gtg y cmkpi "wr "vq "c "pgy "f kuekr rkpg<"j cr r kpguu "uwvf kgu0"Vqf c{. "Xggpj qxgp "ku "cv"vj g hqtghtqpv'qh"c "hkgrf "vj cv'ej wtpu"qwl"j wpf tgf u"qh'tgugctej "r cr gtu"gcej "{ gct0'Vj gtg"ctg j cr r kpguu "eqphgtgpegu "cpf "c "Lqwtpcn"qh"J crrkpguu "Uwvf kgu"*y j kej "Xggpj qxgp gf ku+0"Uwvf gpvu"cv'Enctgo qpv'I tcf wcvg"Wpkxgtukv{ "kp "Ecrkhqtpkc"ecp"pqy "gctp"cp OC"qt"Rj F "kp"r qukkxg"r u{ej qmi {ô kp"j cr r kpguu0

Uqo g"qh"Xggpj qxgpøu"eqngci wgu"uwn"y kpnt"j ku"qrf "cf xkuqt "y cu"tki j v "y cv"y g uwf { "qh"j cr r kpguu"ku"o kui wkf gf . "uwr kf 0'Dw'y g { "ecpøv"ki pqtg"j ko 0'J ku"tgugctej "ku qw'y gtg="køu"ekgf "kp"lqwtpcnu."cpf "kp"y g"cecf go ke'y qtrf 'y cv'o gcpu"kv'o cwgtu0

Vj g"eqpvgo r rcvkqp"qh"j cr r kpguu. "qh"eqwtug. "ku"pqv'pgy 0'Vj g"cpekgpv'I tggmu"cpf Tqo cpu"f kf "c "rqv"qh"k0'Ctkurqvg. "Rrcvq. "Gr kewtwu. "cpf "qvj gtu"uy gcvgf "qxgt "vj g gvgtpcn"s wguvkqpu0'Y j cv'ku"vj g"i qqf "rkbgA"Ki"r rgcuwtg"vj g"uco g"cu"j cr r kpguuA"Y j gp ctg'y g"i qkpi "vq'kpxgpv'kpf qqt"r nwo dkpi A

Nevgt."yi g"I tggmu"cpf "yi g"Tqo cpu"y gtg"lqlpgf "d{ "qyi gtu."r crgt/umlppgf "o gp htqo "rcpf u "hctyi gt "pqtyi "y j q "ur gpv"cp "lpqtf lpcvg "co qwpv"qh "vko g "lp "ech? u. eqpvgo r rcvlpi "rllhgøu"lpgzvtlecdrg "s wcpf ctlgu0'O gp "rlnng "Mcpv. "Uej qr gpj cwgt. "O km P lgv| uej g."cpf. "rcvgt."Nctt { "F cxlf 0'Vj g{ ."vqq."j cf "o wej "vq"uc{ "cdqw/j cr r lpguu0

Cpf "vj gp"vj gtg"ku"tgrki kqp0"Y j cv"ku"tgrki kqp"kh"pqv"c"i wkf g"vq"j cr r kpguu. "vq"drkuuA Gxgt { "tgrki kqp"kpuxtwexu"hqmqy gtu"kp"vj g"y c { u"qh"j cr r kpguu. "dg"kv"kp"vj ku"rkhg"qt "vj g pgzv."dg"kv"vj tqwi j "uwdo kuukqp."o gf kcvkqp. "f gxqvkqp."qt. "kh" { qw"j cr r gp"vq"dgmqpi "vq yj g"Lgy kuj "qt"Ecyj qrke"hckj. "i wkn0

Cm"qh"y ku"o c{ "j cxg"dggp"j grr hwn "gprki j vgpkpi "gxgp."dw"kv"y cupøv"uelgpeg0"kv y cu " qr kpkqpu " cdqw " j cr r kpguu0" Ngctpgf " qr kpkqpu. " pq " f qwdv. " dw" qr kpkqpu pqpgyj grguu."cpf "kp"vqf c{øu"y qtrf "y g"j cxg"rkwrg"tgi ctf "hqt"qr kpkqpu."gzegr v"r quukdn{ qwt "qy p"cpf "vj gp"pqv"cny c{u0Pq."y j cv"y g"tgur gev."r c{ "j ggf "vq."ku"j ctf "uelgpeg"qt. hckhpi "vj cv."uqhv"uelgpeg0"O quv"qh"cm "y g"mxg"c"i qqf "uwf{0"P gy uecuvgtu"mpqy kpukpevkxgn{ "vj cv"y g"dguv"y c{ "vq "i gv"r gqr ngou"gctu"vq "r gtm"wr "ku"y kyj "vj gug"hkxg y qtf u<"õC "pgy "uwf { "j cu"hqwpf 0o"Kv"o cwgtu"rkwrg"y j cv"hqmqy u"pgzv0C "pgy "uwf { j cu"hqwpf "vj cv'tgf "y kpg"ku"i qqf "hqt"{qw"1"mkmu"{qw0"C "pgy "uwf { "j cu"hqwpf "vj cv i qqr ngou gy qtm"f wmu "vj g"dtckp "1"gprcti gu "ko0"Y g "gur gelcm("rkng "uwf kgu "vj cv"rgpf etgf kdkrkv{ "vq "qwt "qy p"kf kqu{petcukgu. "cu"kp. "õC "pgy "uwf { "j cu"hqwpf "vj cv'r gqr ng y kyj "o guu{ "f gumu"ctg "uo ctvgtö"qt "õC "pgy "uwf { "j cu"hqwpf "vj cv"o qf gtcvg "f ckn{ hrcwrgpeg"ko r tqxgu'hqpi gxks{0}

P gz v "y g "pgy "uelgpeg "qh"j cr r lpguu "pggf gf "f cvc0"P wo dgtu0"Hqt "y j cv"ku "uelgpeg lh"pqv"pwo dgtu. "r tghgtcdn{ "rcti g "qpgu"y ky "rqvu"qh"f gelo cn"r qlpvu0"Cpf "j qy "f q uelgpvluu'i gv'y gug"pwo dgtuAVj g{ "o gcuwtg"y kpi u0

Qj ."pq0'O clqt "tqcf dmqen0'J qy "ecp" {qw"o gcuwtg"j crr kpguu
A'J crr kpguu'ku "c hggrkpi ."c"o qqf ."cp"qwmqm'qp'hklg0
J crr kpguu'ecpøv'dg"o gcuwtgf 0

Qt "ecp"kvA'P gwtquekgpvkru"cv'y g"Wpkxgtukv{ "qh'Kqy c"j cxg"kf gpvkhkgf "y g"tgi kqpu qh"y g"dtckp"cuuqekcygf "y ky "i qqf "cpf "dcf "o qqf u0'Vj g{ "f q"y ku"d{ "j qqnkpi "wr tgugctej "uwdlgewi*eqmgi g'uwf gpwi'kp"pggf "qh's wkeniecuj +'\q'O T Ko cej kpgu"cpf "y gp uj qy kpi "y go "c "ugtkgu"qh"r kewtgu0'Y j gp "y g{ "uj qy "r gqr ng "r ngcucpv'r kewtguô / dweqnle "ncpf uecr gu. "f qnr j kpu"r nc{kpi ô r ctwi"qh"y g"r tghtqpvcn"nqdg "ctg"cevkxcygf 0 Y j gp"y g{ "uj qy "wpr ngcucpv'ko ci guô c"dktf "eqxgtgf "kp"qkn"c"f gcf "uqnf kgt"y ky "r ctwu qh"j ku"hceg"o kuukpi ô y g"o qtg"r tko kkxg"r ctwi"qh"y g"dtckp"nki j v'wr 0J cr r { "hggnkpi u. kp"qy gt "y qtf u. "tgi kuyt"kp"y g"tgi kqpu"qh'y g"dtckp"y cv"j cxg"gxqnxgf "o quv'tgegpwf 0 Kv"tckugu "cp "kpvtki wkpi "s wgurkqp<"Ctg"y g. "kp "gxqnwkqpct { "kh"pqv"r gtuqpcn"vgto u. unqwej kpi "\qy ctf" j cr r kpguuA

Tgugctej gtu "j cxg "vq{gf "y kỳ "qý gt "y c{u "qh"o gcuwtkpi "j crr kpguu<"uvtguu j qto qpgu. "ectf kce "cevkxk{. "cpf "uqo gý kpi "ecngf "õhcekcn"eqf kpi öô eqwpvkpi "j qy o cp{ "vko gu "y g "uo krg. "hqt "kpuvcpeg0'Cm"qh" ý gug "vgej pks wgu "ctg "r tqo kukpi . "cpf . kpf ggf . "qpg "f c{ "uekgpvkuvu"o c{ "dg "cdrg "vq "õvcng "{ qwt "j crr kpguuö "ý g "y c{ "c "f qevqt vqf c{ "cngu"{ qwt "yo r gtcwtg0} }

 $P~qy~. \label{eq:property} P~qy~. \label{eq:property} qwi~j~ \label{eq:property} ellipsy ell$

Tww'Xggpj qxgp "cpf "j ku "eqmgci wgu "encko "vj cv"vj g "cpuy gtu "ctg "tgo ctmcdn(ceewtcvg0'ō[qw'ecp"j cxg"c"f kugcug"cpf "pqv'mpqy "kvö'Xggpj qxgp "vgmu"o g. "ōdww'{qw ecpøv'dg'j crr { "cpf "pqv'mpqy "kv0'D{ 'f ghkpkkqp. "kh"{qw'ctg'j crr { ."{qw'mpqy 'kv0'b

 $Rgtj\ cr\ u.\ ''dw''o\ cpøu''ecr\ cek\ \{''hqt''ugrh'f\ gegr\ ulqp''ku''pqv''vq''dg''wpf\ gtgunko\ cvgf\ 0'Ctg\ y\ g''kpf\ ggf\ ''ecr\ cdng''qh''i\ cwi\ kpi\ ''qwt\ ''qy\ p''j\ cr\ r\ kpgunA''Vj\ gtg''y\ cu''yj\ ku''o\ qo\ gpv.''hqt\ kpuvcpeg.''yj\ gp''K'y\ cu''xgt\ \{''j\ cr\ r\ \{''kpf\ ggf\ .\ eqo\ r\ ngvgn\{''eqpvgpv.''y\ kyj\ qw''c''ectg''kp''yj\ g''y\ qtnf\ 0'Kp''tgvtqur\ gev.''kv''wtpu''qwv''K'y\ cu''lwwv\ gzvtgo\ gn\{''uvqpgf''cv''yj\ g''ko\ g0'Rnwu.''dggt''y\ cu''kpxqnxgf\ 0'K'yj\ kpn0'$

Cpqy gt "ur ggf "dwo r "qp "y g "tqcf "vq "j cr r kpguu<"F khhgtgpv" r gqr ng "f ghkpg j cr r kpguu "f khhgtgpvt(0[qwt "kf gc "qh"j cr r kpguu" o c{ "pqv"dg "y j g"uco g"cu"o kpg0"O { hcxqtkg "f ghkpkkqp "qh"j cr r kpguu "ur tcpi "htqo "y j g"o kpf "qh"cp "wpj cr r { "o cp "pco gf P qcj "Y gduvgt0"Y j gp"j g"r gppgf "y g"hktuv"Co gtkecp "f kevkqpct{ . "kp"3: 47. "j g"f ghkpgf j cr r kpguu"cu"ōy j g"ci tggcdng "ugpucvkqpu"y j kej "ur tkpi "htqo "y j g"gplq{o gpv"qh"i qqf 0o Vj cv"uc{u"kv"cn0"Kt"j cu"ōci tggcdng "ugpucvkqpu.ö"y g"pqvkqp"y cv"j cr r kpguu"ku"c "hggnkpi 0 Vj g"j gf qpknvu"y qwrf "i gv"qhh"qp "y cv0"Kv"j cu "õgplq{o gpv"qh"y j cvA"Qh"y j g i qqf .ö"c"y qtf "y cv "Kty kpm"Y gduvgt "uj qwrf "j cxg"ecr kcnk gf 0"Vj g"I qqf 0"Y g"y cpv vq "hggn"i qqf "dww"hqt "y g "tki j v"tgcuqpu0"Ctknqvrg "y qwrf "j cxg "cr r tqxgf "qh"y cv0 õJ cr r kpguu"ku"c "xkt wqwu"cevkxkv{ "qh"y g"uqwnö"j g"uckf 0"C "xkt wqwu"nkhg. "kp "qyi gt y qtf u."ku"c"j cr f "hhg0

Y g"j wo cpu"ctg"etgcwtgu"qh"y g"rcuv"hkxg"o kpwgu0"kp"qpg"uwf { . "r gqr rg"y j q hqwpf "c"f ko g"qp"y g"r cxgo gpv'c"hgy "o kpwgu"dghqtg"dgkpi "s wgtkgf "qp"y g"j cr r kpguu

s wgurkqp"tgr qt vgf "j ki j gt "rgxgru"qh"uc kuhce kqp "y kj "y gkt "qxgtcm"rkxgu" y cp "y qug y j q"f kf "pqv"hkpf "c"f ko g0"T gugctej gtu" j cxg"vtkgf "vq" i gv"ctqwpf "y ku"s wktm"qh" y g j wo cp "r u{ej g"y tqwi j "uqo gyj kpi "ecmgf "y g"gzr gtkgpeg/uco r nkpi "o gyj qf 0"V j g{ uxtcr "rkwrg"Rcmo "Rkmqvórkmg"f gxkegu"vq"t gugctej "uwdlge w"cpf "y j gp"r kpi "y go "o c{dg"c f q| gp "vko gu"c "f c{0"Ctg"{qw"j cr r { "pqy A"Y j cv"cdqw"pqy A"J gtg. "y qwi j . "y g J gkugpdgti "r tkpekr ng"t gctu"kwu"j gcf 0"V j g"o gtg"cev'qh"qdugtxkpi "uqo gyj kpi "cnvgtu"kw0 Cm'qh'y cv'r kpi kpi ."kp"qyj gt"y qtf u."o ki j v'chhgev'y g'uwdlge wy'j cr r kpguu0

Cniq. "o quv'r gqr ng"y cpv'vq"r tgugpv'c"j cr r { "hceg"vq"y g"y qtnf 0'Vj cv'gzr nckpu"y j { r gqr ng "eqpukuvgpvn{ "tgr qtv'j ki j gt "j cr r kpguu"ngxgnu"y j gp "y g{ "ctg"cungf "kp"hceg/vq/hceg"kpvgtxkgy u"tcyj gt "y cp"kp"o ckn/kp"uwtxg{u0Cpf "y g"tgr qtv'gxgp"j ki j gt "j cr r kpguu ngxgnu"kh'y g"kpvgtxkgy gt "ku"c"o go dgt "qh"y g"qr r qukkg"ugz0'Kpuvkpevkxgn{ ."y g"mpqy "y cv j cr r { "ku"ugz{0

 $\label{eq:continuity} J \ cr r \ lpguu''tgugctej \ gtu. "j \ qy \ gxgt." \ ctg"s \ wkem'vq "f \ ghgpf "vj \ gkt "y \ qtm0'Hqt "qpg"vj \ kpi . r \ gqr \ ngơu "cpuy \ gtu" \ ctg "eqpukuygpv''qxgt "vko g0'Cnuq. "tgugctej \ gtu" \ eqttqdqtcvg "r \ gqr \ ngơu tgur \ qpugu''d{. 'hqt "kpuvcpeg. "ej \ gemkpi \ "y \ kj "vj \ gkt "ht \ kgpf u''cpf "tguckxgu0'ôF \ qgu'' \ lqg''uggo \ nkmg"c"j \ cr r \ "r \ gtuqp"vq"\ qwAö"K'wtpu"qw'vj \ cv'vj \ gug"qwukf g"cuuguuo \ gpwu'vgpf "vq" \ lkdg y \ kj "qwt "qy p"f \ gi \ tgg "qh"r \ gtegkxgf "j \ cr r \ kpguu0'Dgukf \ gu. "uekgpvkuw"o \ gcuwtg "KS "cpf \ cwkwf \ gu''vqy \ ctf "kuuwgu'nkmg'tcekuo ."y j \ kej "ctg"cnuq'uwdlgevkxg0'Y j \ "pqv'j \ cr r \ kpguu'cu y \ gmA'Qt"cu''O \ kj \ a \ n\ "Eu\fmu \ gpvo \ kj \ cn\ k "c"i \ kcpv''kp"vj \ g"hkgnf "qh'j \ cr r \ kpguu'uwkf \ kgu. "r \ w \ k\~oY j \ gp"c''r \ gtuqp'uc\ u''j \ g''ku''+r \ tgw\ "j \ cr r \ \ \ \ \ g'qpg''j \ cu''pq''tki j \ v'vq''ki \ pqtg''j \ ku''uvcvgo \ gpv. \ qt''kpvgtr \ tgv'k'q''o \ gcp''j \ g''qr r \ qukg0`o$

Uq "cuwo kpi "yʻ cv''yʻ gug"j cr r kpguu"uwf kgu "ctg "tgcuqpcdn{ "ceewtcvg. "yʻ j cv''j cxg yʻ g{ 'hqwpf A'Yʻ j q'ku'j cr r { A'Cpf 'jʻ qy 'f q'Klqkp''yʻ go A'Vj ku'ku'yʻ j gtg'T wwXggpj qxgp cpf 'jʻ ku'f cvcdcug''eqo g'kpvq'r m{ 0

 $\label{eq:controller} Xggpj\ qxgp\ "ngcfu"o\ g"vq"c"tqqo\ "cu"pqpf\ guetkr\ v"cpf\ "uqwnguu"cu"yj\ g"tguv'qh"yj\ g\ eco\ r\ wu0\ Kpukf\ g"ku"c"dcpni'qh"c"j\ cnh'f\ q|\ gp"eqo\ r\ wgtu0\ Vj\ g{\ "ctg"o\ cppgf\ "d{\ "vj\ g"uo\ cm\ o\ quvn{\ "vqnwpvggt\ "uvchh'qh"vj\ g"Y\ F\ J\ ."pqpg"qh"yj\ qo\ "nqqmu"gur\ gekcm{\ "j\ cr\ r{\ 0'Krgv'vj\ ku\ kpeqpi\ tvkv{\ "urkf\ g="gxgp"cp"qxgty\ gki\ j\ v'f\ qevqt"o\ ki\ j\ v'j\ cxg"uqo\ g"i\ qqf\ "cf\ xkeg"cdqww\ gzgtekug"cpf\ "f\ kgv0$

 $K'r\ cwug"vq"vcng"kp"vj\ g"o\ qo\ gpv0'Qp"vj\ gug"eqo\ r\ wgtu."tki\ j\ v''kp"htqpv''qh"o\ g. "ku\ j\ wo\ cpks{ou"ceewo}\ wcvgf\ "npqy\ rgf\ i\ g"qh"j\ cr\ r\ kpguu0"Chvgt "xktwcm{ "ki\ pqtkpi "vj\ g\ uwdlgev'hqt"f\ gecf\ gu. "uqekcn'uekgpvkuvu"ctg"pqy "o\ cmkpi "wr "hqt"nquv''vko\ g. "ej\ wtpkpi "qwvtgugctej "r\ cr\ gtu"cv'c''r\ tqf\ ki\ kqwu''tcvg0J\ cr\ r{."{qw'o\ ki\ j\ v'uc{."ku''yj\ g"pgy\ 'ucf\ 0}}$

Vj g"tgugctej "hlpf lpi u"ctg"cngtpcvkxgn{ "qdxvqwu"cpf "eqwpvgt/lpvkxkxg. "gzr gevgf cpf "uwtr tkulpi 0"Kp"o cp{ "ecugu." vj g"hlpf lpi u"xcnvf cvg" vj g"i tgcv" vj lpngtu"qh"egpvt tggvg cuv0 cu"kh" vj g"cpev1 tggv1 tggv2 txcnv6 cv4 gtg"ctg"c"hgy "qh" vj g"hlpf lpi u." lp"pq r ctv6 cvv6 tgv7 gtg"ctg"c"hgy "qh" vj g"hlpf lpi u." lp"pq r ctv8 cvv9 tgv9 tg

Gzvtqxgtw"ctg"j crrkgt "y cp"kpvtqxgtw="qr wo knw"ctg"j crrkgt "y cp"r guuko knw= o cttkgf "r gqr ng"ctg"j crrkgt "y cp"ukpi ngu. "y qwi j "r gqr ng"y kij "ej knf tgp"ctg"pq"j crrkgt y cp"ej knf nguu"eqwr ngu="T gr wdrkecpu"ctg"j crrkgt "y cp"F go qetcw="r gqr ng"y j q"cwgpf tgrki kqwu"ugtxkegu"ctg"j crrkgt "y cp"y qug"y j q"f q"pqv="r gqr ng"y kij "eqmgi g"f gi tggu ctg"j crrkgt "y cp"yi qug"y kij qwx. "y qwi j "r gqr ng"y kij "cf xcpegf "f gi tggu"ctg"nguu"j crr { y cp "y qug"y kij "lwuv"c"DC="r gqr ng"y kij "cp"cevkxg"ugz "nkhg"ctg"j crrkgt "y cp "y qug y kij qwx="y qo gp"cpf"o gp"ctg"gs wcm("j crr{."yi qwi j "y qo gp"j cxg"c"y knf gt "go qvkqpcn tcpi g="j cxkpi "cp "chrckt "y km"o cng "{qw"j crr { "dw"y km"pqv"eqo r gpucvg "hqt "y go cuukxg"nquu"qh"j crr kpguu"y cv"{qw'y km"kpewt"y j gp"{qwt "ur qwug"hkpf u"qw"cpf "ngcxgu {qw="r gqr ng"ctg"ngcuv"j crr { "y j gp"y j g{øtg"eqo o wkpi "vq "y qtm="dwu{ "r gqr ng"ctg" crr kgt "y cp"r qqt "qpgu. j crr kgt "y cp"y qug"y kij "vqq"nkwng"vq"f q="y gcnij { "r gqr ng"ctg" j crr kgt "y cp"r qqt "qpgu.

dw'qpn{ 'unki j vn{ 0

Uq "y j cv'uj qwf "y g "f q "y kỳ "ỳ gug "hợpf kọi uA'I gv'o cttkgf "dw'f qpøv'j cxg "nkf uA Uctv'i qkọi "vq"ej wtej "tgi wctn{ A'F tqr "qw'qh"y cv'Rj F "r tqi tco A'P qv'uq "hcuv0Uqekcn uekgp kunu"j cxg"c"j ctf "vko g "wptcxgrkọi "y j cv'y g { "ecm"õtgxgtug "ecwucrkv{ ö "cpf "y j cv yi g "tguv'qh" wu "ecm"yi g "ej kengp/cpf/gi i "r tqdrgo 0"Hqt "kpuvcpeg. "j gcnyj { "r gqr rg "ctg j cr r kgt "yi cp "wpj gcnyj { "qpgu="qt "ku "kv'yi cv'j cr r { "r gqr rg "vgpf "vq"dg"j gcnyj kgt A'O cttkgf r gqr rg "ctg"j cr r { "r gqr rg "ctg"o qtg "rkngn{ "vq"i gv'o cttkgf A'Køu" vqwi j vq"uc{0Tgxgtug "ecwucrkv{ "ku "yi g"j qdi qdrkp "yi cv'o cngu "o kuej kgh "kp "o cp { "c "tgugctej r tqlgev0

 $Y\ j\ cv''K'tgcm\{\ ''y\ cpv''vq''npqy\ ."\dot vj\ qwi\ j\ ."ku"pqv''y\ j\ q"ku"j\ crr\ \{\ ''dw''y\ j\ gtg''\dot vj\ g\{\ ''ctg\ j\ crr\ \{\^0\ cpf\ ''y\ j\ \{0Xggpj\ qxgp''uki\ j\ u''y\ j\ gp''Kcum'cdqw''y\ ku"cpf\ ''r\ qwtu"cpqy\ gt''ewr\ ''qh\ vgc0'J\ gtg."'y\ g"ecnewrvkqpu"i\ gv''vkenkgt0'Ecp"y\ g"tgcm{"uc{"y\ j\ kej\ "eqwpvtkgu."y\ j\ kej\ r\ gqr\ ngu."ctg"j\ crr\ kgt ''y\ cp"qvj\ gtuA''J\ cu"o\ {\ ''ugctej\ ''hqt\ ''y\ g"y\ qtnf\ øu''j\ crr\ kguv''r\ rcegu\ gpf\ gf\ ''dghqtg''kv''dgi\ kpuA$

Cm'ewnwtgu"j \exp "c "y qtf "hqt"j crr kpguu. "cpf "uqo g"j cxg "o cp "y qtf u0'Dw'f qgu yj g"Gpi rkuj "y qtf "õj crr kpguuö"o gcp "yj g"uco g"cu'yj g"Htgpej " dqpj gwt "qt "yj g"Ur cpkuj $\operatorname{lgrhelf}$ cf "qt "yj g"Ctcdke" ucj ccf $\operatorname{cA'Kp}$ "qyj gt "y qtf u. "f qgu"j crr kpguu" "tcpurc ucj cxg "Vj gtgøu uqo g"gxkf gpeg"yj $\operatorname{cv'}$ yj g"cpuy gt "ku" {gu0'Vj g"Uy kuu"tgr qtv'gs uch "rgxgnu"qh"j crr kpguu. y j gyj gt "yj g{ "vcng"yj g"uwtxg{u"kp"Htgpej . "I gto cp . "qt "Karkcp. "yj g"eqwpvt{øu"yj tgg o clp'hcpi uci gu0

Cm'ewnwtgu''xcnwg''j crr kpguu. "dww'pqv''vq''yj g''uco g''f gi tgg0'Gcuv'Cukcp ''eqwpvtkgu vgpf ''vq''go rj cukt g''j cto qp{ ''cpf ''hwhkntkpi ''uqekgvcn'qdrki cvkqpu''tcvj gt''yj cp''kpf kxkf wcn eqpvgpvo gpv=''r gtj cr u''pqv''eqkpekf gpvcm{ ."vj gug''eqwpvtkgu''cnuq''tgr qtv''nqy gt ''ngxgnu''qh j crr kpguu."yj cvtu''dggp''ecmgf ''yj g''Gcuv''Cukcp''J crr kpguu''I cr ."yj kej ''uqwpf u''vq''o g nkng''uqo g''uqtv''qh''Ej kpgug''I tcpf ''Ecp{qp0''Vj gp ''yj gtg''ku''yj g''ŏuqekcn''f guktcdkrkv{dkcu0o''Vj g''eqpegtp''j gtg''ku''yj cv'r gqr ng''cpuy gt''yj g''j crr kpguu''uwtxg{u''pqv''Intqo ''yj gkt j gctv''dww''kp''y c{u''yj cv''yj gkt ''uqekgv{ ''y qwrf ''crr tqxg''qh0'Vj g''Icr cpgug. ''hqt ''kpuvcpeg. ctg''hco qwun(''ugnh'ghhcekpi .''chtckf ''vq''dg''yj g''r tqxgtdkcn'pckn''yj cv'uvkemu''qw=''yj g{ ''ctg cnuq. ''tgrcvkxg''vq''yj gkt''y gcnyj .''pqv'xgt{ ''j crr {0'Krkxgf ''kp''Icr cp''hqt''{gctu''cpf ''pgxgt''i qv wugf ''vq''yj g''uki j v''qh''Icr cpgug''y qo gp''eqxgtkpi ''yj gkt ''o qwyj u''yj gp''yj g{ ''ncwi j gf ''qt uo kngf .''cu''kh''cuj co gf ''qh'yj gkt''i ngg0

Y g''Co gtkecpu. "qp" yj g" qy gt "j cpf. "y gct "qwt "j crr kpguu" qp" qwt "urggxgu" cpf. "kh cp{yj kpi. "ctg"i wkm{"qh" kphrc kpi "qwt" eqpvgp vo gpv" kp" qtf gt "vq" kortguu0 J gtg" ku" yj cv" c Rqnkuj "ekk kpp" nkx kpi "kp" yj g" Wpkgf" "Uccygu" vqnf" yj g" ytkgt "Ncwtc" Mnqu" Uqnqn" cdqww Co gtkecpu k" oy j gp" Co gtkecpu uc{"kw'y cu" i tgcv. "Knpqy" kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{kv'y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j qqf 0 Y j gp" yj g{"uc{ky y cu" i qqf 0 Y j qqf 0 Y

Vj ku'ku'i qkpi ''vq'dg''vqwi j 0'Vj g'cvrcu''qh'drkuu. ''kh''qpg''gzkuvu. ''y qpøv'dg''gcu{ ''vq'tgcf 0 Køu''nkng''j cv'etwo r ngf 'o cr ''ukwkpi ''kp''{ qwt''i mxg''eqo r ctvo gpv0'Dwv''K'y cu''f gygto kpgf vq''r my ''cj gcf .''eqpxkpegf ''vj cv'y j krg''y g''o c{ ''pqv'dg''cdng''vq'f khngtgpvkcyg''hkpg''uj cf gu qh''j crrkpguu''co qpi ''eqwpvtkgu. ''uwtgn{ ''y g''ecp''uc{ ''vj cv''uqo g''eqwpvtkgu''ctg''j crrkgt yj cp''qvj gtu0

Xggpj qxgp"i kxgu"o g"eqo r ngvg"ceeguu"vq"j ku"f cvcdcug"cpf "y kuj gu"o g"nwem"dw'hktuv j g"y ctpu"o g< δ qw'o c{ "pqv'nkng"y j cv'{qw'hkpf 0}

õY j cv'f q"{qw'o gcpAö

Vj g"j cr r kguv"r ncegu. "j g"gzr nckpu. "f qpøv"pgeguuctkn("hkv"qwt "r tgeqpegkxgf "pqvkqpu0 Uqo g"qh"vj g"j cr r kguv"eqwpvtkgu"kp"vj g"y qtnf ô Kegncpf "cpf "F gpo ctm"hqt "kpuvcpegô ctg "j qo qi gpgqwu. "uj cwgtkpi "vj g"Co gtkecp "dgrkgh"vj cv"vj gtg "ku "uvtgpi vj . "cpf j cr r kpguu. "kp "f kxgtukx{0'Qpg "hkpf kpi . "y j kej "Xggpj qxgp "lwuv"wpeqxgtgf . "j cu"o cf g j ko "xgt{"wpr qr wrct "y ky "j ku"hgmqy "uqekqmi kuvu0'J g"hqwpf "vj cv"kpeqo g"f kuvtkdwkqp f qgu"pqv"r tgf kev"j cr r kpguu0'Eqwpvtkgu"y kj "y kf g"i cr u"dgw ggp"vj g"tkej "cpf "r qqt "ctg pq "nguu"j cr r { "vj cp "eqwpvtkgu "y j gtg "vj g "y gcnij "ku "f kuvtkdwxgf "o qtg "gs wcm{0 Uqo gsko gu."vj g{"ctg"j cr r kgt0

 $\label{eq:control_of_control} \begin{tabular}{ll} $\tilde{O} & \end{tabular} is $\tilde{O} & \end{tabul$

K'ceegr v'j ku''cf xkeg''r qrkxgn{ "dww'y kpm'j g''o www'dg''gzci i gtcwkpi "cdqww'y g''f cpi gtu y cv''rkg "cj gcf 0''K'co "y tqpi 0''Nqqmkpi "hqt "y g "y qtnf øu "j cr r kguw''r rcegu "ecp "o cmg cp{qpg''o kugtcdrgô qt "cv''y g''rgcuw'i kxg''y go "c''ur rkwkpi "j gcf cej g0'Y ky "gcej "erkem'qh y g''o qwug. "K'gpeqwpvgt "o {uvgtkgu "cpf "cr r ctgpv''eqpvtcf kevkqpu0''Nkmg''y kw<''O cp{ "qh y g''y qtnf øu''j cr r kguv''eqwpvtkgu''cnuq''j cxg''j ki j "uwkekf g''tcvgu0'Qt''y ku''qpg<''Rgqr rg''y j q cwgpf ''tgrki kqwu''ugtxkegu''tgr qtv''dgkpi "j cr r kgt''y cp''y qug''y j q''f q''pqv.''dww''y g''y qtnf øu j cr r kguv''pcvkqpu''ctg''ugewrct0'Cpf . "qj . "vj g''Wpkxgf ''Uvcvgu. "vj g''tkej guv. "o quv''r qy gthwn eqwpvt { "kp "y g''y qtnf . "ku"pq "j cr r kpguu''uwr gtr qy gt0'O cp{ "qvj gt "pcvkqpu''ctg"j cr r kgt y cp''y g''ctg0

O { "fc { u"kp"Tqwgtf co "hcm"kpvq"c"r ngcucpv'tqwkpg0"K'j cxg"dtgcmhcuv'cv''y g"j qvgn r gtj cr u"kpf wri g"kp"c"dkv'qh"kpvgt "eqwtug."'y gp"tkf g"y g"uwdy c { "vq"y g"Y qtrf "F cvcdcug qh"J cr r kpguu0"Vj gtg. "Kukhv'y tqwi j "y g"tgugctej "r cr gtu"cpf "y g"f cvc. "nqqmkpi "hqt"o { gnwukxg"cvrcu"qh"drkuu0"Kp"y g"gxgpkpi u. "Ki q"vq"o { "ech?" "*K'pgxgt"f q"ngctp"kvu"pco g+: y j gtg"K'f tkpm'y cto "dggt. "uo qng"rkwrg"eki ctu. "cpf "r qpf gt "y g"pcwtg"qh"j cr r kpguu0 Kou"c"tqwkpg"y cv'kpxqrxgu"o wej "eqpvgo r ncvkqp. "o qf gtcvg"co qwpwu"qh"kpvqzkecpw. cpf "xgt { "rkwrg"cewcn"y qtm0"K'ku."kp"qy gt"y qtf u. "c"xgt { "Gwtqr gcp"tqwkpg0"Ko "i qkpi pcvkxg0

Hqt "uqo g"tgcuqp. "K'f gelf g"vq"uvctv"cv"y g"dqwqo "qh"y g"j crr kpguu"ncf f gt "cpf y qtm"o { "y c{ "wr 0"Y j kej "eqwpvtkgu"ctg"y g"ngcuv"j crr { A"P qv"uwtr tkukpi n{ . "o cp{ Chtkecp"pcvkqpu"hcm"kpvq"y ku"ecvgi qt{ 0"Vcp| cpkc. "Ty cpf c. "cpf "\ ko dcdy g"ctg"pgct y g"xgt{ "dqwqo "qh"y g"j crr kpguu"y gm0'C "hgy "Chtkecp "eqwpvtkgu. "uwej "cu"I j cpc. o cpci g"vq"cej kgxg"o kf f nkpi "ngxgnu"qh"j crr kpguu. "dw"y cvxu"cdqwv"kx0"Vj g"tgcuqpu uggo "qdxkqwu0"Gzvtgo g"r qxgtv{ "ku"pqv"eqpf wekxg"vq"j crr kpguu0"Vj g"o { yi "qh"y j g j crr { . "pqdng"ucxci g"ku"lwuv'y cv<"c"o { yi 0"Kn"qwt "dcuke "pggf u"ctg"pqv"o gv."y gøtg"pqv nkngn{ "vq"dg"j crr { 0

Ewtkqwurf.."KThkpf "cpqvj gt "dcvej "qh"pcvkqpu"uwem'cv'vj g"dqwqo "qh"vj g"j cr r kpguu ur gevt wo <"vj g "hqto gt "Uqxkgv"tgr wdrkeuô Dgrct wu. "O qrf qxc. "Wntckpg. "W dgrkuvcp. cpf "c"f q| gp"qvj gtu0

Ctg"f go qetcelgu"j crrkgt "vj cp"f kevcvqtuj kruA"P qv"pgeguuctkr(0"O cp{ "qh"vj qug hqto gt"Uqxkgv"tgrwdrkeu"ctg"s wcuk/f go qetcelgu="egtvckpn("vj g{ "ctg"htggt"pqy "vj cp"kp Uqxkgv"vko gu. "{gv"vj gkt "j crrkpguu"rgxgnu"j cxg"f getgcugf "ukpeg"vj g"eqmcrug "qh"vj g Uqxkgv"Wpkqp0Tqp"Kpi ngj ctv."c"rtqhguuqt "cv"vj g"Wpkxgtukv{ "qh"O kej ki cp. "j cu"ur gpv o quv"qh"j ku"ectggt "uwf {kpi "vj g"tgncvkqpuj kr "dgwy ggp"f go qetce{ "cpf "j crrkpguu0"J g dgrkgxgu "vj cv" vj g "ecwucrkv{ "hrqy u "vj g "qvj gt "y c{="f go qetcekgu "f qpøv"rtqo qvg j crrkpguu."dwv"j crr{ "rncegu"ctg"o qtg"rkngn("vq"dg"f go qetcvkeô y j kej ."qh"eqwtug.

f qgu'pqv'dqf g'y gm'hqt'Kcs 0

 $Y\ j\ cv''\ cdqw''\ j\ g''\ y\ cto\ "cpf\ "uwpp{\ "rregu."\ ''j\ qug\ "vqrkecn''r\ ctcfkugu''\ j\ cv''\ y\ g\ cuuqekcvg''\ y\ kj\ "'j\ crrkpguu''cpf''r\ c{\ ''i\ qqf''o\ qpg{\ ''vq''xcecvkqp''kpA'K''wvtpu''qw''\ j\ g''\ ctg''pqv'uq''\ j\ crr{0Hkk''Vcjkk''\ y\ g''Dcj\ co\ cuô\ y\ g{\ ''cm''hcm''kpvq''\ j\ g''o\ kf\ f\ g''rckwf\ gu''qh\ j\ crrkpguu0J\ crr{\ ''eqwpvtkgu''vgpf''vq''dg''\ y\ qug''kp''vgo\ r\ gtcvg''enko\ cvgu. ''cpf''uqo\ g''qh''y\ g\ j\ crrkguvô\ Kegrcpf.''hqt''kpuvcpegô\ ctg''f\ qy\ ptki\ j\ v'eqnf\ 0$

Dgrkgxg"kv'qt"pqv."o quv'r gqr rg"kp"yj g"y qtrf "uc{"yj g{"ctg"j cr r{0'Xktwcm{"gxgt{eqwpvt{"kp"yj g"y qtrf "ucqtgu"uqo gy j gtg"dgw ggp"hkxg"cpf "gki j v'qp"c"ygp/r qkpv'uecrg0 Vj gtg"ctg"c"hgy "gzegr vkqpu<"Vj g"uwngp"O qrf qxcpu"eqpukuygpvn{"ueqtg"cdqw"607."cpf hqt"c"dtkgh'r gtkqf "kp"3; 84"yj g"ekkl gpu"qh'vj g"F qo kplecp"Tgr wdrke"eqwrf "o wuvgt"qpn{c"308."vj g"nqy guv'ngxgn'qh'j cr r kpguu"gxgt"tgeqtf gf "qp"vj g"r rcpgv0'Dw."cu"Kuckf ."vj gug ctg"tctg"gzegr vkqpu0'O quv'qh'vj g'y qtrf "ku"j cr r{0

 $Y \ j \ \{ \ "f \ qgu"\ y \ ku"eqo \ g"cu"uwej \ "c"uwtr \ tkug A"Vy \ q"v \ r \ gu"qh"r \ gqr \ rg. "K"y \ kpm "ctg"vq \ droo \ g < "lqwtpcrkuw"cpf "r j krquqr j gtu0"Vj g"o \ gf kc. "qh"y j kej "K"co "c"ewr cdrg"o go \ dgt. tgr qtv. "cu"c "twg. "qpn \ "dcf "pgy u <"y \ ctu. "hco \ kpg. "vj g "revguv"J \ qm \ y \ qqf "eqwr \ rgøu \ ko r \ rqukqp0"Kf \ qpøv"o \ gcp "vq "dgrkwrg"vj g"vt \ qwdrgu"kp "vj g"y \ qtrf . "cpf "I \ qf "npqy u"K"j \ cxg o \ cf g"c"i \ qqf "hxkpi "tgr \ qtvkpi "vj \ go . "dw"y g"l\ qwt pcrkuvu"f \ q"r \ ckpv'c"f \ ku\ qt \ yf "r \ kewt \ g0$

 $\label{thm:comparison} Vj\ g"rj\ knquqrj\ gtu." vj\ qwi\ j\ ."ctg" vj\ g"tgcn" ewrtkuô\ vj\ g"dtqqf\ kpi\ "vj\ kg" i\ w{ u"lntqo}\ Gwtqr\ g0" Vj\ g{ "vgpf\ gf "vq" vgct "cm" dncem "uo\ qng" vqq" o\ wej\ ."cpf" j\ cf "vtqwdng" i\ gwkpi\ f\ cvgu0" Uq" vj\ g{ "j\ wpi\ "qwv."cnppg." kp" ech² u. "r\ qpf\ gtgf" vj\ g"wpkxgtug. "cpf\ ô\ uwtrtkug#ô\ eqpenxf\ gf "kv"ku" cp" wpj\ crr { "r\ nceg0" Qh" eqwtug" kv"ku0" Vj\ cv"ku. "kh" { qw" j\ crr\ gp" vq" dg" c\ npgn{.}"dtqqf\ kpi\ ."r\ cuv{/umkppgf}" vj\ kg" i\ w{0"Vj\ g" j\ crr { "r\ gqr\ ng" qh" uc{.}"gki\ j\ wgpvj /\ egpwt{ "T\ gkf\ gndgti\ "y\ gtg" dwu{ "dgkpi\ "j\ crr{.}"pqv" y\ tkkpi\ "nqpi\ ."tco\ dnkpi\ "f\ kcvtkdgu\ kpvgpf\ gf "vq" vqtwtg" uqo\ g"pqv{ gv'dqtp" eqnmgi\ g"uwf\ gpv'kp" Dnqqo\ kpi\ vqp" y\ j\ q"pggf\ u"vqr\ cuu'Rj\ knquqrj\ {"323" kp"qtf\ gt" vq" tcf\ wcvg0}$

Y qtuv'qh'cm'y cu'Htgwf 0Y j krg"pqv'vgej plecm{"c"dtqqf kpi "r j krquqr j gt."Htgwf "f kf o wej "vq "uj cr g"qwt "xkgy u"qp "j cr r kpguu0' J g"qpeg "uckf < "õV j g "kpvgpvkqp "vj cv"O cp uj qwf "dg" j cr r { "ku"pqv'kp" vj g"r rcp "qh"Etgcvkqp0o" Vj cv'ku"c" tgo ctmcdrg "uvcvgo gpv. gur gekcm{"eqo kpi "htqo "c"o cp" vj j qug "kf gcu"hqti gf "vj g"hqwpf cvkqp "qh"qwt "o gpvcn/ j gcnj "u{ uvgo 0'Ko ci kpg "kh"uqo g"f qevqt "kp" wtp/qh/ vj g/egpwt{ "Xkgppc" j cf "f genct gf < õV j g"kpvgpvkqp" vj cv'O cp" uj qwrf "j cxg"c" j gcnj { "dqf { "ku"pqv'kp" vj g"r rcp"qh'Etgcvkqp0o Y ggf "r tqdcdn{ "rqemij ko "wr ."qt"cv'rgcuv'uvtkr "j ko "qh'j ku" o gf kecn'rkegpug0Y g"egtvckpn{ y qwrf pøv'dcug "qwt "gpvktg" o gf kecn'u{ uvgo "qp" j ku"kf gcu0[gv'vj cv'ku"gzcevn{ "y j cv'y g f kf "y kj "Htgwf0

Ukm "o quvir gqr ng"ctg"j cr r {A'Ki'f qgupøv'ukv'tki j v'y kj "o g0'Køo "c"r gtuqp."cpf "Køo pqv'r ctvkewnctn{ "j cr r {0'Y j kej "i qv'o g"yj kpnkpi <"Y j gtg"f kf "K'hcm"kp "Xggpj qxgpøu eqpuvgmcvkqp"qh"j cr r kpguu'f cvcA'Ki'Kco "j qpguv."cpf "Ko ki j v'cu'y gm'dg"kh"køo "vcmkpi yj g"tqwdng"vq"y tkvg"yj ku. "Køf "uc{"Ky cu"c"ukz0'Vj cv'o cmgu"o g"eqpukf gtcdn{ "nguu"j cr r { yj cp"o { "hgmqy "Co gtkecpu. "dwv'ceeqtf kpi "vq"yj g"Y F J "Køf "hggn"tki j v'cv"j qo g"kp Etqcvkc0

Ko "kpenkpgf" vq"ci tgg"y kj "rkpi vkuv'cpf "hgmqy "ewto wf i gqp" Cppc" Y kgt | dkemc. y j q. "y j gp" hcegf "y kj "y ku" xgt { "uco g"emko "vj cv'o quv'r gqr ng"ctg" tgcuqpcdn{ "j cr r { tgr nkgf "y kj "qpg" uko r ng"s wgunkqp<õY j q"ctg" y qug'tgr qt vgf n{ "j cr r { "r gqr ngAö

Y j q "kpf ggf 0'O { "j gcf "j wt vu0'J cxg "K'go dctngf "qp "c "hwktg "o kuukqp "vq "hkpf "vj g y qtnf øu"j cr r kguv'r nceguA'Vj gp "K'pqvkeg "vj cv'qpg "eqwpvt { "ueqtgu "eqpukuvgpvn("j ki j "qp vj g "j cr r kpguu "uecrgô pqv'pwo dgt "qpg "dwv'f ctpgf "enqug0'K/'cnuq "j cr r gpu "vq "dg "vj g eqwpvt { "Kco "xkukklpi "cv'vj ku "xgt { "o qo gpv0

Ktgwtg"vq"o {"ech?."qtf gt "c"dggt."cpf "r qpf gt "F wej "j cr r kpguu0"Y j {"uj qwf "yj g P gyj gtrepf u."c"hrev'cpf "pqpf guetkr v'eqwpvt{."dg"uq"j cr r {A'Hqt"uvctvgtu."yj g"F wej "ctg Gwtqr gcp. "cpf "yj cv"o gcpu"yj g{ "f qpøv"j cxg "vq "y qtt{ "cdqww"mukpi "yj gkt "j gcnyj kpuwtcpeg."qt"hqt"yj cv'o cwgt "yj gkt "lqd0"Vj g"uvcvg"y km'vcng"ectg"qh"yj go 0"Vj g{ "i gv'c i c| kmkqp"y ggmu"qh"xcecvkqp"gcej "{gct "cpf."dgkpi "Gwtqr gcp."ctg"cnq"gpvkxngf "vq."cv pq"gzvtc"equv."c"xci wgn{ "uwr gtkqt"cwkxwf g"vqy ctf "Co gtkecpu0"F qgu"uo wi pguu"ngcf "vq j cr r kpguuA'Ky qpf gt."ukr r kpi "o {"Vtcr knvg"dggt0"P q."yj gtg"o wuv'dg"uqo gyj kpi "gnug0"

 $\label{thm:continuity:continuit$

Vj g"F wej "y km'\qngtcvg"cp { yi kpi ."gxgp"kpvqngtcpeg0'Kp"yi g"r cuv'hgy "f gecf gu'yi g { j cxg "y gneqo gf . "y kyj "qr gp "cto u. "ko o ki tcpvu"htqo "ctqwpf "yi g "y qtnf . "kpenxf kpi yi qug"htqo "pcvkqpu"yi cv'f qpøv'vqngtcvg"yi kpi u'nkng'tgrki kqwu'htggf qo "cpf "y qo gp"y j q y qtm'qt"f tkxg"qt"uj qy "yi gkt "hcegu0'F wej "vqngtcpeg"eqo gu"cv'c"equv."cu"yi g"o wtf gt"qh yi g"hkno o cngt "Vj gq"xcp"I qi j "d{ "c"O wurko "gzvtgo knv'j ki j nki j vgf 0'Dw'Xggpj qxgpøu tgugctej "uj qy u'yi cv'vqngtcpv'r gqr ng"vgpf "vq"dg"j cr r { 0

Y j cv'gzcevn("f qgu'F wej "vqrgtcpeg"rqqm'rkng. "kp"cp"gxgt{f c{ 'y c{ A'Vj tgg"yj kpi u eqo g "vq "o kpf <''f twi u. "r tquvkwwkqp. "cpf "e{erkpi 0" Kp "yj g "P gyj gtrcpf u. "cm"yj tgg cevkxkkgu "ctg"rgi cr0'Cm"yj tgg "ecp "gcukn("rgcf "vq "j cr r kpguu. "r tqxkf gf "yj cv"egtvckp r tgecwkqpu"ctg"vcngp0Y gctkpi "c"j gro gv'y j krg"e{erkpi . "hqt"kpuvcpeg0

K'pggf gf "vq "kpxguvki cvg"qpg"qh"vj gug"cevkxkkgu. "wr "enqug. "kp"qtf gt "vq"i gv"cv"vj g j gctv"qh"F wej "j cr r kpguu0'Dw"y j kej "qpgA'E {enkpi "ku"egtvckpn{ "y qtvj y j krg. "cpf "I qf mpqy u"vj g"F wej "mxg"vj gkt "dke {engu. "dwv"kv"y cu"ej km("qwukf g. "vqq"ej km("vq"i gv"qp"c dkng0"RtquvkwkqpA"Vj cv"cevkxkv{ "vcmgu"r nceg "kpf qqtu. "wuwcm{ . "uq "vj g "y gcvj gt y qwrf pøv"dg"c "hcevqt0'Cpf "kv"engctn{ "o cngu"uqo g"r gqr ng"j cr r {0'Dwv"vj gtg"y cu"vj g kuuwg "qh"o { "y khg0"Uj g"j cu"uwr r qtvgf "o { "j cr r kpguu"tgugctej . "wr "vq "c "r qkpv "cpf uqo gvj kpi "vqrf "o g"vj cv"gpi ci kpi "vj g"ugtxkegu"qh"c"F wej "r tquvkswy"nkgu"dg{qpf "vj cv r qkpv0

Uq "f twi u "kv'ku0'Uqhv'f twi u "o ctklwcpc"cpf "j cuj kuj ."ctg"ngi cn'kp "y g'P gyj gtrcpf u0 Vj g{ "ctg"ugtxgf "kp "eqhhgg"uj qr u "y j kej "ctgpøv'tgcm{ "eqhhgg"uj qr u "cv'cm'dwv'f twi f gpu0'õEqhhgg'uj qr ö'uqwpf u'o qtg'tgur gewcdng'yj cp'of twi "f gp.ö'yj qwi j 0

 $\label{eq:continuous} Dw'y j kej "qpg"uj qwf "K'ut {A"Vj gtg"ctg"uq"o cp{ "vq"ej qqug"htqo 0"Kp"Tqwgtf co. gxgt { "vj ktf "qt "hqwtyj "uvqtghtqpv."kv"uggo u. "ku"c "õeqhhgg"uj qr 00"Ko "vgo r vgf "d{ "qpg ecmgf "Um{ "J ki j ."dw'yj g"pco g"uggo u"vqq '0000'qdxkqwu0'Qyj gtu"mqm'vqq"j kr 0"Kj cxgpøv i qwgp"j ki j "ukpeg"o { "lwpkqt"{gct "kp"eqmgi g0Kf qpøv'y cpv'vq"o cmg"c "hqqn'qh'o {ugnh0} to cmg"c "hqqn'qh'o kg to cmg to cmg"c "hqqn'qh'o kg to cmg t$

 $\label{thm:condition} Vj\ gp\ "K'ur\ qv"k0"Vj\ g"Cnr\ j\ c"Dnpf\ kg"Eqhhgg"Uj\ qr\ 0"Kxu"r\ gthgev0"Dgulf\ gu"vj\ g\ kttgulurkdng'pco\ g."vj\ g'Cnr\ j\ c"Dnpf\ kg"cnuq"qhhgtu'xgpvkrckqp."cp"qr\ gp"y\ kpf\ qy\ ."vj\ kej\ ku"c"f\ ghlpkxg"r\ nxu0Kr\ tguu"c"dw|\ |\ gt\ "vj\ gp"y\ cm'wr\ "c"pcttqy\ "uvcktecug0'Kpulf\ g."vj\ gtgøu"c\ hqudcm'vcdng"cpf\ "c"eqqngt"hkngf\ "y\ kj\ "qtcpi\ g"Hcpvc"cpf\ "Eqng."cu"y\ gm"cu"r\ ngpv{\ "qh\ Upkengtu"cpf\ "O\ (\ O\ vu."hqt\ "vj\ g"o\ wpej\ kgu."pq"f\ qwdv0'Kxo\ "uwtr\ tkugf\ "vq\ "ugg"cp\ "cewcn\ eqhhgg"o\ cej\ kpg"kp"vj\ ku"eqhhgg"uj\ qr\ ."dw'kv'nqqnu'nkng"kv'j\ cupøv'dggp"wugf\ "kp"o\ qpvj\ u0C\ r\ tqr\ ."Keqpenwf\ g0$

Dcf "3; 92u"o wuke "ku"r ro{kpi. "cpf "c "rkwrg "vqq "rqwf r(0"Qp "qpg "y cm "K'pqvkeg "c r ckpvkpi "y cv'rqqmu'rkmg'kv'y cu'f qpg'd{ "c''vcrgpvgf "ukz y /i tcf gt0"kp''y g'hqtgi tqwpf "ku"c ect "y cv'j cu'l wuv'r rqy gf "kpvq"c''vtgg. "y ky "undf "o ctmu"vtckrkpi "qhh'vqy ctf "y g'j qtk qp0 Wpf gtpgcyj "ku"y tkwgp<"õUqo g"tqcf u"qpn("gzkuv'kp"f twi i gf "o kpf u0o"ko "pqv'uwtg"kh y ku'ku'o gcpv'cu'c'y ctpkpi "cdqwv'y gug'tqcf u"qt"cu"cp"gpf qtugo gpv'qh'y go 0

Gxgt{qpg"j gtg"uggo u"vq"dg"c"tgi wrct. "gzegr v. "qh"eqwtug. "hqt "o g0"Ko "kpuvcpvn{ vtcpur qtvgf "dcend'vq"o { "eqnrgi g"f qto "tqqo "kp"P gy "Igtug{0"Vt{kpi "vq"dg"eqqn"vt{kpi vq'hkv'kp. "dw'hckrkpi "o kugtcdn(0

Cp "qrkxg/unkppgf "o cp "eqo gu "qxgt "vq "o g "cpf . "kp "dtqngp "Gpi rkuj . "gzr rckpu "y g o gpw0Vqf c{ "vj g{ "ctg 'hgcwtkpi "Vj ck'o ctklwcpc."j g "uc{ u. "cu 'kh'f guetkdkpi "vj g "uqwr "f w lqwt. "cu'y gm'cu'y q "v{ r gu'qh'j cuj kuj <'O qtqeecp "cpf 'Chi j cp0

Kýo "cv'c"nquu0'Uq"Kfq"y j cv'Kcny c{u"fq"y j gp"y g"o gpw'r tqxgu"qxgty j gm kpi 0'K cum'y g"y cksgt"hqt"j ku'tgeqo o gpf cvkqp0

õFq"{qw'r tghgt 'uxtqpi ''qt''o krf Aö'j g''cumı0

õO krf (ði

õVj gp'Ky qwrf 'f ghkpkgn('i q'y ky ''y g'O qtqeecp0o

Kj cpf 'j ko 'c'hkxg/gwtq'pqvg'*cdqw'ukz 'f qmctu+.''cpf 'j g'j cpf u'o g'c'dci i kg'y kj 'c ej cm('dtqy p'urcd'yj g'uk| g'qh'c'r quvci g'uvco r 0

Kj cxg'cduqnwgn{ 'pq'kf gc'y j cv'vq'f q'y kj 'ko'

 $\label{thm:composition} Hqt "c" o qo gpv. "Ko" "vgo r vgf" "q" ecm" o { "qnf" eqmgi g" tqqo o cvg. "Tww{ "Hkuj nkpf 0 Tww{ "y qwf" "mpqy" y j cv' vq" fq0 J g" y cu" cny c { u" vj g" eqqn" qpg0 Tww{ "j cpf ngf" c" dqpi vj g" y c{"[q/[q"O c"j cpf ngu" c" egmq0 Ko" "wwtg" Tww{ "ku" c" eqtr qtcvg" ncy { gt" pqy . "nkx kpi kp" vj g" uwdwtdu" y kj "hqwt" nkf u. "dw' uwkm "K'dgv' j g" y qwrf" mpqy "y j cv' vq "fq" y kj "vj ku ej wpm'qh' O qtqeecp" j cuj 0$

K'dtkghn("eqpukf gt "uy cmqy kpi "y g"j cuj "cpf "y cuj kpi "kv"f qy p"y kj "c"Rgr uk'dw y kpm"dgwgt "qh" y cv"kf gc "cpf "lww"hwo drg" y kj "y g"j cuj "kpuwgcf . "vt { kpi "vq "mqm"cu j grr rguu "cu "r quukdrg. "y j kej "wpf gt "y g "ektewo uwcpegu "eqo gu "pcwtcm(0"Hpcm(. "c dgctf gf "o cp"y gctkpi "c"rgcyj gt "lcengv'vcngu"r kw{ "qp"o g0"Y kyj qww'uc { kpi "c"y qtf . "j g wcngu "y g"j cuj "kp"j ku"j cpf u"cpf "etwo drgu "kv"rkng "hgw "ej ggug0"Vj gp "j g "wptqmu"c eki ctgwg. "c"tgi wrct "eki ctgwg. "cpf "kpugt w'y g"j cuj 0"Chygt "c"hnwgpv'uj cng. "rkem"cpf "vcr . j g"j cpf u'y g "pqy "j cuj /kphwugf "eki ctgwg"dcem'vq"o g0

Ky cpm'j ko 'cpf 'rki j v'wr 0

C 'hgy "qdugtxcvkqpu0'Hktuv'qh'cm "Kfq"tgeqo o gpf "vjg"O qtqeecp0'K/ku'kpfggf "c uo qqvj "uo qng0'Ugeqpf."cv'ngcuv'j crh"vjg"hwp "qh"gpi ci kpi "kp"knkekv''cevkxkv{ "ku"vjg knkekv"r ctv"cpf "pqv"vjg"cevkxkv{ "r ctv0'Kp"qvjgt "yqtfu. "uo qnkpi "jcuj "ngicm("kp Tqwgtfco "ku'pqv'pgctn("cu'o wej 'hwp"cu'fqkpi 'kv'knkekxn('kp"{qwt 'eqnngig'fqto 'tqqo y kyj 'Twuv('Hkuj nkpf.'npqy kpi 'vjcv'cp{"o qogpv'{qw'o kijv'i gv'ecwijv0

Ukm 'Kco 'hggrkpi 'i qqf 0P q'r ckp0Cpf ."cu'\j g'O qtqeecp 'ugwrgu'\kpvq'o { 'egtgdtcn eqt \text{vg}. 'K'y qpf gt <'Y j cv'\kh'K\trc{gf ''rkmg'\j ku''cm'\qh'\j g'\ko gA'Y qwrf pø\'K'dg''j cr r { ''cm qh'\j g'\ko gA'Keqwrf ''gpf ''o { 'ugctej ''hqt'\j g''y qtrf øu''j cr r \kguv'r \text{regu'\tki j v'j gtg. ''cv'\j g Crr j c''Dmpf \kg''Eqhhgg''Uj qr ''\p''Tqwgtf co 0'O c{\dg''\j \ku''\ku''\j g''j cr r \kguv'r \text{reg''\kp''\j g y qtrf 0}

Vj g"r j krquqr j gt "Tqdgtv'P q| kemij cf "uqo gyj kpi "vq"uc { "qp" yj g"uwdlgev0P qv'cdqw yj g"Crr j c"Drqpf kg." y j kej "Kf qwdv'j gøu"ht gs wgpvgf ." pqt "cdqwv'O qtqeecp" j cuj ." y j kej j g"o c { "qt "o c { "pqv'j cxg"uo qngf 0'Dw'P q| kemi'f kf "vj kpmi'nqpi "cpf "j ctf "cdqww'y j g tgrcvkqpuj kr "dgwy ggp "j gf qpkuo "cpf "j crr kpguu0" J g "qpeg "f gxkugf "c "vj qwi j v gzr gtko gpv'ecngf "yj g"Gzr gtkgpeg"O cej kpg0

Ko ci kpg "yj cv"õuwr gtf wr gt "pgwtqr u{ej qnqi kuniö "j cxg "hki wtgf "qww"c "y c{ "vq unko wrcvg"c"r gtuqpøu"dtckp "kp"qtf gt "vq"kpf weg"r ngcuwtcdng "gzr gtkgpegu0"Køu"r gthgevn{ uchg. "pq "ej cpeg "qh"c "o chwpevkqp. "cpf "pqv"j cto hwn"vq "{qwt "j gcnyj 0"[qw"y qwrf gzr gtkgpeg "eqpuvcpv'r ngcuwtg"hqt "yj g"tguv'qh"{qwt "rkhg0Y qwrf "{qw'f q"kwAY qwrf "{qw

r nwi 'kpvq''yi g'Gzr gtkgpeg'O cej kpgA

Kh"pqv."cti wgf "Pq|kem"yj gp"{qwøxg"lwuv'r tqxgf "yj cv''yj gtg"ku"o qtg"vq"nkhg"yj cpr ngcuwtg0Y g"y cpv''vq"cej kgxg"qwt"j crr kpguu."cpf "pqv'lwuv'gzr gtkgpeg"kv0Rgtj cru'y g gxgp "y cpv"vq "gzr gtkgpeg "wpj crr kpguu. "qt "cv"ngcuv"ngcxg "qr gp "yj g "r quukdkrkv{ "qh wpj crr kpguu."kp"qtf gt"vq"vtwn{"crr tgekcyg"j crr kpguu0

 $Tgi\ tgwcdn{``K'hkpf''o \{ugnh''kp''ci\ tggo\ gpv''y\ kyj''P\ q|\ ken0''K'y\ qwrf''pqv''r\ nwi''o \{ugnh\ kpvq''yj\ g''Gzr\ gtkgpeg''O\ cej\ kpg. "cpf''yj\ gtghqtg''K'y\ km''pqv''dg''tgnqecvkpi''vq''yj\ g''Cnrj\ c\ Dmpf\ kg''Eqhhgg''Uj\ qr\ 0'Y\ j\ kej''ku''c''uj\ co\ g0'F\ kf'''K'o\ gpvkqp''j\ qy''uo\ qqvj'''yj\ g''O\ qtqeecp\ j\ cuj''kuA$

Vj g"pgzv"o qtpkpi ."o { "o kpf "O qtqeecp/htgg."Ko cng"o { "f ckn{ "vtkr "vq" yj g"Y F J 0'K o gpvkqp"o { "rkwg"gzr gtko gpvkq"Xggpj qxgp0J g"crrtqxgu."qh"eqwtug0Kp"hcev."y j gp"K i cf "bktw"r glovaf "gwy'i cy'o cp{ "gh'yi g"ceykykkqu" yi cy'yi g"F wei "gni ci g"kp"t gi wettf

j cf "hktuv"r qkpvgf "qwv"yj cv"o cp { "qh"yj g"cevkxkkgu"vj cv"yj g"F wej "gpi ci g"kp"tgi wrctr(. uwej "cu"r tqurkwwkqp"cpf "f twi u. "y qwrf "i gv"o g"cttguvgf "kp"vj g"Wpkxgf "Uvcvgu. "j g"Iwuv uo krgf "un(n{ "cpf "uckf. "ōK'mpqy OGplq{0o

Xggpj qxgp "uc{u"yj g"f cvcdcug"o ki j v"rtqxkf g"uqo g"cpuy gtu"vq "yj g"ci g/qnf s wguvlqp<"Ku"r ngcuwtg"yj g"uco g"cu"j cr r kpguuA"Chvgt "c"hgy "f ki kxcn"f gvqwtu. "K'hkpf "c r cr gt "yj cv'Xggpj qxgp"j ko ugrh"y tqvg0'Køu"ecmgf "õJ gf qpkuo "cpf "J cr r kpguu0ö''Ktgcf yj g"cduvtcev0

$$\label{eq:continuity} \begin{split} &\tilde{o}Vj \; g"tgrc kqp "dgw \; ggp "j \; cr r \; kpguu"cpf "eqpuwo r kqp "qh"uvko wcpu "hqmqy u"cp kpxgt vgf "Wewtxg0"Ur qkn'ur qt w"cpf "i w| | ngtu"ctg"nguu"j \; cr r { "vj \; cp"o \; qf \; guv'eqpuwo \; gtu0 i \; Kp "qy \; gt "y \; qtf u. "cu "y \; g "cpekgpv"I \; tggmu "eqwpugngf "c "hgy "y qwucpf "{ gctu "ci q. gxgt { vj kpi "kp"o \; qf \; gtc kqp0"Ktgcf "qp"cpf "ngctp"vj \; cv'õugxgtcn'uwf kgu"j \; cxg"qdugtxgf "c r qukkxg "eqttgnc kqp "dgw \; ggp "r gto kuukxg "cwkwf gu " vqy ctf u " ugz " cpf " r gtuqpcn j cr r kpguu0 i "Rt guwo cdn{ . "vj \; gug "r gto kuukxg "j \; cr r { "r gqr ng "ctg "pqv"vj g "uco g "j \; cr r { r gqr ng "y j q"ctg"cwgpf kpi "ej wtej "tgi wnctn{ 0Cu"hqt"f twi u. "c"3; ; 7"uwf { "hqwpf "vj cvô pq "uwtr tkugô wug "qh"j ctf "f twi u" vgpf u" vq "f getgcug"j cr r kpguu"qxgt "vko g0"Dw'y j cv cdqww'uqhv'f twi u. "rkng. "uc{ . "O qtqeecp"j cuj A"Ki'wtpu"qwv'vj cv'vj gtg"j cu"dggp "rkwrg tgugctej "kp"vj ku"ctgc0 } \label{eq:continuity}$$

J qy "cdqwl'y cv."K'y kpm"uy kxgrkpi "cy c $\{$ "htqo "y g'eqo r wgt "o qpkqt0Ncuv'pki j v cv"y g"Crr j c "Drqpf kg "Eqhhgg"Uj qr . "qp "y g"xgt $\{$ "htuv"rgi "qh"o $\{$ "lqwtpg $\{$. "K'y cu gpi ci gf 'kp'ewklpi /gf i g'j cr r kpguu'tgugctej 0Y j q'mpgy A

Kớu "o { "heuv" f c { "kp" T qwet f co 0C" hạt i gwed ng "ek { "dww" qpg" yi c v" K'y km" o kuu "pap gyj grguu 0 Kớu "vko g" va "uc { "i qaf d { g" va "X ggpj qxgp. "cpf "K'co "pgxgt "i qaf "c v"i qaf d { gu0" K'yj cpm j ko "hạt "cm" qh" j ku "j grr. "hat "cm" qh" j ku "drkuu hwr! f c vc0" Vj gp. "cm quv" cu "cp" chượt yi qwi j v. "K r cwug" c v' yj g" f qat "cpf" uc { . "õ K'o wuv" dg" y qpf gthwn' y qt m kpi "kp" yj g" h kgrf" "qh" j cr r kpguu uw f kgu0 o

Xggpj qxgp'hqqm'r gtr gzgf 0°6Y j cv'f q''{ qw'o gcpA°6

 $\label{eq:control_problem} \begin{picture}(2000) \put(0,0){\line(0,0){100}} \put(0,0){\line(0,0){1$

õPq. 'pqv'tgcm(0i

$$\label{eq:continuous} \begin{split} & \| \mathbf{p} \|_{\mathbf{q}} \|$$

 $\label{eq:continuous} \begin{tabular}{l} $\tilde{q} = 1$ & $$

Klwuv'uvcpf "y gtg'hqt'c'o qo gpv.'uwppgf 0J gtg'Ky qwi j v'Xggpj qxgp'y cu'c'hgmqy vtcxgrgt.''c'eqo tcf g'kp'y g'j wpv'hqt''j crrkpguu.''dw'k'wtpu'qwv'y cv.''cu''y g{ 'uc{ 'kp''y g Uqwj .''j g'j cu''pq'f qi 'kp'y ku'j wpv'\Qt.''kh''{qw'rtghgt.''Xggpj qxgp'kupøv'c'rrc{gt'kp''y g j crrkpguu''i co g="j gøu"y g "tghgtgg. "nggrkpi "ueqtg0'Cpf ."rkng"cp{ "i qqf "tghgtgg. "kv o cwgtu''pqv'qpg''y j kv''q''j ko "y j q''y kpu''y g''i co g0'J crrkpguu''qt''f gurqpf gpe{ .''kwju'cm y g''uco g0'Cu''nqpi ''cu''qpg''ukf g''rtgxcknu0

 $\label{thm:control_c$

 $\label{eq:Ktgcrk} Ktgcrk g"yi cv"o { "xkukv"vq"yi g"Y FJ "y cu"c "hkpg"uvctv"dw"cp "kpeqo r rgvg"qpg0 P qy j gtg"co qpi "yi g"gki j v"yi qwucpf "uwwf kgu"cpf "tgugctej "r cr gtu"f kf "K"hkpf "cp{ o gpvkqp"qh"yi g"j cr r kpguu"c "pcvkqp"f gtkxgu"htqo "kxu"ctvu. "yi g"r rgcuwtg"ceetwgf "d{ j gctkpi "c"r ctvkewrctn{ "rqxgn{ "r qgo "tgcf "crqwf "cpf "y gm "qt"d{ "y cvej kpi "c"f ctpgf i qqf "o qxkg. "ceeqo r cpkgf "d{ "c"wd "qh"r qr eqtp. "pq"dwwgt0"P qt "f qgu"yi g"f cvcdcug tgxgcn"cp{yi kpi "cdqw"yi g"kpxkukdrg"yi tgcf u"yi cv"dkpf "c "hco kn{0"Uqo g"yi kpi u"ctg dg{qpf "o gcuwtkpi 0}$

 $\label{thm:continuity} $$ Uq''Keqpuntwev'o { 'cvrcu''qh''drkuu.''o { ''tqcf''o cr''qh''j crr' kpguu.''dcugf''r ctvn{ ''qp''T www Xggpj qxgpøu''f cvcdcug''cpf''r ctvn{ ''qp''o { ''qy p''j wpej gu0'Tkej ''qt''r qqt.''j qv''qt''eqnf. f go qetce{ ''qt''f kevcvqtuj kr.''kv'o cwgtu''pqv0'Ky knihqmqy ''vj g''j crr' kpguu''uegpv'y j gtgxgt kv''ngcfu0} $$$

 $Y \; kj \; "o \; \{ \; "cvrcu"kp "j \; cpf \; ."K'dqctf \; "ý \; g "vtckp "cv"Tqwgtf \; co \; "Egpvtcr0'Cu"ý \; g "vtckp \; dgi \; kpu"vq "tqm"cpf "ý \; g "F wej "eqwpvt \; \{ukf \; g "i \; nkf \; gu"d \; \{ \; ."K'hggn"cp "wpgzr \; gevgf "ugpug "qh tgrkgh0'Htggf qo "gxgp0'Htggf qo "htqo "y j cvA"K'ecpøv"ko ci kpg0'O \; \{ \; "xkukv'y \; cu"hkpg0'K \; f tcpm'uqo \; g "i \; qqf "dggt . "uo \; qmgf "uqo \; g "hkpg"j \; cuj \; ."cpf "gxgp "mgctpgf "c "ý kpi "qt "w \; q \; cdqwv'j \; cr r kpguu0$

 $Pq."ij g"F wej "y c { "ku"pqv'hqt "o g0"Rgtj cr u"o { "pgzv'f guvkpcvkqp"ku"ij g"qpg0"Koj gcf kpi "vq "c "eqwpvt { "y j gtg "ij g "vtckpu"twp "qp "vkog."ij g"uvtggwu"ctg "engcp. "cpf vqngtcpeg."ikng"gxgt { ij kpi "gnug."ku"f qngf "qwv'ectghwn{ ."kp"o qf gtcvkqp0"Kco"j gcf kpi "vq Uy k\| gtncpf 0 }$