

jftfj /of Joj :yfkgsf lfgdf n\Estfsf ; jfnx?

n\Estfnf0{larf/ ug{xf]eg]dlxf tyf k?ifaf/f ul/g]jgsf]kpf] tyf Joj :yfkgsf
leG-leG k\$[tsf xG5g\h; sf]; xl klxrfg u/L ; Daf]wg xg' cToGt h?/L 5 .

jg Joj :yfkgsf tyf kpf]nf0{lgodg ug]; :yfx\df k?ifx\sf thgdf dlxfx\sf]
kxT sd xG5 . olt xbf-xb}klg ; fdbflos jg ; DaGwl ; E7gx\sf lgOfG ug]
; ldltx\df dlxf ; xeflutdf ul/Psf]clej [4af6 jg ; DaGwl ; Zf; g tyf ; f]x\sf]
lbuf]kgdf ; wf/ ePsf]b]vPsf]5 . ; fdbflos jg pkef]mf ; dx tyf tl ; dx\sf
lgOfG ug]kx\df olb dlxf 5g\eg]To; sf kl/Ofd thgf]ds \kdf p]s[6 5g\
ljZj a\$sf cg; f/ jg; u ; DaGwt ; dbfox\df dlxfx\n]jgaf6 cfk]gf]cfDbfglsf]
) ? cfhG u5G\hals k?ifx\n]o; sf] Ps-ltxf0 dfq cfhG u5G\
ult]lwx\af6 xg] cfDbfgl jgdf cyjf jgsf] glhs a; f]af; ug] u]dlOf
3/-kl/jf/x\df kl/jf/sf]h]df cfDbfglsf] sl/a Ps-k-rfzlx; f xG5, dlxfx\sf
thgdf k?ifx\n]a9L of]ubfg u5G\lsgeg]ltgsf ult]lwx\af6 cfo cfhG xG5
hals dlxfx\ lgj]d\vl ult]lwx\df a9L ; m]lg xG5g\ k?if tyf dlxfx\n]3/-
kl/jf/x\df of]ubfg k?ofpg]jg ; DaGwl lj ifosf] c]l]bog ubf{To:tf ult]lwx\sf]
dx]dj dfly ; fj wfglk] \$ lj rf/ ug{cfj Zos xG5 .

t/ ljleG c]l]bog Pj+cg; Gwfg / ; dbfodf cfwf/t jg Joj :yfkgsf k4ltx?df
dlxfx?df lglxt jg ; DaGwl] 1fg, l; k / cge]nf0{vf; }dxTj lbPsf]kf0bG . jg
Joj :yfkgsf nflu dlxfx?n]v]h]sf]el]dsf tyf pglx?sf]hl]j sf]k]hGdf ; wf/ Nofpg
jg dfl]ysf]lge{tfnf0{klg c]l]bog cg; Gwfgdf k]fo ; d]6Psf]kf0bG . ljZj sf ljleG
b]zx?df s]if lfgdf n\Estfsf ; jfnx?nf0{hf\$ lbOPtf klg jg lfgdf eg]oy]6
?kdf o:tf kpf; x? xg cem}afsl 5 . c]t/f]6 tyf /f]i6 kl]ta4tfsf cfwf/df
dlxf / k?iflarsf]; fdf]hs leGtfnf0{; Daf]wg ug]kpf; ePtf klg ljz]f]tM jg
lfgdf Gofof]rt Joj :yfsf]sfof]og Pp6f 7hf]rgf]lsf]?kdf /x\$]5 . To; df klg
hnjfo' kl/jtGhGo ; jfnx?sf] sf/Ofaf6 dfgj lxt, ; dtf, ; AfOf / lbuf]lj sf;
; DaGwl cjwf/Ofdf klg cfdh kl/jtG cfPsf]5 . t; y{jg lfgdf ljBdfg n]Es
; jfnx?nf0{; Daf]wg ub]jgsf]lbuf]Joj :yfkgsf ; lglZrt ug{dxTj kOf{lj ifo ag\$]5 .

jtdfg cj:yfdf nf\$tg tyf ljs]bl]s/Ofsf]sf/Ofaf6 ljleG lsl; dsf ; 3, ; :yf
tyf JolQmx?nf0{cfk]gf]OR5f tyf rfxgxf? JoSt ug]cj; / k]kt ePsf]5 . j]h]ds
?kdf cfPsf]; fdf]hs tyf /fhgl]ts kl/jtGaf6 jg lfgdf klg n\Estfsf
; jfnx?nf0{; Daf]wg ub]hfg]dxTj kOf{cj; /sf]l; hGf ePsf]5 . ; AfOfdf dlxf

tyf lk5l8Psf ju\$]cyk0f{/ ; lqmo ; m\lgtfsf]k]46 ugfn]pglx?sf]clwsf/ dfq ; lglZrt ub5 ; Af0fdf kefj sl/ tf / lbuf]kgf a9fpg klq plQs}; xof]u klb5 e6g] tVo kdfloft e0; s\$]5 . ; fy}pglx?sf] ; xeflutfaf6 ; zf; g, nfesf]aff8kmf8 / jgsf]lbuf]Jo]y:fkqdf pNn\vglo ; wf/ Nofpg d2t ub5 . dlxf tyf lk5l8Psf ju\$]f0{cfkm]f]hljg / cfkm'lge{/x\$]k]s[ts ; f]sf]Jo]y:fkqdf c; / k%ofpg] x/\$ lsl; dsf lg0f6 k\$]fdf ; m\lg /xg]k0f{clwsf/ x65 . t/ o; cj:yf ; lglZrt ug{Toxf"b]vPsf, ef]uPsf / dxz'; ul/Psf n]Estf ; DAfGwl ; jfnx?sf]; xl ?kdf klxrfg u/l Itgsf]; Daf]wg xg'h?/L 5 . To; h]jg Ifq; u ; DaGwl ljleG clWbog Pj + cg; Gwfg ubf{o:tf ; jfnx?sf]; dfo]hg ug{ckl/xfo{ePsf]5 . o; af6 dlxf tyf lk5l8Psf ju\$]ef]u\$] jf:tlj s ; jfnx?sf]klxrfg e0{pglx?sf clwsf/ ; Af0f ug{ / hlj s lj]wtf ; Af0fdf ol ju\$]g]Tj lj sf; ug{d2t klb5 .

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- ; f]xg >]7

:j]l0f@ cgkft / lknaft]fls; qnd

sIf (df k9d]Ps hgf 5fqfn]; fdf]hs ; ~hfn km] a'sdf Pp6f l:y]lt /flvg\h; df n]vPsf]lyof] “s]tkf0{sg}lj bzl efiffsf]sIf ln0/xgePsf]5 <”

(“Are you taking any foreign language classes?”) h; sf]dlg To; sf]pQ/ n]vPsf]lyof] “xf] uloft ũ”

(“Yes, maths!”)

xfdlDwb]w]m] ulOfTnf0{ “dg gkg[ljifo” egšf] ; gšf 5f)xf]hf . cyjf sltkon] ulOfTnf0{“galemg]eriff” jf “s?k ljifo” egšf]klg ; gšf 5f)xf]hf . o; sf]Pp6f sf/of ulOfTsf] Jojxfi/s pkof]utfsf] af/df ePsf] cgle1tf xg ; Sb5 . t/ s] jf:tjd}ulOfT olt s?k 5 t < :j lOfđ cgkftsf]af/df yxf kfP kl5 ; fob tkf0šf] ulOfTnf0{xg]b]6sf]of kl/j tđ xg ; Sb5 .

s]xf]t :j lOfđ cgkft (Golden Ratio)<

:j lOfđ cgkft Ps ulOfTlo cgkft xf]h; df 7hf]dfg / ; fg]dfgsf]cgkft, 7hf] / ; fg]dfgsf] of]ukm / 7hf]dfgsf]cgkft; # a/fa/ xG5 . cyfš olb “a” / “b” qmđZM 7hf] / ; fg]dfg xg\eg] “a” / “b” sf]cgkft; # “a + b” / “a” sf]cgkft a/fa/ xG5 . of]:j lOfđ cgkftnf0{a / b = (a + b) / a

:j lOfđ cgkftnf0{luš c]f/ kmf0 (Phi : φ) n] hgf0G5 h; sf] gfdfs/of lkm]bof; (Phidias) gfdS d[šf/sf]gfda6 ePsf]xf]h; n]cf^gf]d[Lđf of]cgkftsf]kpf]u u/šf]dfGotf 5 .

:j lOfđ cgkftsf]Pp6f lj|zi6 uOf of]xf]ls of]dfgnf0{o; s}cfwf/df kl/eflft ug{ ; lsG5 (φ = 1 + 1/φ) hg leGgsf]?kdf cgft; Dd hfg ; Sb5 (φ = 1 + $\frac{1}{1 + \frac{1}{1 + \frac{1}{\dots}}}$)

:j lOfđ cgkftsf] of] ; lds/of (φ = 1 + 1/φ) nf0{ ; fdfGo j u{ ; lds/ofsf] ?kdf ?kfGtl/t u/l xn ug]xf]eg] φ sf]dfg $\frac{1+\sqrt{5}}{2}$ cyfš sl/a !=!*)# = xG5 .

lkmaf]f]S; qmđ (Fibonacci Sequence)M

lkmaf]f]S; qmđ Ps ulOfTlo >[vnf xf]h; sf qmddf ePsf ; Wofx? ; w}qmđsf] cl3Nnf b0{ ; Wofx?sf]of]ukm; # a/fa/ xG5 . lkmaf]f]S; qmđsf ; Wofx? M), !, !, @, #, %, *, !#, @!, #\$, %%, *(, !\$\$, @##, #&&=

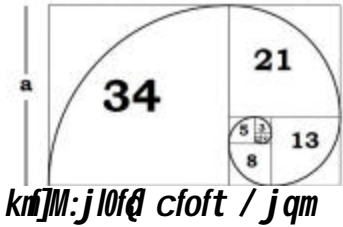
lkmaf]f]S; qmđsf]p]klQ M

lkmaf]f]S; qmđsf] gfd !@cf}ztfAb]sf ulOfT1 Inof]gf]f] lkmaf]f]S; (Leonardo Fibonacci) sf] gfda6 /flvPsf] xf] . ulOfTlo 7šfsf] ?kdf lkmaf]f]S; Ps jifšf] cGt/ndf Ps hf]8 v/fof]šf] ; Gtfg p]kfbg sg ?kdf a[4 x5]hfG5 eG]s/f yxf kfgp rfxGy]. pgn]of]qmddf s]dfGotf /fv]eg]Ps hf]8 v/fof]h]Ps dlxgdf jois eP kl5 csf]Ps hf]8 v/fof]hf0{hGd lbg ; Sb5 . h:t}hgj/Ldf Ps hf]8 v/fof]h]Gdof]eg]lOf]v/fof]km] /Ldf jois e0; S5 / csf]dfr]df csf]Ps hf]8nf0{hGd lbg ; Sb5 . Itglx?n]km] / ; Gtfg p]kfbg ubšgV clk]hdf gofFhf]8nf0{hGd lbg ; Sb5g\ of]qmđ rln/xG5 . of]qmđnf0{k5dfpb}hfg]xf]eg]hgj/Ldf h]GdPsf]

hf]8n]hg; Dd cf0kUbf * hf]8 v/fof]x? hDdf e0; s\$}f xG5g\ . dlxgf}lbg; Dd klg
sg}v/fof]x?sf]d[o' ePg eg] dfGg]xf]eg]of]qmd o:tf]b]vG5 M !, !, @, #, %, * ,
!#, @!, #\$, %%, * (, !\$ \$= . lkmaf]f]S; sf]of]qmdsf]k}dV lj z]ftf s]xf]eg] o; df
ePsf x/\$; \fofx? cluNnf]b0{; \fofx?sf]of]ukm xf].

:j]l0f]d cgkft / lkmaf]f]S; qmdsf]; DaGw M

lkmaf]f]S; qmd x}f{lgs}; fdfGo n]lU5 . t/ j }flgsx?n]
of] ; fdfGo h:tf] n]lUg] qmdnf0{dlbog ub{x}hf}f ; g}f]f]
qmdsf] ?kdf lj sl; t u/]. of] qmdn] ubf{pglx?n] x/\$
; \fofnf0{ltglx?sf] k}x{ ; \fofn] efu u/l x}].
o; f] ubf{cl3Nnf s}x glthfx?df To:tf] lj z]f
s}x b]vGg . ! nf0{! n]efu ubf{! . @ nf0{! n]
efu ubf{@ . # nf0{@ n]efu ubf{!=% . t/ hit qmdx? a9b}hfG5 s}x crDdsf
glthfx? cfpG yfNb5 . % nf0{# n]efu ubf{!^ . * nf0{% n]efu ubf{!^ . !#
nf0{* n]efu ubf{!^@% . @! nf0{!# n]efu ubf{!^!% . ol cgkftsf dfgx? crDd
kf/fn]!^!* sf]j]l/kl/ 3Db5 hg :j]0f{cgkftsf]dfg; # em08}em08)a/fa/ xG5 -t/
slxNo}7dfSs}:j]0f{cgkft; # a/fa/ xG5 . of]cgkftsf]dfgnf0{:j]l0f]d d]lUbs jf
cnf]ss cgkft (Golden ratio or divine ratio) eGg yf]nof]lsgls cGj]f0fx?; #}of]
cgkft k\$[tdf hxlExlFb]vGg yf]Nof]. To; h}lkmaf]f]S; qmd / :j]l0f]d cgkftsf]alr
glhssf]; DaGw 5 . b0{qmd} # cfPsf lkmaf]f]S; ; \fofx?sf]cgkftsf]dfg / :j]l0f]d
cgkftsf]dfg neueu a/fa/ xG5 .



:j]l0f]d cfoft / :j]l0f]d j]qmM

:j]l0f]d d]lUbsf]af/]df yxf k}P nuQ}ul]sx?n]:j]l0f]d d]lUbsnf0{:j]l0f]d cfoft agfpg
k}f]u ug{yfn]h; df Pp6f ehfsf]dfg ! Psf0 x}f csf]ehfsf]dfg !=^!* Psf0
xGyof]jf Pp6f ehfsf]dfg lkmaf]f]S; qmdsf]dfg x}f csf]ehfsf]dfg To; }qmdsf]
csf]dfg xGyof]. of]cfoftnf0{ul0ftlo ?kdf ; a}Gbf /df]; Argf dflgGyof]/ ejgx?
cflb agfpg w}g}k}f]udf cfpYof]. kfy}f]g (Parthenon) x?n]:j]0f{cfoftsf]; Sbf]
k}f]u u/]h:t}0lhk6sf]lk/flD8df klg o; sf]cf^g}cnf]ss cgkft e]G5 . olb
lk/flD8sf]cfwf/nf0{! Psf0 dfGg]xf]eg]o; sf]58\$]ehfx?sf]dfg !=^!* Psf0 xG5
/ o; sf]prf0 !=^!* sf]ju{# a/fa/ xG5 . clxn]klg w}g}snfsf gd}fx?df of]
cgkftsf]k}f]u ePsf]b]vG5 . t/ j]qmsf]af/]df rflx s]eGg ; lG5 t < crDd t s]
eg]lkmaf]f]S; sf]qmd j]qmdf klg ToIt g}k}f]sf/l ?kdf b]yf kb5 . tl lkmaf]f]S;
qmdx?sf]cfwf/df tof/ kfl/Psf]cfoftx?sf]sgfx?af6 rfk sf]uof]eg]o; n]j]qm
l; h}f ub5 h; n]lkmaf]f]S; sf]qmdnf0{g}k5dfpb5 . of]j]qmf0{:j]l0f]d j]qm (Golden
curve) e]G5 hg k\$[tdf :j]0f{cgkftx? e}h}lx-tlx e]G5 .

:j]l0f]d k\$]t M

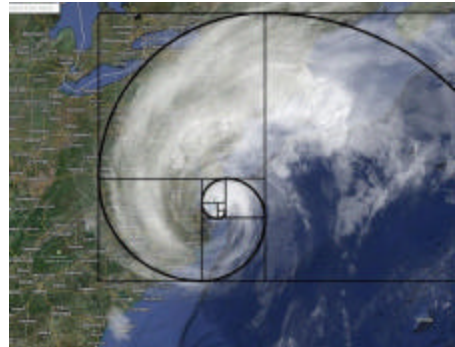
shfP/ xg]xf]eg]k\$[tdf hxlExLF:j l0f0 cgkft, :j l0f0 dWos / :j l0f0 j qm? b\yf kb5 . o; n] ubf{ k\$[t g}:j l0f0 ePsf] efg xG5 . lkmaf\$gf; Lsf] qmd / :j l0f0 cgkftaf6 lj 1fg, ul0ft, snf, 0l-hlgol^a, cyzf:q sg}klg lfg c5'tf]/xg ; s\$] 5g . lkmaf\$flS; qmdsf] pTKlQ dWosflng ; dodf v/fofx?n]; Gtfp pTKfbg s; /L u5g\efg]lj ifosf]Ps ul0ftlo 7\$fsf]pkh xf]. t/ of]ul0ftlo v\haf6 l; h0f ePsf] ; qn]?vx?df xg]kftx? tyf km\$; f]gnlx?sf]; Argf b\lv lnP/ 0lhK6sf]lk/fld8 / ull; sf]kfyf]gsf]agf0 cflbsf]; d] JofVof ug{d2t ub5 . :j l0f0 j qmf0{sfpnlsf] a[4, s6x/sf]cfj /of, ; 00\lsf]alpmx? cflbdf b\lg ; lsG5 . k\$[tdf sg}klg j:tx? ; ul7t ?kdf /xg lkmaf\$flS; j qmsf]qmdnf0{g}k5dfpb5 . pbfx/0fsf]nflu ; 00\lsf] alpmx? Yff7}7fPdf w7}c6fpg :j l0f0 j qm qmdnf0{g}k5dfpg' kg]xG5 . alpmx? hDdf eP/ a:gnf0{; a0ebf /fd] tl/sf Ps rqmdf sl/a !=^!* cf0f alpmx? xg' kb5 . alpmx?sf]; Vof k0f{; Vofsf]?kdf xg]xgfn]alpmx? Ps rqm kZrft aflx/lt/ km]lg yfNb5g\ o; n]:j l0f0 j qmf0{kltlglw]j ub5 oxFDd ls cfsfzuuf h:tf]eldsfo s'/sf]; Argf b\lv lnP/ hljx?sf]j zfgut uof lgwf{0f ug]; [d l8PgP (DNA) ; d] :j l0f0 cgkftaf6 c5'tf]/x\$]5g . k\$[tdf o; sf]Jofkstfnf0{dWogh/ ug]xf] eg]; f/f a\df08 g}:j l0f0 cgkftsf]j l/kl/ 3d\$] efg xG5 . oxl sf/0fn] ubf{ 0ltxf; df :j of{cgkftn] h; /L c6o sg} klg ul0ftlo ; Vofx?n] sg} klg olusf lj rf/sx?sf]Wofgfsif0f ug{; s\$]5g .

k\$[tdf :j l0f0 cgkftsf pbfx/0fx? M

cfsfzuuf (Galaxy):

3dfp/f]cfsf/df ePsf]cfsfzuufsf]cfsf/n]; d] lkmaf\$flS; Lsf]qmdnf0{k5dfpb5 .

Milky Way cfsfzuufdf sof}3dfp/f ehfx? 5g\hg Ps csf{ u sl/a !@ l8ullsf] sf0fdf kl/qmdf ul//x\$] 5g\ . /f]s ?kdf 3dfp/f (spiral) cfsfzuufx?n] 6obgsf] efl]ts lj 1fgsf]l; 4fGtsf]lj?4df sfo{ub5 . ; g\!(@% lt/ g}j }flgsx?n] s] s'/sf] x\$]sf /fv\$] lyP eg] cfsfz uufsf] 3dfp/f] efusf] sf0flo rfn (angular motion) s]b0]v]sf]b/L; u}km/s xG}hfg] xgfn] cfsfzuufsf] 3df0; u}cw{of; lo ehfx? (biradial arms) klg 3ld0}uPsf] xgk5{. of]; u} cfsfzuufsf] slx 3df0 kZrft, 3dfp/f ehfx? cfsfzuufsf] j l/kl/ 3Dg' kg] xf] . t/ To:tf] xG . efl]ts lj 1fgsf]of]; d:ofnf0{"3dfp/f]; d:of" (Winding Problem) elgG5 . of] cj:yfdf aflx/ /x\$] tf/fx? ; f]e0f a9l tlj|ultdf /x\$] b\lvG5, hg a\df08sf] clatlo k\$[t xf]h; n]a\df08sf]cfsf/nf0{Jojl:yt ul//Vg d2t ub5 . cflw-a]lsf] km]fj 6sf]qmdn]; d] lkmaf\$flS; sf]qmdnf0{cflst ub5 .



km]cflw-a]lsf]km]fj 6df :j l0f0 j qm

khgg ultzlnf (Reproductive Dynamics):

df\lx?sf] xsdf loglx?n] c6o /f]s tj/af6 klg lkmaf\gf]S; sf] qmndnf0{k5\pfPsf] x65 . Ps lj|zi6 pbfX/0fsf]?kdf ; d\kdf efn]df\lx?sf]/ kfyL df\lx?sf]; \ofsf] cgkft sl/a !=^!* x65 . of] afx\$ df\lx?sf] j z j [fn] klg oxL 9fFfnf0{df\otf lb65 . efn]df\lsf]Ps hgf dfq cleefj s x65 -Ps kfyL df\l_ t/ kfyL df\lsf]b0{ hgf cleefj sx? x65g\ -Ps efn]df\l / csf[kfyL df\l_ . To; h] j z j [fdf efn] df\lsf]lkt[: \ofsf]qmd @, #, % / * x65}hf65 eg]kfyL df\ldf lkt[: \of @, #, %, *, !# x65}hf65 . of] afx\$ df\lsf]zl//n]; d] : j l0f\ cgkftnf0{/fd]}; u kfnf u/\$f] b]v65 .

hljx?sf]z// (Body of an Animal) M

cgxf/sf cux? afx\$ xdf] zl//sf c6o efux?df ePsf cgkftx? ; d]n]lkmaf\gf]S; qmndnf0{df6b5 . pbfX/0fsf]nflu, gf06f]b]v hldgsf]; txsf]gfk / 6fpsf\$]zlif{efu b]v gf06f]; d]sf]gkfs]cgkft : j l0f\ cgkft xf]. c6o hgj/x? h:t}; f] -cf\, kv\ / kR5/x?sf]cgkft_, tf/\df5f, ; d6b] sf\mf] sldnf / df\lsf]zl//df klg olx s'f nfu' ePsf] b]v65 . dflg; x? cf\fx?sf]cfwf/b]v gfl8; Ddsf] gkfs]km/s dfkg ug[xf]eg]: j l0f\ cgkfts]dfg; u a/fa/ b]v kb5 . To:t}x]s]hf / s0gf; Ddsf]efus]cgkft klg sl/a !=^!* g}x65 .



kn]xftdf : j0f{cgkft

cgxf/x?sf]agf6 (Formation of Faces)M

dfgjlo tyf cdfgjlo b\}k\fltx?sf]cgxf/df : j l0f\ cgkft e6g ; ls65 . dfgj cgxf/df dv / gfs ePsf]: yfg cf\ / lr\8f\$]: j l0f\ cgkfts]efu; u l7Ss dh vfg hf65 . oxL tj/sf]cgkft cf\ / gfss]efudf ; d] kfg ; ls65 . xfdlnf0{ yxf 5 ls x/\$ dflg; x?sf]zl//sf]agf6 km/s-km/s x65 . t/ cf}t hg; \ofsf] cgxf/sf]cgkftn]Phi sf]lglZrt dfgnf0{k5\dfpb5 . of]vf]hsf]cfwf/df of]klg elgPsf]5 ls hlt dflg; x?sf]cgxf/df ePsf cux?sf]cgkft Phi sf]dfgsf]glhs x65 ; f]dflg; x?sf]cgxf/ TolQ g}cfsif\$ x65 . pbfX/0fsf]nflu, ; a}e6b ; 6b/ d':sfg [of]xf]h; df sl6b\ sf6g]bf\ (incisor) 5\pmsf]incisor e6b !=^!* Psf0n] rf\ x65 hg n5g]bf\ (canine) e6b !=^!* Psf0n]rf\ x65 cflb . dfgj sf] lj sf; qmd tyf dl:tis k\ffnlsf]b]6sf\af6 xg[xf]eg]xdf]zl// o; /L ul7t ePsf] 5 ls o; n]k\0n}lkR5]: j l0f\ cgkftnf0{df6b5, hg : j :y zl//sf]kl]ts klg xf]. To; h] ul0ft1x?sf] efiiddf ; \$; lko/sf] “Beauty lies in the eye of beholder” ?kftl/t eP/ “Beauty lies in the phi of beholder.” ePsf]5 .

kf73/ (Uterus)M

a\Nhodsf]lj Zj lj Bfno c:ktfn lnpe\sf Ps :ql/f\ lj z]f1 h]k/ e\6\sf]cg; f/ o; sf]lqcfoldc cj :yfx?sf]cfwf/df kf73/ :j :y 5 jf 5\ eg]s/fsf]lgSofh ug{ ; ls65 lsgls ol tlg}cfofdx?sf]cgkft :j l0f6 cgkft; # d]h vf65 . of]vf]hsf] qmddf %))) lj le6g pd]sf dlxnf?sf] kf73/sf] nDaf0 / rf8f0sf] cgkftnf0{ cN6k; fp08sf] df\Wodaf6 dfkg ul/Psf]lyof]. of]cgkftsf]dfg h6d6f @ x65 hg pd]; #}36] !-\$^sf]xf/fxf/Ldf k\B5 . 8f= e\6; \of]vf]haf6 lgs}g}rlst ePsf lyP ls dlxnf? ; a66f al9 khgg of]o ePsf]cj :yf -!^ b]v @) j if{ df kf73/sf] nDaf0 tyf rf8f0sf]cgkft !=^ x65, hg :j l0f6 cgkftsf]lgs}ghs 5 .

zw]s/fsf]vk6f (Shells of Snails)M

:j l0f6 j qm cyf{ logarithmic spiral k\$[tdf Jofkt 5 . zw]ls/fx?sf]vk6fdf of] logarithmic spiral b]vg ; ls65 . of]dfgjx?sf]leql sfgsf] cochlea tyf s\l e8f-afv\fx?sf]3ldPsf]l; # / dfs/fsf]hfnf6f ; d] b]vg ; ls65 .

?vsf xf6fx? (Branches of Trees)M

?vsf xf6fx? 6lqmg]tl/sfdf klg lkmaf6fS; L qmd nfu' x65 . ?vx?df k6v sf08 lj sl; t eP kl5 sg}cj :yfdf uP/ of]xf6ug yfNb5 h; af6 b0{cf6f a9g]la6bx? lg:s65g\ . To; kl5 gofFknfPsf xf6fx? d\W6f]Ps xf6faf6 kgM csf]xf6f lj sl; t x65 ha ls of]cj :yfdf csf]xf6f eg]l:y/ b]v65 . of]qmd x/\$ gofFlj sl; t xf6fx?df b]vf kb5 . of]qmddf xf6fx? lj sl; t xg]qmd lkmaf6fS; Lsf]qmd; # d]h vf65 . Sneezewort gfdS lj ?jfdf of]qmd lgs}:ki6; #n]b]vf kb5 . h/fsf]a9g] klqmf ; fy}cNulx?df ; d] of]qmd o; /l g}b]vf kb5 .

:Nnfsf]kmx? (Pine Cones)M

; Nnfsf]kmx?df ePsf]kqx?sf] ; Argfn]klg lkmaf6fS; L qmdsf]kfngf ub5 . x/\$; Nnfsf]kmdf Ps hf6f 3d]x? x65g\hg lj kl/t lbzdf 3d] dlylt/ uPsf x65g\ x/\$ kqx?n]qmda4 ?kdf cfpq]lkmaf6fS; L ; Wofnf0{kl]tlglw]j ub5 . h:t}#-% r/of ePsf]kmdf b]6f6 3ldP/ hf6f e]6g]t] f]kq bflxg6f6 3ldP/ hf6f e]6g]kfrf}kq x65 .

kmknh / t/sf/lx? (Fruits and Vegetables)M

s6x/ / sfpnl h:tf kmknh / t/sf/Ldf b]vf kg]kqx?n]klg oxl lkmaf6fS; Lsf] qmdnf0{k5dfpb5 .

k\fx?sf]kqbnx? (Flower Petals)M

k\fx?sf]kqbnx?n]lg/lt/ ?kdf lkmaf]fS; Lsf] qmndnf0{k5dfpb5 . pbfx/0fsf]?kdf
lnnl km\ndf tlg kqbnx? x65g\ a6/skdf kfF, lrs/L -sf; gl df @!, 8]hldf #
cflb . kqbnx?df kmf0 (Phi) sf]dfg 8flj gsf]k\$[t 5gf6sf]l; 4f6t cg?k ; a}e6bf
ldNbf]cj :yfdf Jojl:yt x65 . #^) l8ullsf]3df0df kqbnx? !=^!*)#\$ sf]cgkftdf
h18Psf x65g\h; sf] sf/0fn]ubf{ol kqbnx?df 3fdfs]k\$zf nufot c6o t]jx?
/fd/L kg{; Sb5g\ oxl sf/0fn]ubf{kfglsf]clws dfqf jf zlt h/flt/ emg{; Sb5 .

alpmnsf]zlif6fu (Seed Heads)M

; fdf6otof alpmx? s]b6df ptkfbg e0{afix/L ; a}:yfgx? cf]u6g lj:yflkt x65g\ of]
3ld]psf]alpmnsf]cj:yf ; 6d]l km\ndf /fd/L b]vg ; ls65 . s]l cj:yfx?df alpmx?
olt ; ul7t eP/ /x\$]f x65g\ls alpmx?sf] ; Wof !\$ \$ e6bf al9 klg ; Sb5 . ol
3df0x?nf0{ u0fgf ubf{ lkmaf]fS; Lsf] qmd; # em08} em08} dh vfg
hf65 . /f]s s/f t s]eg] h; /l lkmaf]fS; Lsf] qmndsf] c6To x6g To; /l g}Ps
lg]Zrt kl/lwdf c6g ; Sg] ol 3df0x?sf]lg]Zrt ; Wof lgsfl]g] xf] eg] klg ; fg]
le6gsf]?kdf cfpj] ; Wof; Dd c6To x6g .

r/fx?sf]p8fg k4lt (Flight of Birds)M

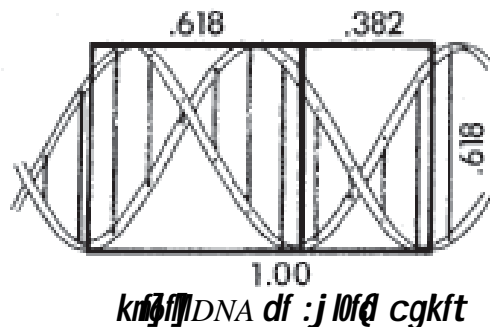
ha afh o; sf] lzsf/sf] glhs}cf0k]5, o; sf] tlvf] x]f0 o; sf] p8fgsf] lbzful
sf]df (directional angle) x65 . of]sf]f :j l0f6 j qmsf] 3dfp/f] sf]f (spiral pitch)
sf] ; dfg x65 .

cyzf:q (Economics)M

lkmaf]fS; sf] pkof]utf af:s tyf pgsf ; xsdl(?n]
(Brasch et. al. 2012) cyzf:qsf] lf]df klg 5 e6g] s/f k6fl0ft u/]. of] qmndsf]
pkof]utf af]s-ld/dg (Brock-Mirman) sf]cfly\$ a[4sf]gdgdf b]vg ; ls65 .

k/ftg k':tsx?sf]9fFf (Book Design of Ancient Books)M

; g\!%) b]v ; g\!&&) ; Ddsf k]oM k':tsx?df kfgx?sf] cgkft @ M # /
lsgf/fx?sf]cgkft ! M@ M@ M# df xg]uVof[h; n]:j Of{cgkftnf0{k]t]glw]j ub5 .
s]l ; f]x?sf]cg' f/ cfh; Dd klg k6f]udf cfpj]k]o cfsf/x? h:t}k]6sf8{ tf; ,
k]6/, rf8f 6]nlehg, km]f] aQlsf] :jlr
ePsf]kftf / sf/x?sf]cfsf/df ; d] :j Of{
cgkftsf]k6f] ePsf]x65 .



l8-Pg=Psf]c0fx? (DNA Atoms)M

; [d hlj lj 1fgsf] l8-Pg-P h:tf] dx]j k6f]
t]j klg lkmaf]fS; sf] qmdaf6 c5tf] /x\$]f]
5g . l8-Pg=Psf]c0fsf]spiral helix k]f Ps

rSs/ 3Pbf # \$ Angstrom nfd] xG5 / @! Angstrom rf8f xG5 -gf6M !
Angstrom a/fa/ ! ld6/sf]!) c/a efusf]Ps efu xG5 _ ol ; Wofx? @! / # \$
lkmaf6f]S; qmdsf] g} ; Wofx? xg\ / o; sf] cgkft
-!^!()\$&^)_ Phi sf]cgkft cyft (!^!*)##(; # sl/a a/fa/ g)5 .

/df0nf\$]nflu lkmaf6f]S; (Fibonacci For Fun)M

lkmaf6f]S; qmdaf6 ljle6g crDd nflu6f l; 4f6tx? klg kl:t:yflkt ug{ ; lsG5 .
pbfx/0fsf]nflu sg}!) nuftf/ b]yf kg]lkmaf6f]S; qmdsf ; Wofx?nf0{!! n]lgz]f
efu hfG5 . lkmaf6f]S; ; Wofsf]j u{/ To] ; Wof e6bf bf] f]cl3Nnf] ; Wofsf]j u\$]dfg
36fpbf cfp] ; Wof klg lkmaf6f]S; ; Wof g)xG5 . cS66df xg]lkofgf\$]uf6]df klg
lkmaf6f]S; ; Wofx?sf]g}k6fu ul/Psf]xG5 M* ;]f] % sfnf]/ hDdf !# .

ol ; a}s/fx?n]k\$[t ; w}:j l0f6 cgkfts]kl/kl/ 3D5 h:t]nflu ; S5 . t/ ol ; a}
s/fx?df of]s/fnf0{dWbgh/ ug{h?/L xG5 ls k\$[tsf]cf^g}lgodx? 5gV sg}klg
s/fnf0{Pp6f dfq t]j n]lglb6 ub6 . To; h]k\$[tn] ; w}g}of]qmdnf0{g}k56fpg'
k5{e6g]56 lsgls k\$[tsf]hlj jg:klt cflbnf0{:yflkt ug]tl/sfx? w]}5gV
o; n] ; w}ul0fts]lgodnf0{dfG5 e6g]x6 . ; ah] ; a}s/fdf lkmaf6f]S; sf] qmd
ge6nf t/ ha kl[s[ts j:tx?n]of]qmd k56fg yfNb5, of]clatlo blvG5 . t/ o; n]
of]s/fnf0{yk an lbG5 ls k\$[tdf ePsf ; a}s/fx?nf0{ ; Wofsf]?kdf kl/oft u/
JofVof ug{/ gofFvf]h ug{ ; lsG5 .

: ft ; fdulx? M

Sources and images: Top: Loskutnikov/Shutterstock; Buttercup: motorolka/shutterstock, ThinkQuest, Shell, Galaxy: FabulousFibonacci, American Museum of Natural History and here, honey bee, Hurricane: MNN, Faces: Goldennumber and here, DNA tyf ljle6g j6 ; f06x? .

- s'zn >]7 tyf glj g gf/fo0f dg\$dl{

lj iffbl Joj :yfkGM ; d:of / ; dfwfg

s]if afnldf xflgsf/s dflgg]sl/f km6dfuf tyf enf/kft gi6 ug] / s]if p]kfbgdf
a[4 Nofpg] ; f]sf ; fy /f; folgs lj iffblsf] k6fu ug] ul/G5 . o; /L k6fu ul/g]
/f; folgs lj iffblf al=Pr=; l=, l8=8l=6l=, c]N8g, 8f0c]N8g, dnflyg, kf/fylhg,

gf06fhg, afd08, n\$, cfz00, SoflNzod cfz00, j\ug, lng80 cflb kdV ?kdf /x\$ 5g\ o; ; DaGwdf hg; Vof tyf jftfj /of dafnon]lbPsf]Ps hfgsf/L cg; f/ lj z]fu/L s[lif afnl / vfBfgdf nllg]xflgsf/s sl/fx? df/L pTkfbg a9fpg]clekfon] en08} @%) lsl; dsf sl6gfzs, \$) lsl; dsf emf/gfzs tyf ljleG 9;l gfzs lj iffblx? kofudf Nofpg]ul/Psf]5 .

lj Zj df k/Dk/fut s[lif k0ffnlndf{cfwlgsls/of ug[klqmf; u}o; lsl; dsf /f; folgs lj iffblx?sf]kofu ug[sfo\$]yngl ; jkyd lj sf; fldv dh\$?af6}ePsf]alen5 . gkfnsl] ; Gbedf eGkbf{ ; g\!(^) lt/ vf; u/L cflf] lgoG0fsf] nflu egl o; lsl; dsf lj iffblx?sf]kofu ug{yflnPsf]xf]. kl5 uP/ gkfnsl klg o; sf]kofu k/Dk/fut / lgjfdvl s[lif k0ffnlndf{Jo; fols/of ug[clekfon]o:tf lj iffblx?sf]kofu ug{yflnPsf]xf]. ljleG bql dh\$?af6 ; xofu :j?k kbf ul/Psf 9;l; s tyf sl6gfzssf]?kdf kofu ul/g]o:tf lj iffblx? xfn kljt if{ ; of}6gsf]cgkftdf kofu xg] u/\$ 5g\ . gkfnsl kofu xg] o:tf lj iffblx?dWo] cufGk]k, cufG\$nl/g, sfj08 cflb kdV 5g\ o:tf klTalGwt Pa\Wofb gl3; s\$ /f; folgs lj iffblx?sf]plrt Aoj :yfk g}clxn]; /sf/sf]nflu 7hf]; d:of aG kl\$]5 .

lgM GbX s[lif lf0df o; lsl; dsf /f; folgs lj iffblx?sf]pkofu cTolws / cJol:yt tj/n]ul/bf jftfj /oflo ljgfzdf ; 3fp k/\0p5 . vf; u/L o:tf /f; folgs lj iffblsf]kofu cTolws dfqdf ul/bf k]s[ts jftfj /oflo ; Gthgsf nflu lj Bdfg ; -; fgf sl/f k00fuf Pa\sl6ktux?sf]ljgfz u/fp05 eg]sltko dNojfg af0 lj?jfx? ; d} gi6 kfb5 . ; fy}o; af6 hnlo :ynlo hljhGthf0{klg lft k/\0fpg] kSsf 5 . Tot dfq ge0{s[lif jfnldf kofudf Nof0g]o:tf /f; folgs lj iffbln]xfjf, kgl, df6]dfq ge0{t/sf/L, kmktn nufot cG0 vfB kbfx?df ; d} klts h c; / k/\0p5 . o; /l /f; folgs lj iffblsf]kofu dfknt pTkflbt vfBfgsf]kofu dflg; nufot cG0 kzkflsf]nflu klg dGb ljif ; /x xg]s/f j]flgs ?kd}kli6 e0; s\$]5 . s[lif jfnldf nllg]ljleG sl/f / /fux?sf]; xl klxrfg gxg', lj iffblsf]plrt dfqaf/]1fg gxg' / cfjZos ; fjwfgl clg ; hutf gckgfp' cflb h:tf sf/0fx?n]ubf{o:tf lj iffblx? clxn]kdV ; d:ofsf ?kdf b\yf k/\$ xg\ . afnlgnldf lj iffblx?sf]hyfekl Pa\cJol:yt kofun]dfgj :jf:Yodf ; d} k\ol jf k/f]f ?kdf c; / k/\0fpg] s/f clWogaf6 kli6 e0; s\$]5 . vf; u/L km]k00m lj iffbl h:t} 8folhg0, dnflyg, sfjkn/n cflbsf]kej w} ; do; Dd /x/xg] / loglx?sf]kofuaf6 afnlgnldf nllg]xflgsf/s sl/fx? dg\$; fy}ljleG pkoful hljx? ; d} gi6 xg klb5g\ . dfgj :jf:Yodf k\ofpg]xflgsf af/df s/f ubf{sltko o:tf lj iffblx?sf]kejaf6 dfgj e0sf]a4df lllt klGsf ; fy}Sofg; /h:tf]3fts /fu ; d} pTkG xg]; Defjgf /xG]s/f lj 1x? atfp5g\ la8Dagf g}dfG' kb5 ls bZdf hit; 5} s[lifsb] / kljlwsx?sf] ; Vof ylb} uPtf klg clwsfz s[fsx? o:tf /f; folgs lj iffblx?sf]plrt 1fg / kof]hgaf/]cgle1 g}/x\$ 5g\ . s[fsx? lj iffbl

lj t/ssf]cfwf/df o:tf sl6gfzs cfjflwx?sf]kpfu ug[ub5g\ . cfjflwsf]dfqf /
; fjwfglaf/]Vofn /flvbog . o; n]ubf{f/hwfgl nufot bzs cf6 sltko zx/x?df
pknJw xg]lj leGg kmkth, t/sf/L Pa\; fu; Jhl ; d] lj iffblaf6 dQm 5g\eg] eGg
; lsg]cj :yf 5g .

o; } ; Gbedf lj Zj :jf:Yo ; #7g4f/f xfn; fn}k\$flzt Ps kl]tj dg cg' f/ lj Zj df
clxn]kl]tif{em08}% nfv dfg; x? lj iffbl cfjflwsf] sf/0faf6 dg[u/\$f 5g\eg]
cfjflwsf]kl]tsh c; /af6 kl8tdWb]em08}\$) kl]tzt lj sf; fl]dv dh'sx?df byf
k/\$f 5g\ . ; #7gsf cg' f/ lj sf; fl]dv dh'sx?df kl]t ldg6 Pshgf JoIQm lj iffblsf]
kpfuaf6 ul; t xg]u/\$f]/ o; sf]lzs/ lj z]fu/L afnafnsfx? Xg]u/\$f 5g\; fy}
lj iffblsf]unt pkofu g}o; sf]kdv sf/0f /x\$]s/f klg kl]t dg]sgf]lgrf\$df pNny
ul/Psf]5 . To; f]t lj iffblnf0{Jo]l:yt tNof0{To; sf]xfglaf6 aRg lj Zj sf ; ah; f]
/fi6x?n] ; g\!((@ d}kl]:6; f08 ; DaGwl ; eQm /fi6«; 3lo ; Dd]hg (UNCP) n]kfl/t
u/\$f]@!cf]Ph]8fnf0{DfWb]gh/ /fVb}o; ; DaGwl lj leGg glt lgodx? klg th]df e0{
; s\$]f 5g\ g]kfn] ; g\@)@ d}pQm dxf; Gwldf x:tfif/ ul/ ; s\$]f]5 . To:t}g]kfnf
; g\!((! Dff kl]:6; f08 ; DaGwl Pq / To; kl5 ; g\!((# df kl]:6; f08 lgodfj nl klg
th]df e0; s\$]f xg\ . o; sf cltI/Qm jftfj/0f]o ; Af0f Pq, !((^ nfu"ePsf]klg
em08}b0{bzs klu; s\$]f]5 . t/ klg g]kfnf o:tf lj iffbl cfjflwsf]kpfuaf6 xfdl
cem]klg ; /lft 5f]eGg ; lsg]cj :yf 5g .

To; h]g]kfnf0{olb ; fR}g}o:tf lj iffblsf]c; /af6 arfpg]xf]eg]s[if lf]df /fu,
sl/f lgoG0fdf h]j s / c6o k]fl/s dnsf]kl]lwdf hf\$ lbg' h?/L e0{ s\$]f]5 .
; fy} s[fsx?nf0{o:tf sl6gfzs cfjflwaf/]kl]lws 1fg lbnfpgsf ; fy} ; DaGwlt
kl]lwssf]l; kmfl/; df dfq lj iffbl kpfu ug{lb0g' kb5 . afnlgfnldf n]lg]/fu /
sl6f0'gi6 ug{dufpg]ul/Psf o:tf sltko lj iffblx? ; dod}s[fsnf0{pkofu]sf nflu
lj t/0f gul/g]/ sld; gsf]kpf]egdf cfjZoseGbf a9L dfqdf duf0g]u/\$f sf/0f klg
; d:of pTkGg ePsf]lj 1x? atfp5g\ . lj iffbl cfjflwx?sf]kpf]hgsf] ; DaGwdf oxf+
Pp6f dgglo s/f s]5 eg]Dofb gf]3; s\$]f lj iffbl ; DaGwlt dh'sn] ; /lft tj/n]
lj ; hg ug{g; s] ; eQm /fi6\; 3sf] ; dg]o / cu]f0df cfoft ul/Ps}bzd nlu
lj ; hg ug]k]kl]wfg lj iffblsf] ; /lft lj ; hg ; DaGwl cGt/fl]6d cle; Gwl, :6sxf]n]
u/\$f]5 . To; h] ; /sf/n] hg:jf:Yosf] ; Da]gzlntfnf0{bl]6ut ub\ ; f] cle; Gwl
kpf]sf/L ?kdf sf]og u/L h]j s lj iffblsf] ; dlrt Joj:yfkg / k]fl/s dnsf]
pkofu]df hf\$ lbgkg]68sf/f]cfjZostf bl]Vpsf]5 .

- /fhzdfg s}; l=

jg:kltsf]lj sf; df k\$fszf]eldsf

k\j]ldf hljgsf nflu lglZrt pnhf\$;]t] xf] ; fð{pnhf{. k\$sz lj B'trDaslo pnhf{
xf] h; nf0{ gf^uf] cf7fn] b\vg ; lsg5 . lj B'trDaslo ljls/0fsf] axt\jOfk6
(Spectrum) sf]w}}; fgf]cæ xf]b\vg ; lsg]k\$sz . o; jOfk6df /]8of]t/E, PS; /] /
ufdf /x? xG5g\ . k\$szsf]; ft /u ahgl, gl/, glnf] xl/of] kx]mf] ; Gtnf / /ftf\$]f]
t/u nDaf0{leG leG xG5g\

jg:kltsf]lj sf; df k\$szsf] s:tf] eldsf /xG5 eG] c\Wbog ug] lj 1fgnf0{knfG6
knfGf] fof]h]h] elG5, hg bzdf hd/f pdfbf{xfdn]cgej ub]cfPsf 5f}. t/ o;
af/]yxf kfg xfdn]o; sf]klqmf aem] cijZos 5 . k\$sz ; in]Of Ps dVo lqmf
xf] h; df k\j]lsf ; a}h; f]hlj t hljx?sf]vfgfsf]dVo ;]t] cfwf/t xG5 . of]Ps
jf ax\$]f]lo jg:kltdf hdlg / kfgldf xg]ub5 . o; klqmfdf sfaGsf];]t]sf]?kdf
sfaG8f0cS; f08 /x\$]f] xG5 / kfgln] xf08]hg cOf' kbfG ub5, hg
sfaG8f0cS; f08nf0{sfafxf08]df kl/Of t ug{rflxG5 . log}xg k\$sz ; in]Of lqmf sf
dVo pTkfb / jg:kltdf xg]k\$sz ; in]Of lqmf sf]; x pTkfb xf]clS; hg, hg o; sf]
xf08]hg k/dfOf' sfafxf08] k/dfOf; E ldn] lg:sG5 . jg:klt sf]df Golsno; ,
Snf]f]nf:6, df06f\$]f]8of, df0qmf]8L, uNhlla8Lh:tf lj leG k\$ /sf lj z]f eldsfoQm
c^Us cyf\; h cufG]x? xG5g\ . Golsno; n]sf]f leqsf ; DkOf{lqmf snfkdf Ps
k\$ /n] lgoGqOf u/\$]f] xG5 . Snf]f]nf:6n] sfafxf08] agfpg] sfd ub5 .
df06f\$]f]8ofn]sf]f leq pnhf{pTkfbg ug{sfo{ub5 .

jg:kltdf xg] k\$szsf] kefj To; sf] sf]df kf0g] lj leG k\$ /sf /^ab]o cyf\ \
klld]6x?sf] d\Wodaf6 pTkGg xG5 . x/\$] klld]6sf] k\$szsf lj z]f k\$ /sf t/E
nDaf0nf0{cj z]f]of ug]uOf xG5 / lj leG klld]6x?n]lj leG eldsf lgjfx ub5g\
pbfx/0fsf nflu xl/tsOf -Snf]f]km_ n] k\$szsf] pkl:yltdf sfaG8f0cS; f08 /
kfglaf6 lj?jfnf0{rflxg]pnhf\$;]t] -sfafxf08] agfpg d2t ub5 . xl/ts/Of h:t}
lj?jfdf kf0g] Ps csf] dxTj kOf{ klld]6 xf] knf06f]mf] . of] klld]6n] klg lj z]f
k\$ /sf]k\$sz cj z]f]of ub5 / jg:kltsf]lj sf; df 7hf] eldsf v]b5 . pbfx/0fsf
nflu jg:kltdf kmh kmNg]klqmf o; }klld]6n]lgoGqOf ub5 .

c\Wf/f]df pdfi/Psf hd/fsf 6' fx? kx]mf] /usf xG5g\ . k\$sz kfPkI5 loglx? xl/of]
/u]df kl/Of t xg yf]b5g\ o:tf]xg]sf]sf/Of s]xf]eg] c\Wf/f]df xl/tsOf -Snf]f]km_
eG]klld]6 aGg kfp5g / 6' fx? kx]mf]xG5g\ . k\$sz kfPkI5 ol klld]6x? aG5gV
6' fx? xl/of] aG5g\ . k\$zn]jg:kltsf]lj sf; df cG6 lj leG k\$ /sf]c; / kf/\$]f]
xG5 . jg:kltsf]lj sf; df k\$szsf]k]olf c; / b\vg ; lsg klg k\$zn]o:tf c; /x?
lsg / s; /l u5{eG]sfo{k]ffnl l; 4fGt cem}klg -w}}xb; Dd_ yxf kfg af5L g}
5 .

w]}; do; Dd sf]f leqsf c^Usx? d\Wb] Snf]f]nf:6sf] lj sf; df dfq k\$sz

krf06f\qmf\dsf]eldsf x65 e6g]l; 4f6t :yflkt lyof]. krf06f\qmf\dsf]c; / Snf7f\fnf:6sf] lj sf; df dfq}; lldt 5 cyjf o; n]c6o c^a\usx?sf]lj sf; df kl5 c; / kfb5, klxn] o; k7gsf]hj fkm sg}j}flgs; E lyPg . t/ j}flgsx?n]sf]f leqsf df06f\sf]8of Pj+df0qmf\8l gfd5 c^a\usx?sf]lj sf; df krf06f\qmf\dsf]c; / kQf nufpg cg'; Gwfg u/]. c^a\usx?sf]lj sf; sf ljle6g klfx?, h:t}loglx?df k0g]06hfdx?, loglx?sf] ; 1d agf6 -cN6k6&r/_ , 3gTj cflbsf]c\l6og cg'; Gwfg ul/of]/ w7}j if\$]cg'; Gwfg kl5sf]kl/0ffd]krf06f\qmf\dn]Snf7f\fnf:6 dfq xf0g sf]f leqsf c6o c^a\usx? h:t} df06f\sf]8of tyf df0qmf\8lsf]lj sf; df kl5 dxTj k0f{eldsf v\65 e6g]b\yfof].

- ; fef/Mlj 1fg klj lw /18of]sfo6md, 8f= 0zfg uf;d

kyfids pkrf/ af/]hfgsf/l

Emergency cyf\cfsl:ds 36gf jf rf6k6s hx\Fklg, hlt ahf kl5 / h; nf0{kl5 kg{; S5 . To; h} First Aid cyf\kyfids pkrf/ ; a\$]nflu / ; a}7fp6f rflxg]Ps clt cfjZos ;}f xf].

la/fdl kbf{jf rf6k6s n\lbf c:ktfn n\hfg'kj{; j kyd ul/g]x7lj rf/ jf pkrf/ g} kyfids pkrf/ xf]. kyfids pkrf/ rf6k6ssf]cj:yf x\, Ps tfnld k\kt JolQm jf cfsl:ds 36gf kbf{lj 1n]ug{pkrf/ xf]. sg}/f\ jf rf6nf0{clt/0m lrlst; s ;}f lbg' gkg]x65 cyf\sg}/f\ jf rf6 ; xh pkrf/af6 kl5 lgsf]x6f To:tf /f\ jf rf6k6sx?nf0{kyfids pkrf/af6 ; lhn}lgsf]agfpg kl5 ; ls65 .

kyfids pkrf/ Ps ; /n lj lwaf6 hljg arfpg]klqmf xf]. hg Ps tfnld k\kt JolQm] s\l pks/ofx?sf d2taf6 ; lhn}; Dk6g ug{; Sb5g\ . t/ kyfids pkrf/, cfsl:ds ;}fs] ; \$df kof\ ug{ldNg ;}f eg]xf0g . of]Ps dxTj k0f{klxn]sbd xf]. h; n]szntfk] \$ / rfB}uDel/ rf6nf0{lgsf]agfpg]/ hljg arfpg]ub5 .

- kyfids pkrf/sf]dVo p27ox? o; k\$ / 5g\
- != hljg arfpg' / d[osf]eo G6gls/of ug{
- @= yk 3f0t]xgaf6 arfpg'
- #= rf6k6s / /f\af6 lgsf]xg]klqmf ckgfpg' xf].

ljle6g c\l6og cg'; f/ klxn]k6s !! cf}ztfAbldf Knight Hospitaller gfd5 wld\$ of7fn] o4 d\fgdf xg]; fw/of 3fp rf6x?nf0{s; /L pkrf/ ug{; ls65 e6g]tfnld of7fx?nf0{k6fg u/L kyfids pkrf/sf]z? u/\$f lyP . kl5 ; g\!^*# df Geneva df a; \$]a7sn]Ps ; :yfsf]:yfkf u\of] hg kl5 Red Cross gfdaf6 k\Int a6of]

o; sf]dVo p27o o4 elddf la/fdl k/\$f j f 3f0t]; lgssf]pkrf/ ug{lyof].

To; kl5 Knight Hospitaller sf]l; 4f6t cg' f/ klylds pkrf/sf]krf/, k| f/ / k9f0{ klg u/f0of]/ yk}; 3 ; :yfnf0{klylds pkrf/sf]klxf]k6s hfgsf/L klg lb0of]. ; g\!*&* df klylds pkrf/ ; jf c6tu6 Civilian Ambulance ; jf k6fudf klg Nof0of] h; sf]dVo p27o /hj]/ vlgh kbfy{ePsf]7fp6f klxf]pkrf/ / /fli60 ; xofu kbfg ug{lyof].

; g\!*&* df g} Surgen – Major Peter Shephord / Colonel Francis Duncan n]klylds pkrf/sf] tfnld ; j {fwf/0fnf0{ kbfg ug{ kgI cjwf/0ff agfP / klylds pkrf/sf] klxf]slff "First aid for the injured" cyf6\3f0t6f nflu klylds pkrf/ e6g]lij ifodf ; ~rfng u/].

klylds pkrf/ / yk}IrlsI; f klj lwsf] lj sf; o4af6 g}k|/t ePsf]kf065 h:t} cd|/sg Civil War af6 American Redcross n]:yfk6f ePsf]lyof]. cfhef]n klylds pkrf/sf]krf/ ug{yk}; d6x? ag6f kf065g\h:t}Military, Scouting Movement Cflb . gof6klj lw / ; fwg?n]cfhef]n klylds pkrf/nf0{; xh / k6fj sf/L agfPsf]5 .

c? b6zdf h:t}g|kfnf klg dfgj lo lft 36fpg]/ kl8tsf]p4f/ ugInlo lnP/ ; g\ !(^# ; fndf NRCS cyf6\Nepal Redcross Society Sf]:yfk6f ePsf]xf]. xfn NRCS n] b6zsf &% j6}hNnfd cfkngf]; jf kbfg ul//x6f]5 .

; /sf/L / u} ; /sf/L ; 3 ; :yf, ; dbfo / :j o+; j]lsf] d2taf6 NRCS n] cfkngf]; jfx? ; ~rfng ub{cfPsf]5 .

hfthftl, lnE, wd{ sh, ; dbfo cflbsf]e6efj gu/L NRCS n]o4 kl8t, kfs[ts k6f]k / lj kQL h:tf ; s6 axf]L/x6f, ; j {fwf/0f gful/s tyf l; kfxlx?nf0{; xofu k6fop6}cfPsf]5 . ; fy}; /; kmf0{kl/jf/ lgof]hg, HIV/AIDS kf]6s cfx/, ; ?jf / ; m6mdt /fu, klylds pkrf/ cflbsf]af/0f hgr]gf km]fpgsf]; fy}tfnl dsf]Jo: yf klg NRCS n]ub{cf0/x6f]5 .

dVotof klylds pkrf/ cfj Zos kgIcj:yfx? o; k6f/ 5gM != hgj/n]6f6dfm o:tf]cj:yfdf ; j kyd /Om, lj /f6g]k6f; ug{k65 . 3fpnf0{ ; fag / tftf]kfgln]/fdf] E kvfng' kb5 / P66lafof]6s cf]fw nufP/ 3fpnf0{ skf; n]cyj f ; kmf sk8fn]5ff]g' kb5 / plrt IrlsI; f pkrf/ ul/g' kb5 .

@= dfx/L cyj f cl/Efnn] 6f6dfm dfx/L cyj f cl/Efnn] 6f6df] 7fp6f6 vln lgsfng]/ olb ; l6gPsf]5 eg]j/km]; \$g' kb5 . of]3fp @ blv % lbg ; Dd lgsf]e0xfNb5 .

#= cfufh] kfh d f M kfh \$ f] efudf lr; f] kfgl v f o f p g]. x f d f] u f p F 3 / d f c e m k l g k f h \$ f] 7 f p e f l 3 p m n u f p g] r n g 5 h g P s b d u n t x f]. l 3 p m / d n d g n u f p g]. o l b b v f 0 { s d g e P d f c f i l w h : g } i b u r r o f e n , a c e t o m i n o p h e n C y j f n o p r o x e n n u f p g' k b 5 . o l g b v f 0 { a 9 \$ f] 5 j f k f h \$ f] e f u ; l g P s f] 5 e g] t ? t } l r l s t ; s n f 0 { ; D k s { u g { k b 5 .

\$= e n f 8 f k v f n f n f u d f M h l j g h n c y j f g g l r g l k f g l d f q f l d n f P / v f g' k b 5 / l g s f] g e P d f g l h s \$ f] : j f : y o s l b d f ; D k s { u g { k b 5 .

%= l / E 6 f n f u d f M l / E 6 f n f u \$ f] J o l Q m] c f / f d u g { k b 5 / c r f g s p 7 g] j f a : g] s f d e g] u g { x l g .

^= 3 f d n] 8 9 d f M z / l / d f h l t ; S b f] w] k f g l s f] d f q f a 9 f p g' k b 5 / M o i s t u r i z e r , S u n C r e a m x ? n u f p g' k b 5 .

&= x f t v \$ f e f r b f M o l b s g } x 8 8 l a f l x / l g : s \$ f] 5 e g] l e q k ; f p g] k o f ; u g { x b g . / Q m t j n f 0 { / f \$ g] s f] ; ; u g] / t ? t } c : k t f n j f : j f : y o s l b | n h f g' k b 5 .

- ; f e f / l j 1 f g k l j l w / l 8 o f] s f o q m d

; f o l 6 ; M P s k l / r o

n f k f d v j G o h t ' / j g : k l t s f] c t / f l i 6 0 J o f k f / c l e ; l G w c y f f \ C o n v e n t i o n o n I n t e r n a t i o n a l T r a d e i n E n d a n g e r e d s p e c i e s o f W i l d F a u n a a n d F l o r a (C I T E S) P s a x k l f l o ; G w l x f]. o ; s f] d v o s f d v t / f s f] ; F l d f k / \$ f j G o h t x ? / j g : k l t x ? s f] ; A l f o f u g { x f].

c t / f l i 6 0 J o f k f / s f] s f / o f n] u b f { j G o h t ' / j g : k l t s f] a f R g] c j : y f d f ; s 6 g c f P s f] s / f l g l Z r t k f g [p 2] o n] ; g \ (& # ; f n d f r { # u t \$ f l b g c d l / s f s f] j f l ; E 6 g l 8 ; l d f *) b z x ? l d n] o ; ; l G w s f] s f o k q k f / t u / \$ f l y P . T o ; h] o ; ; l G w n f 0 { j f l ; E 6 g c l e ; G w l k l g e l g 5 . ; g \ (& % h h f 0 { ! u t \$ f l b g b l v n f u " e P s f] o f] ; l G w , ; g @) ! \$; f n ; D d d f ! *) b z x ? n] o ; ; l G w n f 0 { c g d f h g u / l ; s \$ f] 5 .

CITES s f] l g o f 6 l n g] l g s f o c y j f k d v J o j : y f k s l o l g s f o , C o n f e r e n c e o f t h e P a r t i e s c y f f \ ; / f \$ f / j f n f x ? s f] ; D d h g / ; a } ; b : o / f i 6 x ? x g \ . o ; } l g s f o n] c t o f l w s

pkofu u/ vt/fdf k/\$f j'ohgt' / jg:klt sf khfltx?sf] lj leG /fi6x? alr
cfoft, lgof kMlgof / ol khfltx? sg}7paf :yfgf ug{k/df Ps clwsf/ kkt
cgdl kq lb0g]koffnlsf]JoJ :yf u/\$f]5 . vt/f / nfkf]dv xg]cj :yf dNofsg u/
j'ohgt' / jg:kltx?sf] cyfx ; fu/af6 5gf6 ul/Psf khfltx?nf0{ltgj6f ; Flx?
(Appendices) df j ul\$ / of ul/Psf]5 .

CITES af/f j ul\$ (Appendices) ; Flx? o; ksf/ 5g\ = Appendix I @ = Appendix II # =
Appendix III

! = **Appendix I:** CITES cg' f/ Appendix I df lj Zj sf] nueu !@) ksf/sf
khfltx? ; Fls 5g\ o; ; Flf o:tf khfltx? kb5g\hg ctoflws Jofkl/s
koffhgdf kofu u/ j f pkofu u/ ; s6df kl/; s\$]f; fy}nfk xg]qmdf 5g\
o; ; dxdf ; Fls khfltx?sf]knf0bfdhs Jofk/ ug{u} sfgl 5 .

@ = **Appendix II :** lj Zj sf] nueu @!,))) khfltx? o; ; Flf /flvPsf]5 hg
; s6sfnlg cj:yfdf kul ; s\$]5 . t/ nfk xg]cj:yfdf eg]klu ; s\$]
5g . olb o; ; Fls khfltx?sf] Jofkl/s sfodf lgo6qof ul/Pg eg] ol
khfltx? klg nfk xg]cj:yfdf kU5g\ . o; ; Fls khfltx?sf] Jofk/ lj?4
s8f lgod agf0Psf]5 . o; ; dxsf khfltx?sf] Jofk/ ubf{lgoft :jls /
kMlgofsf]kdf kq lng' kg]JoJ :yf u/f0Psf]5 . o; khfltx?nf0{cfoft
ug]:jls[eg]x/\$ bZsf]Pg sfgg cg' f/ km/s kg]ub5 . a; 9 Appendix
II sf khfltx? ; of}blv xhf/f}; Wofdf Jofk/ xg]atf0Psf]5 .

olb Appendix I df ; Fls khfltx?sf] s[qd tl/sfn] (Captive Breeding and
Cultivation) khgg ul/of]eg]tl khfltx?nf0{Appendix II df /flv65 .

Appendix III : lj Zj sf] nueu !&) khfltx? o; ; Flf /flvPsf]5 . olb sd; \$d
Ps /fi6k] CITES sf] ; /f\$ / j f n f x ? n f 0 { (Parties) sg} j'ohgt' j f j g : k l t s f] k h f l t x ?
Jofk/sf] sf/0fn] vt/fdf k/L ; Af0f ug{ kg] hfgsf/L u/f0Pdf To:tf khfl
Appendix III df ; Fls u/L kdf0f kq lbg]JoJ :yf ul/Psf]5 .

gkfn] CITES sf] ; lGwdf !(&# df g}x:tf/f/ ul/; s\$]/ CITES cg' f/ gkfnf !%
jg:klt, %* :tgwf/l hgj/, \$) kfl, !# 3l; g]hgj/, ! peor/ / @ j6f sl/fx?
lj leG ; Flf clst ul/Psf]5 .

- d]bgl khflklt

===== lj 1fg n\ydfnf÷c\$ \$)* df3 @)&! =====