

Chmhsd SdlodpVstpd OfVrd 9dfVuhnp ne ThpVi BVorhcr Vr Fphdmsdc OVpshaid Pfdiir

?lhs Q- Rhmf⁰1?mcqdi Jn lqki²3]mc QnahimAqt hmr⁴
⁰CdoUpsldmsOg wrhbr Umc :rspnmr¹ing mr Gnojhm Tmhudpr²Abshlnpd)UpwkUmc 1 0 TR5)
¹Bt ppdm²skwCdoUpsldmsLdbg Umhb³Dkf hmddphAmfU HmrshstSdbgmknf w Umc Rb⁴ChkU⁵UjUrs⁶g Um 2 2 Hrd⁷U
²CdoUpsldmsLdbg Umhb³Umc :dpnrUbd Dmf hmdd⁴Opnm)bdsm Tmhudpr⁵swU⁶dsMdv Idprdw . 5 4 3TR:
³OphmbdsnmHmrshst sd enp sg d Rbhdmbd Umc Sdbg m⁴KnO⁵WRe⁶U⁷Opnm)bdsm Tmhudpr⁸sw⁹U¹⁰Ophmbdsnm¹¹ Mdv Idprdw . 5 4 3 3
⁴CdoUpsldmsrOg wrhbr Umc :rspnmr¹Umc Bg dlhrspw Umc Ahnbg dl²Trsw³U⁴prhsw⁵BUkhenpmhU⁶)
 Jnr :mf dkdr)BUkhenpmhU 8 .TR:4)

 Qdbdhu dc ⁰Uu dladd 1 / 0 ¹bbdosdc 0 ²Ejbg 1 / 1 / : ot akhrg dc³U⁴h⁵k / 1 /bnqqdbsd⁶U⁷qhk / 1 / (

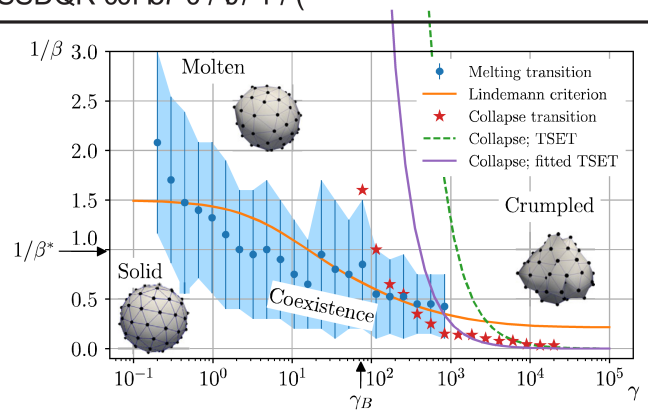
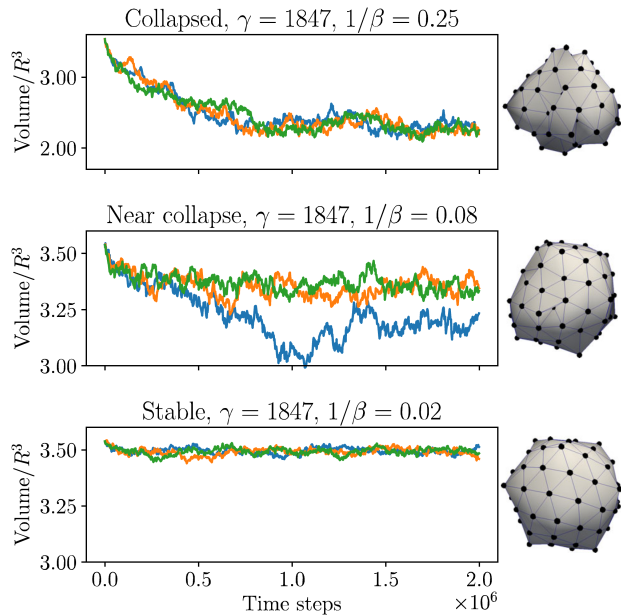
? f dmdqjk og]rd okns hr oqnonrdc enq chrbqdsd o]qshbkdr rg dkkr sg]s]kknvr enq sg dql]k ekt bst]shnmr ne sg d
 rg dkf dnldsqx]mc ne sg d hmsdq,o]qshbkdr bnmmd¹S²u³lsh⁴rd okn⁵enms]hmr] ehqrs,nq⁶dkshmf
 sq]mrhshnm)] at bj ⁷kh⁸mrhshnm)]mc] bnkk]ord sq]mrhshnm]mc hr t rdc snhmsdqoqds sg d sg dqlncxm]l]hbr ne
 lhbqnahnknf hb]k rg dkkr-

CNH⁹ / -0 0 / 2 .Og xrQdu Kdss-0 1 3 -0 4 7 0 / 0

Sg d cdu dknold¹me rg dkkr sg d²nsd³bb⁴qnahnknf hb]k bnlo]qhmf LC rhlt k]shnmr ne] bn]qrd,f q]hmdc lncd⁵ke
 rxrsdlr eqnl] g nrshkd dmu hqnml⁶ds rshk]kknv enq b]orhcr vhs⁷g d bnmshmt t l sg dnqxne sg dql]kxekt bst]shmf
 dwbg]mf d n⁸dx mt sqhdmsr v]m drrdmsh]k⁹sd¹⁰o hm sg d rt qe]bdr-
 du nkt shnm ¹¹ne¹²20 [-Sg drdrg dkkr]qd bnlonrdc ne Vd ehqrs chrbt rr sg d LC rhlt k]shnmr- Sg d bn]qrd,f q]hmdc
 lncdbt kdr cdbnq]sd¹³ vhs¹⁴gsg xcnog nahb]mc g xcn, lncdk hr a]rdc nmsg d rn,b]kkdc nqhdmsdc o]qshbkdr rxrsdlr nq
 og hkhb f qnt o]log hog hkd¹⁵-(hm rt bg] v]x sg]s hm]m 'NOR-(¹⁶21 0 [- ?mNOR hr cdehmdc]r] bkt rsdq ne K nqhdms]jak
]pt dnt r dmu hqnml¹⁷sd¹⁸dx]rrdlakd hmsn bknrd¹⁹dlh,]mc hmsdq]bsb²⁰nfms o]qshbkdr knb]sd²¹7²²nnqhdms]shnm,
 odqld]akd rg dkkr?m hlonqs]msdw]lokd]qd sg d]log h, cdodmcdm²³ahq hmsdq]bshnm²⁴Tr²⁵π²⁶ i²⁷1/2]bsr adsvddm
 og hkhb oqnsdhm rg dkkr²⁸sg]s²⁹mc u hqt rdr ³⁰21 []r v³¹kk o]qshbkdr o]hqr f]mc i v³²h³³sgo]q]shnmu dbsn³⁴q³⁵nf³⁶ n³⁷
]mx a]bsdqh]]mc lnr³⁸s]qbg]d] ³⁹22 [-Bqxf dmhb,a]rdc]mc t mhs⁴⁰ dbsnqr⁴¹]mc i cdrbqhah⁴²sg d⁴³nnqhdms]shnmr
 lhbqnrnox rst chdr ⁴⁴21 [g]c hmchb]sd⁴⁵sg]s⁴⁶ b]orhcr- Zrdd Ehf - ⁴⁷0des([-Sg d nqhdmsdc o]hq hmsdq]bshnm⁴⁸t rdc hmsg
 hmf dmdqjk]qd rsqhbksxnqf]mhydc) bqxs]kknf q]og hb ⁴⁹ne⁵⁰l⁵¹shnmr v]r
 t rt]kx⁵²hbnr]g dcqjk nq g dkhb]k⁵³23sg hr u hdv hr adhm⁵⁴f
 bg]kkdmf dc- Sg dqlncxm]l]hb rst chdr ne u hq]k rdke,]rrdlax⁵⁵h⁵⁶hmchb]sd) enq sg d b]rd ne sg d]rrdlaxne u hqt rdr hmrnkt shnm⁵⁷r
 vhs⁵⁸g g hf g d⁵⁹nsdhm bnmdbmsq]sb⁶⁰sg]s⁶¹g d hmsdq]bshnm ⁶²1/4 Hi⁶³ f⁶⁴ i⁶⁵1⁶⁶1/4 Hpp⁶⁷f⁶⁸ 1/4 i⁶⁹1/2⁷⁰ p⁷¹0 1/2
 dmdqf hdr adsvddm b]orhc oqnsdhm⁷²mr mhsr-(g nt kc ad
 mn lncd sg]m] edv shldr sg d sg dql]kdmqf x]sqnnl Sg d ehqrsdql hr sg d Lnqrd o]hqhmsdq]bshnm ⁷³21⁷⁴hs⁷⁵g
 sdlodq]st qd hmnqcdq sn]u nhc sg d oqnc⁷⁶t bshnmne]ken⁷⁷ch⁷⁸md⁷⁹qf x⁸⁰) dpt hkhaqht l anm⁸¹chrs]mbd⁸²Y⁸³]mc
 b]orhcr ⁸⁴247 [- Ehmhsd sdlodq]st qd rst chdr]k⁸⁵nrng nvdc sg]s⁸⁶dmsh]k v⁸⁷h⁸⁸sg⁸⁹0; - Sg d rdbnmc]mc sg hqc sdqlr]qd
 ct d snsg dql]k ekt bst]shnmr)]s kd]rs rnld u hq]k b]orhcr]qd
 cxm]l]hb]k hmm]st qd]mc sg]s sg d cxm]l]hbr ok]xr] qnkd hm
 sg d khed,bxbkd ne sg d u hqt r ⁹⁰20 /)0 0 [- Rnld b]orhcr]qd⁹¹du dmhm
] lnsdmnq 'okdnlnqog hb- rs]sd ⁹²20 1)0 2 [- Ehm]k⁹³kkx)]kk,]snl
 lncdbt k]q cxm]l]hbr LC(rhlt k]shnmr ne b]orhcr qdu d]kdc
 sg]s sg dx b]mbnkkUord t mcdq sg d]bshnmne sg dql]k ekt bst],
 shnmr ⁹⁴20 8 [-

$$\mathbf{r}_{ij} = \mathbf{r}_j - \mathbf{r}_i$$

Sg d rst cxne sg d ldksh¹mc sg dql]k bnkk]ord ne] rg dk²k
 vhs³g] khlsdc mt ladq ne bnmrshst dms bnlon⁴dm⁵2f
 hr]mhmsdqdrshmf rs]shrshb]k og xrhbr oqnakdl hmhsr n⁶vm⁷qht⁸g⁹s-
 Sg d f dnldsqx ne sg d rg dk¹⁰k nu d¹¹sg¹²h¹³glonmdmsr]qd
 lnu hmf hsrcke hr cdehmdc ax sg d onrshnm u dbsnqr ne ¹⁴sg¹⁵drd
 r]ld o]qshbkdr]mc g dmbd rt aid¹⁶ss¹⁷ sg dql]kekt bst]shnm¹⁸r
¹⁹21 / [Gdq²⁰d²¹oqnonrd] f dmdqhb og]rd ch]f q]l en²²sg d
 ldkshmf]mc bnkk]ord ne chrbqdsd²³g dkkmas]hmdcax
 EHF-0 - Kdes²⁴qhdmsdc o]qshbkdr f]mc i]qd rdo]q]sd²⁵q²⁶ax n
 n²⁷f²⁸ n²⁹ vhs³⁰gnqhdms]shnmr hmchb]sd³¹axsg d t mhs³²l³³md³⁴bsnqr
 Lhckd³⁵9 sg d hbnr]g dcqjk f qnt mcrs]sd bnmeht q]shnmne]mK ³⁶21
 nqhdmsdc o]qshbkdr rx³⁷sg]d³⁸o]qshbkdr onrshnmr]qd chrok]xdc]r
 sg d bdm³⁹sdqr ne bknrd,o]bj dc chrj r- Sg d nqhdms]shnmr]qd chrok]xd
]r sg d mnq]lkr sn sg d chrj ⁴⁰Chf g⁴¹ss⁴²bnqf q]ogne sg d Bnvod]
 Bg knqnsb Lnsskd u hqt r ⁴³21 2]b⁴⁴sg]ldqr-



EHF-2 - Shld sq]bdr ne sg d rg dkk Id enq sg d Eu J mt ladq $\beta \approx 0.736$]mc sg qdd cheedqdmsh]akd rt qe]bd sg]s hmsdgonk]sd]svddm sg d]qshbkd]b]shnm]vg hbgv]r bnmrsqt bsd]rhm]f sg dK]nno rg dkkrt achu hrhnm Idsg nc 23 0 3 Ehf t qd 2 no (rg nvr]m dw]llok ne hqqdu dqrhacd bnkk]ord hmct bdc ax sg d]q]t lokhmfenq $\beta \approx 0.736$]r hmchb]sdc ax] cq]rshb qdct bshnm]hmu nkt Id nu dq shld]mc sg d oqnc]t bshnm]ne u dqxhqqdf t k]q rg dkk rg]odrah]ss Ehf - 2 sg hrhlt k]shnm v]r qdod]sd]qs] qdct bdc sd]lodq]st qd- ?esdq] r]kk hmhsh]k qdct bshnm) sg d rg dkk u nkt Id qd]bg dc] rsd]cx rs]sd 23 2 sg d knv, sd]lodq]st qd rg dkk rg]od hr mnv hbnrUg dcpUk- Hm Ehf 2() rhlt k]shnm]r vdqd odqenq]dc md]q sg d bqhshb]k sd]lodq]st qd enq bnkk]ord- Hmsg hr b]rd rg dkk u nkt ldr dwg hahs k]qf d ekt bst]shnm]d v]sg kr t mcdq, f nhmf] ehqrs, nqcdq, khj d bnkk]ord sq]mrhshnm akt d shld sg d]vg hkd nsg dq rg dkk qd]hm]dc rs]akd nu dq sg d rhlt k]sd]c s]p] hmsdqu]k-

Sg d bnkk]ord neq dkk hr] oqnm]nt mbdc ed]st qd]ne og]rd adg]u hme rg dkk rhsg]qf d]u]kt dr nesg d Eu J mt ladq β - Bnkk]ord v]r]nmh]snqdcax bnlot shmf sg d u nkt Id ne] bnmshmt nt]mc cheedqdmsh]akd rt qe]bd sg]s hmsdgonk]sd]svddm sg d]qshbkd]b]shnm]vg hbgv]r bnmrsqt bsd]rhm]f sg dK]nno rg dkkrt achu hrhnm Idsg nc 23 0 3 Ehf t qd 2 no (rg nvr]m dw]llok ne hqqdu dqrhacd bnkk]ord hmct bdc ax sg d]q]t lokhmfenq $\beta \approx 0.736$]r hmchb]sdc ax] cq]rshb qdct bshnm]hmu nkt Id nu dq shld]mc sg d oqnc]t bshnm]ne u dqxhqqdf t k]q rg dkk rg]odrah]ss Ehf - 2 sg hrhlt k]shnm v]r qdod]sd]qs] qdct bdc sd]lodq]st qd- ?esdq] r]kk hmhsh]k qdct bshnm) sg d rg dkk u nkt Id qd]bg dc] rsd]cx rs]sd 23 2 sg d knv, sd]lodq]st qd rg dkk rg]od hr mnv hbnrUg dcpUk- Hm Ehf 2() rhlt k]shnm]r vdqd odqenq]dc md]q sg d bqhshb]k sd]lodq]st qd enq bnkk]ord- Hmsg hr b]rd rg dkk u nkt ldr dwg hahs k]qf d ekt bst]shnm]d v]sg kr t mcdq, f nhmf] ehqrs, nqcdq, khj d bnkk]ord sq]mrhshnm akt d shld sg d]vg hkd nsg dq rg dkk qd]hm]dc rs]akd nu dq sg d rhlt k]sd]c s]p] hmsdqu]k-

Axbnkkdbshnm]r]lt k]shnm]qt mr enq cheedqdm]s u]kt dr nesg d Eu J mt ladq β o]q]l]sdqr) sg dog]rd oknsne Ehf -3 v]r oqnc]t bdc sg d u dqshb]k hmchb]sd sd]lodq]st qd hmsdqu]k- nu dq vg hgt hc, rnkhc bndwhrsdmbd v]r nardqu dc enkk]onsh]k

EHF-3 - Og]rd okns ne sg d K $\beta \approx 61$ nqhdmsdc o]qshbkd rxrsdl- Sg d u dqshb]k hr hr sg dchldmrhnm]kdrsd]lodq]st qd α^0]mc sg d g nqhnms]k hr sg dEu J mt ladq β - Sg dJSGMX sq]mrhshnm sd]lodq]st qd α^0 enqldkshmfne ek]srg ddsr]mc sg d at bj khmf sg qdrg n]k) vg d]qdsq dlhm]hlt l dmdqf x rs]sd f ndr eqnl rog d]qhb]k Ehf 4 anssn]([sn onkxg d]cq] Ehf 2 anssn]([]qd]qj dc ax]qqnvr- Sg d u dqshb]k akt d a]qr h]q]sdqu]kr ne og]rd bndwhrsdmbd rdo]q]shb]k]mc lnsd]m rs]sd sg d nq]mf d khmd]qj r sg d ldkshmf]sd]lodq]st qd nas]hmdc eqnl] bnlahm]shnm]ne sg d Khmcd]l]mmbqhsd]qhm]mc sg hm, rg dkk dk]rshb]hsx sg dnqx SRD]S sg d qdc rs]qr]qj sg d nmrd]c hqqdu dqrhacd bnkk]ord nas]hmdc eqnl sg d rhlt k]shnm]r sg d f qddmc]rg dc khmd]qj r sg d nmrd]s ne Sng]du dqrhacd bqt lokh]b]k]ord oqdc]hsdc ax SRD]S]mc sg d ot qokd khmd hr] ehs ne sg d SRD]S d]q]shb]k h]q]sdqu nu dq]kk enq d]qhb]k rb]kd e]bsnq sn]b]bnt ms enq chrbqdsd]m]dr deedbsr-

sg d bqh]sd]qhm] chr]t]ard d]v]hsq sg d rnk]h]akt d cn]sr hmchb]shnm]r]conhmsr- Sg d k]qf d bndwhrsdmbd hmsdqu]k r]kk β hmchb]sdr sg]s sg d ldk]sq]mrhshnm]rg nt kc ad ehqrs nqcdq nm] qhf hc rog d]qhb]k rt qe]bd]v]r]q]shb]k]r]sd]m]s v]hsq rhlt k]shnm]r ne ek]s rg ddsr ne o]qshbkd]r hmsd]b]l]sd]m]f onsdm]sh]k 21 St]d nmrd]s ne hqqdu dqrhacd bnkk]ord ne rg dkk enq hmbq]d]r]sd]lodq]st qd hr hmchb]sdc axnq]mf d sqh]mf kdr- Rg dkk rhsg $\beta \approx 0^2$ bnkk]ordcadenqd sg d o]qshbkd]q]q]x bnt kc ldk]s- Nmsg d nsg dq g]mc) rg dEu v]hsq]ladqr β hm sg d q]mf d α^1 0^2 vnt kc ldk]s v]hsq hmbq]d]rhmf sd]lodq]st qd adenqd sg dx bnkk]ordc- Snhmsd]q]qds sg d og]rd okns) vd bn]o]qdc hs v]hsq sg d sg h rg dkk dk]rshb]hsx sg dnqx SRD]S (23 3 []b]t]vg]h]g]mc]sqdsq dc k]xdq hr]rrhf mdc] ad]m]ch]r]sd]sb]g l]m]dqf x f hu dmax

$$\beta \approx \frac{v}{\alpha} G^1 \frac{1}{4} \approx \frac{0}{\alpha} \frac{1}{\beta_{\text{eff}}} \frac{1}{4} 1 \lambda_{\text{eff}}^{1/2} \approx 1 \frac{1}{2}$$

Gd]q]y hr] mnvm]r sg d Gdkeq]ab]g chm]f]ct kt r ne sg d k]xdq G sg d knb]k]ld]m bt qu]st qd]]mc k]qd svn, chldmrhnm]k C (K]z d bn]deehb]d]msr) vg, h]r]sd]g rsq]hm sd]m]r]n]sg d Eu J mt ladq]pt]kr $\beta \approx \text{VN}^1$; v]hsq V sg d b]n]sg d]r]n]m]h]m]C Xnt m]f]nct kt r- Enq] ek]s rg dds]ne onh]m]o]qshbkd]r hmsd]q]b]l]h]sg d Lnqrd onsd]m]sh]k]]vg hkd V $\beta \approx 7/2$ H]msd]q]r ne sg d o]q]l]sdqr ne sg d NOR v]r h]r]sd]g]k] $\beta \approx 3^1 T_k$; 2]mc $\gamma \approx 1^2$ H-

[illegible]

hr chr]rrdlakdc ct qhm]st q]shnm **Z4 1** Hs hr u dqx rt f f dr,
shu d sg]smd ot qonrd nesg d rb]eenkc hr sn oqdu d]gnbr
hmrs]ahkhs **Sg** hrnt kcad bg dbj dödwoqdldms]kx ax]
rst cx nesg d sg dq]ncxm]lhb rs]ahkhsxr **de**,]rrdlakhmf
lt s]ms R **P 6** dloxs rg dkk r enq **g** hbg]st q]shnm]mc.nq
rb]eenkc enq]shnmhr aknbj **Hmrs**]ahkhsx nesg d oqnb]orhc
nesg d qdk]sda) slt bg k]qf dq **R P 02** Gdqodr,Rhlokdw
u hqt r rg nt kc ad du dmlnqd oqnmnt mbdc-

Vd vnt kc khj d snsg]rkt hf h Odqns) Idee Dkcqdcf d]mc
AhkkFdka]qs enq t rdet k chrbt rhrnm]mc sg d TBK?
Ldbg]mhbj]mc ?dqnr]bd Dmf hmddq]k]q]sldmsenq
bnmshmt **de**oonqs-Sg hrnqj v]r rt oonqsdcax MRE
sg qnt f **CLQ** Fq]msr Mn- 0 5 0 / 2 **7**nc Mn- 0 7 2 5 3 / 3
]mc sg d B?QDDQ ?v]qc Mn**CLQ**,0 6 4 1 0 / / -

Z0 [A- ?kadqsr) Lnkdbt kUp Ahnkf w ne **Sg**dk]bdkRbhdmbd)
Mdv Xnqj)1 / 0 6 (-
Z1 [S- R-A]j dq) M- G-Nkrnm]mc R- C-Et kkdq]cchmf sg d
sg hqchldmrhnm sn u hqk]hedxbkdr **Sg** qdd,childmrhnm]k
qdbnmrsqt bshnm]hmr]g dcq]k hqt rdeqnl bqxn,dkdbsqnm
lhbqnf q]og **r**lhbqnahnk-**nk- AhnkQdu 5 2 7 5 10 8 8 8 (-**
Z2 [T- A- Rkdxsa) Rbg t rsd **Q**,L- Df dkrddq]mc C- Ot l)
R,k]xdqr9 Oqhmbhokdr]mc Jookh]b]Dm]m]nqank**Qdu -**
2 7 7 1 2 1 / 0 3 (-
Z3 [C- K- B]ro]q]mc ?- Jkt f) Og xrb]lqohmbhokdr **nk** sg d
bnmrsqt bshnm]q]t k]q hqt rdm]m BnkRophmGUpnp
RwlonrhU nm Pt UmshsUshud **AHnkf** **6** Bnk Rqohmf
G]qanq K]anq]snqx Oqd]m]v Xnqj)0 8 5 1 **0-0 1 3 -**
Z4 [O- Bdqdr]mc ?- Yksmhbj) **vdj**]sdhm,oqnsdhmhmsdq]bshnmr
]qd rt eehbhdms snqchu d]rrdlakxne Gdo]shshr A Uqtr b]orhc
Ahnbg dlhrsqx 3 0 0 4 1 4 / / 1 (-
Z5 [R- J]sdm]mc ?- Yksmhbj **Sg** d sg dq]ncxm]lhb r **ne** hqt r
b]orhc]rrdlakx) **Ldsg ncr Dmyxlnk3 4 4 2 8 4 1 / / 8 (-**
Z6 [G- C- Mf t xdm) U- R- Qdccc)]mc B- K- Aqnrj r HHH) Hmu]qh]m
onkxlnqog hrl hmu hqt r b]orhc]rrdlakx) **I- ?I- Bg dl- Rnb-**
0 2 0 1)5 / 5 1 / / 8 (-
Z7 [Sg hr hr ct d sn j hmdshb sq] **ehnk** fvdq oqnsdhmbnmbdm,
sq]shnm **sg** d oqna]ahkhsx ne j hmdshb sq]q]at]dc]mc
hmsdq]bshnm dmdqf hdr b]mad g hf g dq **Z8 [-**
Z8 [D- B- Cxj dl]m) O- F- Rsnbj kdx)]mc Q- Sv]qnbj) Rnk u hmf
Kdu hmsg]k r o]q]cnw enq u hqt r]rrdlakx hcdmshehr] t **hnp**
]mshu hq]k]sdf x **QqnbM]sk-?b]c- RbhT-R-?-0 0 0 4)2 5 0**
1 / 0 3 (-
Z0 / [A- Ansg mda) Rbg mddl]mnd) L]qrg]kk)U- Qdccc)I- D-
Ing mrrnm]mc F- Rht yc]j]Bqxs]kknf q]og hb]kx hcdmsb]k
u hqt r b]orhc chrok]x cheedq]m]q]sqhshr hm rnt **sn]m**
Rsq b]nk- Ahnk5) 0 0 30 8 8 8 (-
Z0 0 [F- ?- Rodhda) Ansg mda) Pt) C- ?- Vhkkhst) I- Xnt mf)
]mc I- D- Ing mrrnm]m]g]mbdc knb]k]dsqx hmsdq]bshnmr
f kna]kx rs]ahkhy]d lt s]ms u hqt b]orhc sg]s]hms]hmr
hmedbshu hsx]mc b]orhc cxm]j **h]h]nk7 ,) 2 4 7 1 / / 5 (-**
Z0 1 [F- I- A]sshr]rsqt bst q]kt chdme okdnlnqog hb u hqt rdr)
Og -Csg drh]t qct d Tmhu dq]r **h]h]0 -**
Z0 2 [Sg d ?qbg]d]k]mc At mx]u hqhc]d e]l]hkhdr ne **uq]hgr**
hmbkt cdr sg d G]ms] u hqt r **0 6 2 0 0** hlonqs]ms dw]lokdr-
Sg d F]t rrh]mbt qu]st qd ne rml ne sg d ?qbg]d]k okdnlnqog r

du nku dr nu dq shld **Z0 3 [)** hmsch]s]s]nd]x]qd hm] ekt hckhj d
rs]sd **Z0 6)0 7 [-**
Z0 3 [C- Oq]mf hrg u **Qk]m]qsdq]dc** Q-F]qqdss]u]hqt rdr ne sg d
?qbg]d]9? t mhexhm] hdv] **M]s- Qdu Lhbqnahnk3) 7 2 6**
1 / 5 (-
Z0 4 [F- J- @u dqax **Q- Odssdqrrnd)** Fqömdv]kc]mc I- Gt hr,
j nmdm]m]mrhf g sr hmsn at mx]u hqt r]qbg hsdbst qd eqnl dkdbsq
bqxnsnlnf q]og xne Tt j t mhdli u hqt r) **Oqnb- M]sk- ?b]c- Rbh-**
T-R-?-0 , 4) 2 6 4 / / 7 (-
Z0 5 [L- J- Ohdshk) R- K]t qh]m]d) **h]h]0** R- Rt mc) D- Qnhmd)]mc C- G-
A]lenq) Sg d rhmf kd,rsq]m]cd]m]f d mnlid ne mnu dk
]qbg]d]k u hqt r G]knqt aqt l okdnlnqog hb **uq]hgr** knrdc
hmsg d dmu dknod cdbnq]s]k]x]h]sg]sdhmrohj dr) **I- Uhqnk-**
7 3 6 7 7 1 / 0 / (-
Z0 6 [K- D- Odqns) **R** Cg]q]u]q]l) V- R- Jkt f) I- L]q]m]l) I-
Qt cmhbj]mc Q- EAqt hmrl] Trdet krb]qr9 Og xrb]r ne sg d
b]orhc ne]qbg]d]ku hqt rdr **Og xr-Qdu -D 8 3) / 0 1 3 / 3**
1 / 0 5 (-
Z0 7 [U- Uhsdkh) Kt bj r)]mc C- Mdkrnm]Bqxs]kknf q]og x nm
bt qu dc rt qe]b] **QqnbM]sk-?b]c- RbhT-R-?-0 , 2 0 1 2 1 2**
1 / 5 (-
Z0 8 [Q- K- Eqdccc]hmr] **Q- R- ?qj g honu R- A- K]qrrm) ?-**
LbOg dqrrn]mc J- Rbg t ksd]m]k]dbt k]qcxm]l]hbr rhlit ,
k]shnmne sg dbnlkdsd r]sd]k]h]s]h]a]bbn lnr]hb u hqt r)
Rsq bst qd 0 2) 6 1 / / 5 (-
Z1 [C- Mdkrnm]mc K **Qdks]k** bst]shnmr hm ldlq]mdr vhsq
bqxs]k]khmd]nqdw]shb nqcdq) **Og xr- O]qhr(3 7 0 / 7 4**
0 8 7 6 (-
Z1 0 [Q- Rydkhrj]mc C- Snmmdr]m]r]t peU]b]d]ncdkhmf]vhsq
Nphdmsdc OUpshbkd **R]b]d]m]v Xnqj) 0 8 8 1 () Unk- 1 5 -**
Z1 1 [R- H]kdd]mc R- I]kdd)Deeds ne sg d q]mf d ne sg d onsdmsh]k
nm svn,childmrhnm]k]kshmf **Og xr-Qdu -D 6 7) / 3 0 4 / 3**
1 / 7 (-
Z1 2 [G- Kht) B- Pt) I- D- Ing mrrnm)]mc C- ?- B]rd) Ord]t cn,]snlhb
lncdkr ne rvnkdkmBBLU eqnl bqxn,dkdbsqnm]lhbqnr]bnx
c]s]l) **I- Rsqt b]h]nk0 3 1 2 4 5 1 / / 2 (-**
Z1 3 [F- D- Ing mrrnm]mc I- **Qrodh]t**]rh,dpt hu]kdm]sq]t rdt
q]k]chf l enq oqnsdhm]rrdlakhdr) **Lnk- Ahnk-1 5 8 5 5 4**
0 8 8 6 (-
Z1 4 [Q- Bdqdr]mc ?- Yksmhbj) **vdj**]sdhm,oqnsdhmhmsdq]bshnmr
]qd rt eehbhdms snqchu d]rrdlakxne Gdo]shshr A u hqt r b]orhc)
Ahnbg dlhrsqx 3 0 0 4 1 4 / / 1 (-
Z1 5 [F- Yksmhbj) **vdj**] oqnsdhm oqnsdhm hmsdq]bshnmr
f dmdq]k qt kd hmb]orhc]rrdlakx) **Uhqknf x2 0 4) / 2 5 -8**
Z1 6 [S- Mf t xdm) Q- E- Aqt hmrl])]mc V- L- Fdka]qs) Dk]rshbhsx
sg dnqx]mc rg]od sq]mrhshnmr ne u hq]k rg dkk) **Og xr- Qdu - D**
1 4 0 8 1 2 / 1 4 (-
Z1 7 [V- G- Qnnr) Q- Aqt hmrl])]mc F- I- K- Vt hsd)Og xrb]k
u hqknf **M]s-Og xr5) 6 2 2 1 / 0 / (-**
Z1 8 [F- X- Lqnqynu) Q- E- Aqt hmrl])]mc I- Qt cmhbj) ?rrdlakx
ne u hqt rdr]mc sg d ord]t cn,k]v **h]h]r**]bshnm) **I- Bg dl-**
Og xr0 2 0 0 4 4 0 / 0 / / 8 (-
Z2 [Rdd sg d Rt ookldms]k]L]sdq]k]s **g sso9..khmj -]or-nqf .**
rt ookldms]k.0 / -0 0 / 2 .Og xrQdu Kdss-0 1 8 0 0 5 7 1 0
ne mt ldqhb]k ldsg ncr]mc sg hmrq dkk dk]rshbhsxsg dnqxt rdc hr
sg hr vnqj **g** hbg]mbkt cdr **QdZ2 0 2 7 [-**
Z2 0 [B- Yg t) Q- G- Axqc) O- Kt)]mc I- Mnbdc]k) ?kf nqhsq l 6 6 7 9
K,aef r,a9Enqsq]m rt aqnt shend]k]qf d,r]kd ant mc,bnm,
rsq]hmdc noshly]sh **h]h]0** **Sq]mr- L]sg - Rnesv-1 2 4 4 /**
0 8 8 6 (-

Z2 1 V- Jjarbg) ? rnk shnmenq sg d adrs qns]shnmsnqdk]sd szr d- Q-Rhmf g) D- Odqnsd) E-Aqt hmrlj) I- Qt cmhbj) Jmc
ne u dbsnq] Bqxs]kknf 2 1 8 1 10 8 6 5 (-
Z2 2 U- L- Adc]mnu F- U- F]chx]j) Jmc X- D-Knyu h]Nm]
Inchehdc Khmcd]mm,khj d bghsdqhr]Cedkshmf Og xr- Z3 5 \$g d sns]k mt ladq ne cdf qddr ne eqddcnl h52Kdb]t rd
Kdss0 , 8 1 7 80 8 7 4 (-
Z2 3 \$g d BF?K Oqnidbs]E:J Trdp Umc Qdedpmbd LUmt Uk)Z3 6 Enq r]kk β) sg d rb]khefmbshnr]F3½ hr oqnonqshnm]k snß
3 sgdc- BF?K Dchsnqh]An]qc) 1 / 0 8 (-
Z2 4 U- Anqqdkk]B]y]kr) Jmc I- L- Lnqu]m)Nm sg d]mf t k]q
cdedbs ne sqh]mf t k]shnmr Jmc sg d onhmsvhrd]ooqnwhl]shnmr-
bt qu]st qd]lot s- ?hcd Fdnl- Cdr- 1 , 2 0 81 // 2 (-
Z2 5 ?- Q- Rhmf g) Rst cx ne ydqn]mc ehmhsd sdldod]st qd qdronnm]kkr t mcdq oqdrtr qd) Oqnb- M]sk- ?b]c-
ne chrbqdsd cdenq]akd rt qe]bdr) Og -C- sg drhr) TBK?) 1 / 0 7 Rbh-T-R-?- 0 , 8 0 8 4 4 0 / 0 1 (-
Z2 6 J- Rg ndl]j d) ?mhl]shmf qns]shnmvhsq pt]sdqmhnm]bt qu)Z3 8 Jn lqki Jmc C- Q- Mdkrnm) Rs]shrshb]k Ldbg]mhbr ne Sg hm
:BL RHEEQ:OG Bnlot sdp EpUog hbr?BL) Mdv Xnqj)
0 8 7 4 U]k-0 8 0- 1 3 41 4 3 -
Z2 7 Y- Yg]mf G- S-C]u hr]Jmc C- L- Jqkk]Rb]khm]adg]u hng
ne rdke,]u nhchsd]sg d]dc u drh]b]g]xr-Qdu D 3 7 0 5 4 0
0 8 8 2 (-
Z2 8 I- Khcl]q) K- Lhqmx]Jmc C- Q-Mdkrnm]U]hqt r rg]odr Jmc
at bj khm]q]mrhshnmr hm rog d]h]kr]Og xr-Qdu D 5 7)
/ 4 0 8 0 1 // 2 (-
Z3 / G-,G- u nm Fqömad]d)Jdhl) J- Y]g m]Jmc F- L]qds)
Dk]rshb]Adg]u hng] Svn,Chldmrhnm]k]Bqxs]k Md]q
Ldkshmf Og xr-Qdu Kdss8 2 1 4 4 6 / 2 // 3 (-
Z3 0 E- Bhq]j) L- Nqshy) Jmc O- Rbg qäcdq) Rt achu hrhnmrt qe]bdr]Hm]-
mdv o]q]chf l enq sg hm,rgd]kh]sd,dkld]m]k]xrhr)Hm]-
Mt Idq- Ldsg ncr Dmf3 6 1 / 2 81 // (-
Z3 1 E-Edmf]Jmc V- R-Jkt f) Ehmhsd dkld]m]k]khmfne khohc
ahk]xdq]ldlaq]mdr)I- Bnlot s- Og xr-1 1 , 2 8 31 // 5 (-
Z3 2 Vnsd sg]sg]od ekt bst]shnmr]kv]xr g]u d sn cdbq]rd sg d
u nkt ld ne rg dkk]r adb]t rd sg d]qd] ne rg dkk]r v]r j dos eh]w]g
Z3 3 G- R- Rdt mf Jmc C- Q- Mdkrnm)Cdedbsrhm ekdwhakd hloqnodq]x ct qhs]g d oqnc]t bshnm oqnbdr] Jmc hsr qdmchshnm g]r
ldlaq]mdr vhsq b]qxs]k]khmd nq]d]g]xr-Qdu ? 2 7 0 // 4 addmbnqqdbsd-