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T2! 33-(-/2!(/!(&+)+!-23-6+, (!3' (' G!(&+!KQRN: !' , <9-6+)!3-6+, (!+; -3+2, +!E?!, /11+, (-25! 23!), /6-25!
) (93+2(!4/60G!./, 9)-25!/2!E/(&!) *+, -., !)+, (-/2)! 23!(?*+)!/.!) (' 23' 63!, /6+!(&+/1/5?!, /96)+)!/2!(&+!/2+!
&' 23G! 23!) *+, -., !(&+/1/5?!, /6+!1+' 62-25!5/' 1)!/2!(&+!/(&+6!P/6!+8' 7 *1+G!396-25!NUCVCCFCVCDG!, ' AG!" VV!
*' *+6)!6/7!>KK!, /6+!, /96)+)!4+6+!, /11+, (+3!4+6+!), /6+3!E?!KQRN: !9)-25!' !, /7 7-((+F3+)-52+3!69E6-, !
-2!/63+6!(/!'))+)! (93+2(!1+' 62-25!/2!(&+/1/5?!+ ' 62-25!5/' 1)!W"! 23!WH!\$)++!6+)91()G!E+1/4#AT(!-)!(&+!
-2(+2(!/.!(&+!KQRN: !(/!, /239, (!)9, &! ' 65+F), ' 1+'))+)) 7+2(!*6/λ+, ()!-2; /1; -25!)(93+2(!4/60!+

: &6-)' 2-(?! 23!/(&+6!6+1-5-/9)!(6' 3-(-/2)B!HAI+25' 5-25!(&+!' 6-/9)!3-), -*1-2' 6?!7+(&/3)!6+<9-6+3!./6!
(&+/1/5-, ' 1!6+.1+, (-/2G!-2, 193-25!(+8(9' 1G!&-)/(6-, ' 1G!)/, -' 1G!' 23!, 91(96' 1!' 2' 1?)-)#AIK&+!KQRN: !, /11+, (+3!
-23-6+, (!+; -3+2, +!-2!(&+!./67!/.!2+4!<9+)(-/2)! 33+3!(/!' 11!Kc]d!, /6+!, /96)+)!E+5-22-25!-2!PCC!(&' (!
3-6+, (1?! 336+))!(&+!(&+/1/5?!1+' 62-25!5/' 1)M!P96(&+67/6+G!(&+!KQRN: !, /11+, (+3!3-6+, (!+; -3+2, +!6/7!(&+!
PCC!>KK!, /96)+)!\$, ' A!''VV!+8' 7 *1+)!.6/7!CC!, /96)+)!#!' 23G!4/60-25!4-(&! +1+)(+!%+11)! 23!Y+)-, ' !e6++2+G!
3+; +1/*+3!' !), /6-25!69E6-, !./6!(&/)+!'))-527+2()!(&' (!-8' (+3!/2!1+' 62-25!5/' 1)!W''! 23!WHA!

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. "' /\$01. \$ (2\$: !%&' (!4+6+!(&+!7' X/6!'))+) 7+2(!.-23-25)=!c' ; +!(&+6+!E++2!' 2?!6+, +2(!, &' 25+)!(/!
?/96!, 966-, 9197!/6!*6/56' 7=!c/4!3-3!(&+!'))+) 7+2(!3' (' !, /2(6-E9(+!(/!(&/)+!, &' 25+)=!

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!P6/7!E+. /6+!(&+!2+4!)(' 23' 63!(&+/1/5?! , /6+!4')!- 7 *1+ 7+2(+3!
-2!P"b!(&6/95&!NUVCV"FCVCC!(4 /!)9**1+ 7+2(' 6?!<9+)(-/2)!&' ; +! ' **+ ' 6+3!/2! 1!)(93+2(!, /96)+!
+; ' 19' (-/2)6!-2(+23+3!(/! '))+))!(93+2(!*+6, +*(-/2!/.!(&+-6!(&+/1/5?! , /6+!,1')))! .91.-17+2(!/!.!(&+!
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"#! K&-)! : /6+!K&+/1/5?! , /96)+!&')!&+1*+3!7+!923+6)(' 23!(&+!923' 7+2(' 1!(+8)! ' 23!*6' , (-, +)!(&' (!
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,1' -7)! ' 23!(&+-6! 7 /6' 1!-7 *1-, ' (-/2)6!E/(&!*+6)/2' 1! ' 23!)/ , -(' 1A!
K&+)+! ' 6+! ' 2)4+6+3!/2! ' !), ' 1+!/.!"F1!\$"!k!)(6/251?!3-) ' 56++6! !k!)(6/251?! ' 56++##!K&+!KQRN: !, /7 *' 6+3!

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'))-52 7+2(!')! 336+)))-25!) *+, --, !1+ ' 62-25!5/' 1)!-)(+3A!K&-)!4-1!2/(!/21?!923+6), /6+!./6!)(93+2(!(&' (!
(+!+ ' 62-25!5/' 1)! ' 6+!E+-25! ' 336+)))+3!\$+; +2!-!, 1+ ' 6!?!(&+?!*+6, +-; +!(+ 7!')!E+-25! ' 336+)))+3#6!E9(!4-1!
' 1)/!'))-)(!-2)(69, (/6)! 23!(+!KORN: !-3+2(-?! ' 23!, /11+, (!6+1+; ' 2(!)(93+2(!4/60!./6!))+)) 7+2(!*6/λ+, ()!
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(&+/1/5?!, /6+!-7 *1+ 7+2(+3!-2!NUCV" bFCVA!K&+!6+)91(!/.!(&' (!)(93?! , /2.-6 7+3!(&' (!(&+!3+*' 6(7+2(!&' 3!

(&+!)(' ..-25! ' 23!' ; ' -! ' E1+!)+' ()!2+, +))' 6?!./6!)(93+2(!(/!.91.-1!(&+6!(&+/1/5?!, /6+6!' 23!(&' (!)(93+2(!).+1(!

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