





%&' ()\* +&(", - . "/0 1 2"34"5067"%2893/: 29;")<1 "-9> 1 "?82"@2/?29">="59243A2/?307"" 34?>9. "0?"

B>6?829/" - 2?8>A34?"C/3D2943?.;""

- )E&B,"- . "/0 1 2<4"B3 1 >/" - 3724;")<1 "0/"04434?0/?"F9>=244>9"0?"?82"B0/=>9A"BG8>>7">="56H73G"

5>73G. "0?"I 6J2"C/3D2943?.;""

BK&\* K,")<1 "L/: 270"B?2/?;")<1 "A392G?>9">="?82"@2/?29"=>9"&690430/M' (64430/M'0/A"&04?"

&69>F20/"B?6A324"0/A"0"F9>=244>9">=": >D2



?82"N09"3/"@82G8/. 0;"L/A"=>9"077">="?8>42"9204>/4"?82"9270?3>/483F"92077. "80A"



( 64430"F>73G. ;"L/A"04"F09?">="834"92D32NM"N2"3/"?82"R=3G2">="5>73G. "570//3/: W0/A"  
 (3G809A"" 0044"N04"?82"820A">="3?"?82/W0G?6077. "N9>?2"0" 1 2 1 >"?83/J3/: "0H>6?"  
 N80?"3?" 1 3: 8?" 1 20/"N292"N2"?>="29" ( 64430" 1 2 1 H29483F"3/"\* LKR;"B">"834"N04"  
 0/>?829"34462">="G>/?2/?3>/"H2?N22/"?82"@73/?>/"0A 1 3/34?90?3>/"0/A"?82"Y27?43/"  
 0A 1 3/34?90?3>/M"N04"?82"0A 1 3443>/>="5>70/AM" 6/: 09. M0/A"?82"@X2G8" (2F6H73G"?>"  
 \* LKR;"L/A"?80?"N04"0/"2U0 1 F72">="0"=>9N09A#720/3/: "F>73G. "40. 3/: M3=" ( 64430"92077. "  
 A3A"N80?"3?"/22A2A"?>"A>"?>"0>3/"\* LKRW0/A"56?3/"80A"2UF73G3?7. "04J2A"07920A. W  
 SQQ,Q\_QQT"N80?"N292"?82"G80/G24"?80?" ( 64430"G>67A"0>3/"\* LKR`"K82/"?80?"N>67A"  
 07920A. "720A" ( 64430"3/"0"A392G?3>/"?80?"N>67A"H2"H2/2=3G307M"N2"?8>6: 8?"0?"7204?M  
 3/?29/0?3>/077. ;"K82" 1 2 1 >"/2D29"N2/?"D29. "=09;"V 2"A3A"42/A"3?"6F"?>"?82"42G92?09. "  
 >="4?0?2;"

B>)"N>67A"40. "?80?M"93: 8?"=9 > 1 "?82"H2: 3//3/: ">="?82"%648"0A 1 3/34?90?3>/M  
 ?8292"N292"A34F6?24W04"?8292"092M")?83/JM3/"2D29. "0A 1 3/34?90?3>/VH2?N22/"  
 F2>F72"N8>="0D>92A"0" 1 >92"F90: 1 0?3G"F>73G. "?>N09A" ( 64430W=>G643/: ">/"A2073/: "  
 N3?8" ( 64430"3/?29/0?3>/077. M=>G643/: ">/"344624"73J2"09 1 4"G>/?9>7M=3/A3/: "N0. 4"  
 N8292"N2"G>67A"N>9J"?>: 2?829W0/A"?8>42"N8>"N292" 1 6G8" 1 >92"=>G642A">/"  
 A2 1 >G90G. "0/A"86 1 0/"93: 8?4"0/A"N80?"N04"80FF2/3/: "3/?29/077. "3/" ( 64430;"L/A"3/"  
 \$QQ!M"56?3/">/7. "H22/"3/">="3G2"0". 209;"L/A"82"4?377">>J2A"04"3="82"N04" 1 0. H2"  
 3/?2924?2A"3/" : 920?29" ( 64430/"3/?2: 90?3>/"N3?8"?82"V 24?;" 2"80A/<". 2?"92077. "  
 2 1 H09J2A">/"0"F>73G. ">="92F92443>/M"H6?"?8>42"344624"N292"?8292M)"N>67A"40. "93: 8?"  
 =9 > 1 "?82"4?09?M0/A">="G>6942"?82"344624": >?" 1 >92"G>/?2/?3>64"04"?3 1 2"N2/?"H. ;"





K8292"N292"4> 1 2"3/"?82"%648"0A 1 3/34?90?3>/"N8>"N292" 1 >92"4J2F?3G07"  
 0H>6?" \* LKR"2/709: 2 1 2/?M#H6?". >6"A3A": 2?"?82"%3: "%0/: "3/"\$QQ\_M"N82/" . >6"  
 0A 1 3??2A"?82"924?">="@2/?907"&69>F2"0/A"?82"?8922"%07?3G"4?0?24"?80?"80A">="G>6942"  
 H23/: "F09?">="?82"B>D32?"C/3>/;"L/A"?82/"N82/"3?"G0 1 2"?>="69?829"2UF0/43>/M"?8292"  
 )"?)83/J"2D2/"B2G92?09. "(3G2"0/A">?8294"0/A"B2G92?09. "+0?24"N292"074">" 1 >92"  
 4J2F?3G07;)/"/>?829"N>9A4M"?82"3A20">="0A 1 3??3/: "0/. ">?829"F>4?#B>D32?"4?0?2VW0/A"  
 N2"A>/<"92077. "G>6/?"?82"%07?3G"4?0?24"04"F>4?#B>D32?"4?0?24VWH6?"?82"924?">="?82"  
 F>4?#B>D32?"4F0G2M?73J2"+2>9: 30"0/A"CJ903/2"VW2D2/"?82. "H2732D2A"?80?"N04"  
 F9>H0H7. "0"H93A: 2"?>>="09;"B>"?8>42"A2H0?24"N2/?">/;"%6?" ] 3G2"59243A2/?"@82/2. "  
 831 427="N04"0A0 1 0/?"0H>6?"/>?"/7. "?82"/22A"=>9"?82"\$QQ\_"2UF0/43>/M#H6"?82"  
 F>443H373?. ">="69?829"2UF0/43>/M#04"N292"0"/6 1 H29">="F2>F72"N8>"N>9J2A"3/"834"  
 >=3G2;"L/A)"?)83/J"59243A2/?"%648"831 427="N04"F29460A2A;"  
 - )E&B,"@0/"?)064?"04J"b63GJ7. "3=" . >6"80A"0"42/42"SQO,Qd,QQTM=>9"2U0 1 F72M">="@>/A>722XX0"  
 (3G2<4">F3/3>/4;"R/2">="?82"3/?2924?3/: "?83/: 4"?>" 1 2"0H>6?"?82"%648"0A 1 3/34?90?3>/"  
 34"8>N" 1 0/. "(64430"2UF29?4W)": 6244" 1 0. H2"N2"48>67A"40. "B>D32?"2UF29?4W3?"



(64430"F90: 1 0?3G077. ">/344624"N8292"N2"80D2"G> 1 1 >/3/?2924?4"0/A"?80?"N2"A>/?"  
=>G64">/N80?"80FF2/4"A> 1 24?3G077. "3/" (64430M"H6?"074>M"04"F09?">=?80?M?80?"N2"  
80D2"?>"H2"D29. "G092=67">=?0J3/: "0G?3>/4"?80?"N>67A"92077. W=9> 1 "?82" (64430/"0/A"  
?82"Z92 1 73/<4"F>3/?">="D32NW?8920?2/"?8239">N/"42G693?. ;"\9> 1 "834"F>3/?">="D32NM"  
G29?03/7. "?8292"N04" 1 >92"4J2F?3G34 1 "0H>6?"?80?;"\* >NM". >6"074">80A">/?82" \* 0?3>/07"  
B2G693?. "@>6/G37WK8> 1 04"+9080 1 "064?"80A"?82" (64430"F>9?=>73>;"K80?4"8>N"?80?"  
N04">9: 0/3X2A"3/"?82"%648"0A 1 3/34?90?3>/;"I 0/"\932A"80A"&69>F2M"0/A"82"34"  
4> 1 2>/2"N8>"34" 1 6G8" 1 >92"=>G642A">/N80?"80FF2/4"A> 1 24?3G077. "3/" (64430;" 2A"  
074">80A"2UF2932/G2"04"0 1 H0440A>9"?>"5>70/AM"4">82"N04"074">=>G642A">/N80?"N04"  
80FF2/3/: "3/"@2/?907"0/A"&04?29/"&69>F2"0/A"N04"D29. " 1 6G8" 1 >92"0"H2732D29"?80?"  
077">="@2/?907"0/A"&04?29/"&69>F2"0/A">?829"G>6/?9324M"3/G76A3/: "3/"?82"F>4?#B>D32?"  
4FOG2M"0?"7204?"48>67A"80D2"?82"93: 8?"?>"G8>>42"N83G8"=>923: /"F>73G. "07730/G2"?82. "  
N292"3/;"V 3?83/"?82" \* 0?3>/07"B2G693?. "@>6/G37"3?427=M"?8>42"?N">"F>3/?4">="D32NM"  
F09?3G67097. "K8> 1 04"+9080 1 "4"0/A" I 0/"\932A"4M"N292">=?2/"3/">FF>43?3>/"?>"20G8"  
>?829;"

)/" ] 3G2"59243A2/?"@82/2. "4">=3G2M"0"/6 1 H29">="F2>F72"SQQ,!Q,00TW>=?2/"  
F2>F72"N8">"G> 1 2"?>"?834"N3?8"0"H0GJ: 9>6/A"J/>N72A: 2">="@2/?907"0/A"&04?29/"  
&69>F2M">9" 1 0. H2"CJ903/2M">9">?829"G>6/?9324W0": 9>6F">="F2>F72"N8">"N292"D29. "  
46FF>9?3D2">=" +2>9: 30"0/A"92077. "?8>6: 8?"?80?" +2>9: 30"48>67A": 2?"3/?>"\* LKR;)" /"  
?82"B?0?2" I 2F09? 1 2/?M". >6"80A" I 0D3A"Z90 1 29M"N8">"2D2/?6077. "H2G0 1 2"?82"04434?0/?"  
42G92?09. "=>9"A2 1 >G90G. M"70H>9M"0/A"86 1 0/"93: 8?4M"N8">"N04"D29. "=>G642A">/N80?"



N04"80FF2/3/: "A> 1 24?3G077. "3/" ( 64430"0/A"074>"46FF>9?3/: " 1 >D2 1 2/?4M"H>?8"3/43A2"  
 ( 64430"0/A"N3?83/"?82"F>4?#B>D32?"G>6/?9324M">="F2>F72"N8>"N292"3/">FF>43?3>/"?>"  
 1 >92"92F92443D2"92: 3 1 24"0/A"N8>"N0/?2A" 1 >92"A2 1 >G90?3G"92: 3 1 24;"L/A"82"  
 SZ90 1 29T"N04"3/"=0D>9">="=69?829"\* LKR"2/709: 2 1 2/?;"K8292"92077. "N292"b63?2"A22F"  
 A3D343>/4"?8292"SN3?83/"?82"%648"0A 1 3/34?90?3>/T;"  
 %&' ( ) \* + & ( "K80/J". >6;"L/A"4>" 1 >D3/: "?>"?82"F9243A2/?307"9270?3>/4" 1 >92"A392G?7. W4>"  
 %648"0/A"56?3/"80D2"?82"=0 1 >64" 1 22?3/: "3/"B7>D2/30"3/"f6/2M\$QQ!;"L/A"G>67A". >6"  
 ?07J"0"73??72"H3?"0H>6?"N80?"?82"43: /3=3G0/G2">="?80?"=394?"F294>/07"3/?290G?3>/"N04`""  
 BK&\* K,"B692;"59243A2/?"%648"G0 1 2"3/;"V 2<A"80A"?82"2UF6743>/">="?82"A3F7> 1 0?4;"%6?"?82/"  
 59243A2/?"%648" 1 0A2"834"=394?"?93F"?>&69>F2;"L/A"82"92077. "N04/<?"D29. "N277"  
 92G23D2A"?8292;")<1 "?07J3/: "0H>6?"@80/G277>9"BG89gA29M"59243A2/?"@8390b;"K82"  
 &69>F20/" 1 2A30"80A"H273??72A"83 1 M"A3A/<?"0J2"83 1 "?80?"4293>647. ;" 34"92G2F?3>/"3/"  
 &69>F2M"V 24?29/"&69>F2"F09?3G67097. M"N04"/>?"D29. ": >>A;"L/A"?82/"82"N2/?"?>"  
 B7>D2/30M"0/A")?83/J">/2">="?82"3 1 F>9?0/?"F>3/?4"34"?80?"?82"N0. "?80?"59243A2/?"  
 56?3/"SQQ,!\$,QQT"?920?2A"59243A2/?"%648">/"?8239"=394?" 1 22?3/: "N04" 1 6G8" 1 >92"  
 924F2G?=67"?80/"?82"N0. "82"N04"?920?2A"H. "4> 1 2">="?82">?829"&69>F20/"720A294;"  
 59243A2/?"56?3/"804"0"H0GJ: 9>6/A"04"0"Z+%G042">="=3G29;" 2"80A"A>/2"834"  
 8> 1 2N>9J;"L/A"82")?83/J"80A"?8>6: 8?"4293>647. "0H>6?"8>N"?>"?07J"?>"59243A2/?"  
 %648;"R/2">="?82"?83/: 4"82"92077. "N0/?2A"?>"3 1 F9244">/"59243A2/?"%648"N04"?82"  
 A0/: 29"F9242/?2A"H. ")470 1 3G"=6/A0 1 2/?0734 1 ;" 2"?8>6: 8?"?80?"?82"C/3?2A"B?0?24"





074>"J/>NMM'OGG>9A3/: "?>"59243A2/?"%648M?80?"?82" 1 22?3/: "4?09?2A">=="N3?8"56?3/"  
920A3/: "=9> 1 "/>?2"G09A4;"L/A"?82/"3?"N04"59243A2/?"%648"N8>"04J2A"831 "0H>6?"?82"  
G9>44"?80?"59243A2/?"56?3/"N04"N2093/: ;"L/A"?82"4?>9. "?8292"34"?80?"56?3/"4"  
: 90/A 1 >?829^4"8>642"80A"H69/2A"A>N/"0/A". 2?"?82"G9>44"80A"H22/"40D2A;"B>"?82. "  
OG?6077. "?07J2A"0H>6?"M'OFF092/?7. M'0H>6?"9273: 3>/"?>: 2?829;"  
B>"?82"F>3/?"0H>6?"?834"34M'3/"?82"C;B;" ( 64430/"9270?3>/483FM?82"F294>/07"  
9270?3>/4"H2?N22/"?82"F9243A2/?4"092"2U?92 1 27. "3 1 F>9?0/?M' 1 >92"4>"?80/"3/" 1 0/. "  
>?829"G>6/?9324;"L/A"?80?4"H2G0642"N2"A>/<"80D2"?80?" 1 0/. "4?0J28>7A294"3/"?834"  
9270?3>/483F;" ( 64430"34/<"0/"3 1 F>9?0/?"2G>/> 1 3G"F09?/29;"√ 2"092"?82"N>97A<4"?N>"



F04?"[Q". 2094"43/G2"?82"B>D32?"G>770F42"N04"?82"=077">="\$QQ!"N82/"?82"C;B;"0/A" ( 64430"  
 N292"N>9J3/: "?>: 2?829M0/A"?82" ( 64430/4"0G?6077. "A3A"827F"?82"C;B;"3/"?82"3/3?307"  
 G01 F03: /"3/"L=: 80/34?0/"?>"9>6"?82"K073H0/;"K82"1 22?3/: "3/"B7>D2/30"=0G373?0?2A"  
 ?80?"G>>F290?3>/": >3/: "=>9N09A;"

%&' ()\* +&(", "L/A"0/>?829"F69F>42"?80?">=?80?"1 22?3/: "N04"?>"G>/D2. "?82"3/?2/?3>/"?>"  
 N3?8A90N"=9> 1 "?82"L/?3#%07734?3G" - 344372"K920?. M3=")<1 "/>?"1 34?0J2/;"K82" ( 64430/"  
 422 1 2A"?>"80D2"G> 1 1 6/3G0?2A"F92??. "G72097. "?80?"?82. "A3A/<?"N0/?"?80?"?>"80FF2/;"  
 V 8. "A3A"?82"%648"0A 1 3/34?90?3>/": >="=>9N09A"N3?8"3?"0/A"N3?8"F70/4"=>9"1 344372"  
 A2=2/42"1 >92"H9>0A7. `"

BK&\* K,"B>"?834"N04"4> 1 2?83/: "?82. "3/8293?2A;"K82"1 344372"A2=2/42"F9>: 901 "N04"  
 4> 1 2?83/: "?80?"80A"H22/"F29G>70?3/: "=>9"0"A2G0A2M?8>6: 8"/>?"2D29. >/2"3/"?82"  
 @73/?>/"0A 1 3/34?90?3>/"0G?6077. "=0D>92A"3?M3?"N04"G29?03/7. "=0D>92A"H. "?82"C;B;"  
 @>/: 9244W0/A"3?"N04"A2G3A2A"?80?"0"1 344372"A2=2/42"4. 4?2 1 "N>67A"H2??29"F9>?2G?"



?920?324"/>?"/. "N292"D29. "31 F>9?0/?"3/"?29 1 4">="N80?"?82. "0G?6077. "G>/?9>772AW3/"  
 >?829"N>9A4M"8>N"1 0/. ">="?8242"4. 4?2 1 4". >6"G0/"80D2WH6?"3?4"?82"4. 1 H>734 1 ;")?4"  
 ( 64430"04"0/"2b607"F09?/29"?>"?82"C/3?2A"B?0?24;"L/A">="G>6942M"N3?8"?82"B>D32?"  
 G>770F42M"3?"N04"D29. "809A"?>"064?3=. "?82"=0G?"?80?" ( 64430"N04"0/"2b607"F09?/29"?>"?82"  
 C/3?2A"B?0?24M": 3D2/"3?4"2G>/> 1 3G"0/A">?829"F9>H72 1 4;"B>"?82"N3?8A90N07"=9> 1 "?82"  
 L%- "K920?. "N04"92077. M=9> 1 "?82" ( 64430/"F>3/?">="D32NM"422/"04"0"43: /">="A34924F2G?"  
 ?>" ( 64430M">="H920J3/: "0"?920?. M"0/A"F>?2/?3077. "A0/: 29>64"=9> 1 "?82"H2: 3//3/: ;"K82"  
 ( 64430/4"403AM"N2"?83/J"?80?"?834"34"A392G?2A"/>?"/. "0: 03/4?"90/MH6?" 1 344372"  
 A2=2/42"G>67A"H2"A392G?2A"0: 03/4?" ( 64430"3?427=;"L/A"59243A2/?"%648"A3A"G> 1 2"3/?>"  
 >=3G2"0/A"OFF>3/?2A"F2>F72"73J2"f>8/"%>7?>/"0/A">?8294"N8>"N292"D29. "1 6G8"  
 >FF>42A"?>"@>7A"V 09#290"09 1 4"G>/?9>7"?920?324M3/G76A3/: "?82"L%- "?920?. M"0/A"?82. "  
 N292"A2A3G0?2A"04"4>>/"04"?82. "G0 1 2"3/?>">=3G2"?>"80D2"?82"C;B;"N3?8A90N"=9> 1 "3?;"

%&' ()\* +&(",L/A"8>N"N>67AW""

- )E&B,"B>99. "5067M"GO/"N2"064?"J22F": >3/: "N3?8"?834"D29H07"2097. "?69H672/G2"?82 1 2M3="N2"  
 1 0. ` "V 2D2"80A"Ph!!M"N2D2"80A"L%- ;"V 80?"0H>6?"?82">?829"H3: "2F34>A2"3/"?82"  
 2097. "%648". 2094M"0/A"?80?4"?82")90b"V 09`"@0/". >6": 3D2"64"0"42/42">="8>N"3?"422 1 2A"  
 ?>". >6"?80?"?82" ( 64430/"720A29483F"920G?2A"?>"SQQ,Id,QQTM"6/A294?>>A"?8>42"2097. #  
 \$QQ["A2G343>/4"3/"F09?3G6709` "

BK&\* K,"B>/>N"N2"G> 1 2"?>"?82"H2: 3//3/: ">="?82"73?0/. ">="G> 1 F703/?4"?80?"N2D2"8209A"  
 =9> 1 "56?3/"0/A" ( 64430"43/G2"\$QQ\$;"B>"N2"48>67A"074>M"H. "?82"N0. M"40. "?80?"0=?29"?82"  
 N3?8A90N07"=9> 1 "?82"L%- "?920?. M"59243A2/?"%648"0/A"59243A2/?"56?3/"A3A"43: /"?82"



\$QQ\$"BR (K"?920?. W0: 03/M"0"H903/G837A">="F2>F72"73J2"f>8/"%>7?>/\WN83G8"N04/



: 3D2/"H932=3/: 4"3/"A3==292/"F09?4">=?82"C;B;": >D29/ 1 2/"MH6?"2D2/"=9> 1 "?82"  
( 64430/"F>3/">="D32N"3?"=27?">"?82 1 "04"3=?82"C;B;";=>G642A"D29. "1 6G8">/" ( 64430<4"  
2G>/> 1 3G"4?0J2"3/" )90b"0/A"/>?">/"?82"42G693?. "4?0J2;"\9> 1 "?82" ( 64430/"F>3/">="<br>D32NM"?82"3A20">="3/D043>/"0/A"A24?0H373X3/:"?834"F09?">=?82"N>97AM"/>?"?>="=09"=9> 1 "<br>N8292" ( 64430"34M"N04"92077. "422/"04"0" 1 00>9"F>?2/?307"42G693?. "?8920?">"?82 1 ;"L/A"



=0G?"80?"82" ( 64430"92077. "80A/?"H22/"G>/467?2A">/"?834"S?82"A2G343>/"?>"3/D0A2"  
)90bT;)"?"80A"064?"H22/"3/=>9 1 2A;"

%&' ()\* +&(", "L/A"04". >6"064?" 1 2/?3>/2AM?82"G>7>9"92D>76?3>/4"G> 1 3/: "93: 8?">/"?82"82274"  
>="?82")90b"3/D043>/W3=". >6"G>67A"2UF0/A"0"73??72"H3?">/"8>N"?82" ( 64430/4"D32N2A"  
?8>42"0/A"G>67AM">9"48>67AM?82"%648"0A 1 3/34?90?3>/"80D2"80/A72A"?8239"0FF9>0G8"  
>9"920G?3>/"?>"?82"92D>76?3>/4"3/" +2>9: 30M"CJ903/2M0/A"Z. 9: . X4?0/"A3=292/?7. ` "R9"  
A3A"?82. "?0J2"0"H9>0A#H9648"0FF9>0G8"?>"?8>42"?8922` "

BK&\* K,"R/2">="?82"2442/?307"F92 1 3424">=" ( 64430/"=>923: /"F>73G. "6/A29"56?3/W/>?">/7. "  
6/A29"56?3/MH6?"F09?3G67097. "/>N"6/A29"56?3/W34"?80?" ( 64430"A>24"80D2"0"93: 8?"?>"  
0"4F8292">="F93D372: 2A"3/?2924?4"3/"?82"F>4?#B>D32?"4F0G2;"L: 03/M?80?"3?4"A2=2/42"  
F293 1 2?29"34"A2=3/2A"/>?"04"?82"H>9A294">="?82" ( 64430/"\2A290?3>/"H6?"04"?82"  
H>9A294">="?82"=>9 1 29"B>D32?"C/3>/M0/A"?82"3A20">="F9>#V 24?29/": >D29/ 1 2/?4"  
G> 1 3/: "/209"?>" ( 64430"N04"422/"04"0"?8920?M"N04"G29?03/7. "A2=3/2A"04"0"F>?2/?307"  
?8920?;"B>"3=". >6"4?09?">="3/" +2>9: 30M"&A609A"B82D09A/OAX2"N04"?82"F9243A2/?">="<br>+2>9: 30"0/A"SQQ,\$\_,QQT"80A"H22/">/2">="?82"704?"B>D32?"=>923: /" 1 3/34?294;" 2"A3A/?"  
80D2"0": 920?"9270?3>/483F"N3?8" ( 64430W?8292"N292"0"7>?">="?2/43>/4WH6?"=9> 1 "?82"





?8239"G0/A3A0?2;" 2"N04"-9> 1 "?82"204?M0/A"?82. "42/?" 1 >/2. "0/A"F2>F72"?>"827F"

831 ;"L/A"?82/" . >6"80A"] 3J?>9"Y648G82/J>"96//3/: "0: 03/4?"831 M"N8>"80A"H22/"=>9"

0"?31 2"?82"820A">="82"@2/?907"%0/J;" 2"80A"0/"L 1 293G0/"N3=2W0G?6077. "0"=>91 29"

4?6A2/?">=" +2>9: 2?>N/"N8>)"?06: 8?W0/A"82"N04"044>G30?2A"N3?8"?82"C/3?2A"

B?0?24"0/A"&69>F2"0/A"?82"V 24?;"L





Y648G82/J>"N>/;"B>"=9> 1 "?82" ( 64430/"F>3/?">="D32NM"?82"C;B;"80/A"N04"?8292M"?82. "

G703 1 2A"3?"N04"077"46FF>9?2A"H. "?82"i4F2G307"429D3G24j">="?82"C;B;""

\* >NM"N82/"3?"G0 1 2"?>"Z. 9: . X4?0/M"?8292"N292"4> 1 2"A3=292/?"344624"?8292"

H2G0642"N80?". >6"80A"3/"Z. 9: . X4?0/"N04"0"C;B;"S 1 373?09. T"H042W0/A"?80?"N04": >24"

H0GJ"?>"?82"3/3?307"G0 1 F03: /"3/"L=: 80/34?0/W0/A"?82"C;B;"H042M0/A"?82"

: >D29/ 1 2/?">="Z. 9: . X4?0/"?80?"N04"?82"/>D29?89>N/"N04"A>3/: "b63?2"N277"=9> 1 "?82"

C;B;"H042;"K8292"34"4> 1 2"2D3A2/G2"?80?M3/"\$QQaM"?82" ( 64430/4"3/"=0G?"N292"

46FF>9?3/: "?82": 9>6F4"?80?">FF>42A"?82": >D29/ 1 2/?"3/"Z. 9: . X4?0/;"K82" ( 64430/4"

A3A/?"73J2"N80?"80FF2/2A"3/"Z. 9: . X4?0/;"%6?"3/"?82"2/AM"?82"Z. 9: . X4?0/"

: >D29/ 1 2/?"?80?"92F70G2A"?82">/2"?80?"N04">D29?89>N/" 1 03/?03/2A"3?4"?324"?>"

( 64430;"\9> 1 "?82" ( 64430/"F>3/?">="D32NM"?3?"N04"A2=3/3?27. "?82"R90/: 2" ( 2D>76?3>/"

?80?"N04"422/"?>"H2"?82" 1 >4?"A392G7. "?8920?2/3/: "?>"?8239">N/"3/?2924?4;"L=?29"?82"

R90/: 2" ( 2D>76?3>/M. >6"80D2"?82"H2: 3//3/: ">=" 1 6G8": 920?29"G70 1 FA>N/"3/43A2"

( 64430"0: 03/4?">FF>43?3>/": 9>6F4;""

%&' ( ) \* + & ( , "L/A"3=")<1 "/>?" 1 34?0J2/"09>6/A"\$QQaW. >6"G0/"?277"64" 1 >92"4F2G3=3G077. W

. >6" 1 >D2A"=9> 1 "B?0?2"5>73G. "570//3/: "?>"?82" \* 0?3>/07")/?2773: 2/G2"@>6/G37` ")4"?80?"

G>992G?` "

BK&\* K,"B>)"N04"H0GJ"0?" +2>9: 2?>N/;"B>)"N04"3/"SQQ,[Q,QQT"?82" \* 0?3>/07")/?2773: 2/G2"

@>6/G37"3/"\$QQ\_ "0/A"\$QQaW4>"?8>42"?N>"G072/A09". 2094;"V 82/")"/3. 2A"H809"M080/3



(2D>76?3>/;"L/A"?82/)"N04WN277M"A>". >6"80D2"0"4F2G3=3G"b624?3>/". >6"N0/?"?>"

04J`"

%&' ()\* +&(,)"N04"064?": >3/: "?>"04J"3=". >6"G>67A"?277"64"0"73??72"H3?" 1 >92"0H>6"?82"

A3=292/G24"H2?N22/"N>9J3/: "3/"?82"B?0?2"l 2F09?1 2/?"5>73G. "570//3/: M"0/A"?82"

N>9J"0"?82"\* 0?3>/07")/?2773: 2/G2"@>6/G37M"N80"??. F2">="N>9J". >6"N292"A>3/: "?8292"

0/A"N80"?3?"N04"73J2"?>"N>9J"?8292"A693/: "?82"%648"0A 1 3/34?90?3>/`"

BK&\* K,"B692;"B>"3/"?82"B?0?2"5>73G. "570//3/: M". >6"92"46FF>42A"?>"H2"A>3/: "7>/: 29#?29 1 "

?83/J3/: M"H6?">="G>6942". >6"-3/A">6?"D29. "4>>/"?80?". >6"G0/?"92077. "A">82"7>/: 29#

?29 1 "?83/J3/: "6/7244". >6"92077. "J/>N"N80?4": >3/: ">/;"L/A"3/"?80?"F>43?3>/M". >6"

80D2"?>"J22F">/"?>F">="N80?4"80FF2/3/: "3/"?82"92: 3>/07"H692064M"H6?". >6"092/?"

: 3D3/: "F>73G. "0AD3G2;"

K82"\* 0?3>/07")/?2773: 2/G2"@>6/G37"43?4"0?>FWN82/)"N04"?8292M"3?"N04"!a"





\* >NM?82">?829?83/: "?80?")"80D2"SQO, [\_ .OOT"?>"40. "34"N82/")"4?09?2A"0?"?82"  
 \* 0?3>/07")/?2773: 2/G2"@>6/G37"3?"N04"4?377"F09?">="@2/?907")/?2773: 2/G2;"K80?"34"?>"40. M  
 ?82"A392G?>9">="?82"@)LM"@2/?907")/?2773: 2/G2M"N8>"N04"+2>9: 2"K2/2?WN2"N292"  
 6/A29"831 ;"L/A"?82/M"N8372)"N04"?8292M?82"R=3G2">="?82"l 392G?>9">=" \* 0?3>/07"  
 )/?2773: 2/G2M?82"RI \* )M"N04"42?"6F;"K834"N04"0"A392G?"924F>/42"?>"Ph!!M"?>"?82"3A20"  
 ?80?"Ph!!"G>67A"80D2"H22/"OD>3A2A"80A"?82"A3=292/?"3/?2773: 2/G2"0: 2/G324"80A"1 >92"  
 G>>9A3/0?3>/0/A"80A"F2>F72"/>?"H22/"4>"437>2A;"B">"N82/"?82. "42?"6F"?82"RI \* )W  
 0/A"?82"=394?"I \* )"N04"L 1 H0440A>9"f>8/"\* 2: 9>F>/?2WN2"?82/"483=?2A"=9> 1 "  
 92F>973/: "?>"?82"A392G?>9">="?82"@)L"?>"92F>973/: "?>"?82"A392G?>9">="?82"RI \* )M">="<br>
 \* 0?3>/07")/?2773: 2/G2;"K80?"S?90/43?3>/T"N04"0"73??72"H6 1 F. "H2G0642"3/"077">="?8>42"



@2/?907"L430;"K8292"N04"0"93>?"3/"?82"F934>/"S3/"L/A30>/T;"L"/6 1 H29">="F2>F72"  
044>G30?2A"N3?8"0": 9>6F"G0772A"LJ90 1 3. 0M"N83G8"N04"0/")470 1 34?": 9>6FM"80A"H22/"  
31 F934>/2A;"K82"CXH2J": >D29/ 1 2/?M"N83G8"N04"D29. "92F92443D2M"80A"403A"?80"?82. "  
N292"077"=6/A0 1 2/?0734?4"0/A"?299>934?4;"R?829"F2>F72"80D2"0442442A"?80"?834"N04"0"  
: 9>6F"?80?"N04/?"/2G2440937. "0"?299>934?": 9>6F"H6?"N04"0AD>G0?3/: "=>9"?8239"93: 8"?>"  
N>9483F"3/"?82"N0. "?80"?82. "N0/?2A"?>;"Y>6"80A"0"F934>/"93>?M?82. "4> 1 28>N": >?"  
3/"N20F>/4"=9> 1 "?82">6?43A2;"K82": >D29/ 1 2/?"G70 1 F2A"A>N/"D29. "809A">/"?80?;"?)?"  
J3772A"N2"A>/??"92077. "J/>N"8>N"1 0/. "F2>F72M"H6"?3?4"F9>HOH7. "3/"?82"86/A92A4;"  
L/A"04"0"92467?">="?80?M?8292"N04"0"A2H0?2"N3?83/"?82"%648"0A 1 3/34?90?3>/"  
OH>6?"N80"?>"A>"OH>6?"?834;M"B2G92?09. "( 6 1 4=27A"N04"4> 1 2>/2"N8>"H2732D2A"?80?"  
3?"N04"D29. "3 1 F>9?0/?"S?>" 1 03/?03/" : >>A"?324"N3?8"?82": >D29/ 1 2/?">=")47> 1 "  
Z093 1 >DT;"V 2"80A"0"H042"3/"CXH2J34?0/WN2"80A">/2"3/"Z. 9: . X4?0/M">/2"3/"  
CXH2J34?0/W0/A"3?"N04"D29. "3 1 F>9?0/?"?">"J22F"?80?"H042"0/A"?80?M"04"82"831 427=" "  
403AM"iK834"34"0"/23: 8H>98>>AM"04"3/" 1 0/. "/23: 8H>98>>A4"3/"?82"N>97AM"N8292"?8292"  
092"/>"403/?4;j"V 829204"?82"B?0?2"l 2F09? 1 2/?M"0/A"F09?3G67097. "?82"H69206"A2073/: "  
N3?8"86 1 0/"93: 8?4M"N0/?2A"?>"40/G?3>/"0/A"A3A"40/G?3>/"CXH2J34?0/"=>9"N80?"3?"  
80A"A>/2;"L/. N0. M"3/"?82"2/AM?82"CXH2J4"J3GJ2A"?82"C;B;">6?">="?82"H042"3/"?82"  
Z09483#Z80/OH0A;"E0?29">/M?82. " 1 >A3=32A"S92D3D2AT"?80?" 1 373?09. "9270?3>/483FM"H6?"  
0"?82"?3 1 2"3/"\$QQaM"N2"N292"J3GJ2A">6?;"B">"8292"N04"b63?2"0"7>?"?80?"N2"N292"074>"  
?9. 3/: "?>"6/A294?0/A"3/"?82"3/?2773: 2/G2"G> 1 1 6/3?. "OH>6?"?82"9>72"?80?" ( 64430"  
F70. 2A"0/A"?82/" ( 64430/"3/?2/?3>/4M"N80?"N2"?8>6: 8?"SQQ,[d,QQT"N04": >3/: "?>"



80FF2/"3/"CXH2J34?0/;"B>"?80?"N04"0/>?829"1 00>9"34462"N3?8"N83G8"N2"80A"?>"

G>/?2/A"3/"?82"G>6F72">=". 2094"?80?)"N04"?8292;"

%&' ()\* +&(",L/A"074>"3/"?80?"\$QQ\_"I"\$QQa"90/: 2M?8292<4"?82"%648"92272G?3>/M"0/A"?82/M"3="

)"6/A294?0/A"G>992G?7. M?8292"N04"0/"0??2 1 F?W?834"1 3: 8?D2"2D2/"80FF2/2A"2097329"

93: 8?0=?29"?82"=3446924">F2/2A"6F">D29")90bVW?>"F0?G8"6F"?82"9270?3>/483F"0"73??72"

H3?;"(3G2"804"?80?"=01 >64"F89042M"i 56/348"\90/G2M"3: />92"+291 0/. M"0/A"=>9: 3D2"

(64430;j)"=." >6"80A"?>"?07J"0H>6?"N80?"N2/?"N9>/: M"N8. "?80?"4>9?">="9242?"1 0. H2"

/2D29"80FF2/2AM">9"N8. "3?"N04"0"=0742"4?09?"H2?N22/M"40. M"\$QQ\_"I"\$QQc"90/: 2M"N80?"

N2/?"N9>/: "?8292`"(3G2"A24G93H24": >3/: "?>" - >4G>N"0/A"804"0"D29. "?2/42"1 22?3/: "

N3?8"56?3/"0/A"?8292<4"?82"1 22?3/: "H2?N22/"%648"0/A"56?3/"3/"%90?3470DOM)"H2732D2"

3/"\$QQaM"?80?"34"0"7>N"F>3/?"3/"?8239"9270?3>/483F"?>: 2?829;"B>"G0/". >6"?07J"0"73??72"H3?"

0H>6?"N80?"N292"?82"344624"?80?"F92D2/?2A"?82"C;B;#(64430"9270?3>/483F"=9>1 "

: 2??3/: "H0GJ">/"?90GJ"?8292`""

BK&\* K,"B>)">7"H2: 3/"1 0. H2"N3?8"0"4?>9. ;)/"\$QQ\_M"?82"(64430/4"=>9"?82"=394?"?3 1 2"80A"0"

1 22?3/: ">="4> 1 2?83/: "G0772A"?82"] 07A03")/?29/0?3>/07"i 34G6443>/"@76HM"N83G8"4?377"

2U34?4"?>A0. ;"L/A)"N04"0"/0?3>/07"3/?2773: 2/G2">=3G29M"H6?)"N04"3/D3?2A"?>"?834"

1 22?3/: ;)"?N04"0"1 22?3/: ">="=>923: /"2UF29?4">/"(64430;"L/A"3/"\$QQ\_M"N2"N2/?"?)>"

(64430"S\* >D: >9>A"0/A" - >4G>NT;"SQQ,\_Q,QQT;"L/A"3/"=0G?M"N2"0993D2A"?8292"064?"3/"

?82"1 3AA72">="?82"8>4?0: 2"G30(9)- 0.3(23)- 0.2(:).0.2(/"2U)- 0.5(F)0.4(29)- 0.3(?4)0(6).3(9)-









?80"?82. "N292"/>"80FF. "N3?8"?82"N0. "?80"?9270?3>/483F"N04": >3/: M'H6?"N8. "N292"







Y>6"80A"?834"f0GJ4>/#] 0/3J"72: 3470?3>/": >3/: "H0GJ"?>!"PeaM"N82/"?82"  
 @>/: 9244"F0442A"?82"f0GJ4>/#] 0/3J"L 1 2/A 1 2/?M"N83G8"?32A"?82": 90/?3/: ">=" 1 >4?#  
 =0D>92A"/0?3>/"4?0?64"?>"?82"B>D32?"C/3>/"?>"3?4"F>73G. ">/"f2N348"2 1 3: 90?3>/"0/A"  
 2 1 3: 90?3>/"3/": 2/2907;"K82"B>D32?"C/3>/"G>770F42AW0: 03/M"?834"34"422/"3/" ( 64430M"3/"  
 F>4?#B>D32?" ( 64430"F09?3G67097. M"04"6/A29 1 3/3/: "3?4"72: 3?3 1 OG. M"04"A34924F2G?"?>"  
 ( 64430"H2G0642M"2D2/"6/A29" +>9H0G82DM"0/A"G29?03/7. "0=?29" +>9H0G82DM" ( 64430"  
 9270U2A"3?4"2 1 3: 90?3>/"F>73G. ;)=. >6"N0/?"?>"720D2" ( 64430M. >6"G0/"720D2" ( 64430;"  
 L/A"4>"?82. "J2F?"40. 3/: M"N8. "A>/<?". >6"92 1 >D2"?834"f0GJ4>/#] 0/3J"L 1 2/A 1 2/?"  
 0/A": 3D2"64" 1 >4?#=0D>92A"/0?3>/"4?0?64M"N83G8"?82"C;B;"0==>9A4" 1 >4?"G>6/?9324"N3?8"  
 N83G8"3"?90A24;"L/A". 2?"2D29. "?3 1 2"?834"G0 1 2"6FM"?8292"N04"4> 1 2">?829": 9>6F"3/"  
 @>/: 9244"?80?"403AM"i \* >M"/>M"N03?"0" 1 3/6?2;"V 2"A>/<?"73J2"N80?" ( 64430"34"A>3/: "8292"  
 >9"?8292;j"L/A"?80?"80A"?>"A>"N3?8" ( 64430"4"46FF>9?"=>9"?82")90/30/"%648289"/6G7209"



?>"920G8">6?"?>"(64430;"B>1 2?83/: "73J2"73=?3/: "f0GJ4>/#] 0/3JM'SQQ,a\$,QQT"N83G8"

A3A/?"80FF2/"6/?3"\$Q!!M"N>67A"80D2M")?83/JM: >/2"4>1 2"NO. "?>"G80/: 3/: "?82"

/0990?3D2"?80?">/2"8209A"=9>1 "(64430;"



?69="H0??724W/>?"4>"1 6G8"?69="H0??724M#H6?"074>"92077. "A340: 922 1 2/?4"0H>6?"8>N"?>"

?920?" ( 64430"G>/?3/62;"



A34F6?24M'. >6"80A"=9>X2/"G>/=73G?4"?8292;"L/A"?80?"N>67A/?"80D2"1 0A2"42/42"

23?829M0/A"?82. "N292"D29. "1 6G8"0: 03/4?"?834;"L/A"4>". >6"80AM"H270?2A7. M"?834"

0??2 1 F?"H. "?82"%648"0A 1 3/34?90?3>/"?>"F29460A2"+29 1 0/. "0/A"\90/G2M"H6?"3?"N04/?"

: >3/: "D29. "N277;"SQQ,ac,QQT"

K82"F09?324"48>N"6F"3/"%6G80924?M0/A"/>?83/: "804"H22/"A2G3A2AM0/A"56?3/"

34"0993D3/: ">/"?82"42G>/A"A0. ">=?82"46 1 1 3?;"L/A"4>". >6"80A"0"D29. "G>/?2/?3>64"



& 1 F392M'H6? 1 >4?>="3?"N04"F09?">="?82" (64430/"& 1 F392;j"L/A"?834"34"0"F89042"?80?"  
824"92F20?2A"0"/6 1 H29">="A3=292/?"?3 1 24;"L/A"4>"3?"422 1 4"?>" 1 2"?82"F9>H72 1 "N3?8"  
?82"%6G80924?"@> 1 1 6/3b62"34"?80?M3/"0"N0. "SQQ,ad,QQTM?": 0D2" (64430"73G2/42"/>?"  
>/7. "?>": >"?>"N09"N3?8"+2>9: 30"3/"L6: 64?">="\$QQd"?>"40. "?82. "N0/?2A"?>"F92D2/?"  
+2>9: 30"=9> 1 "0>3/3/: " \* LKRM'H6?"074>"0//2U3/: "@93 1 20M'H2G0642"56?3/W>/2">="?82"  
064?3=3G0?3>/4"82": 0D2"N04M">/G2"?82": >D29/ 1 2/?"G80/: 2A"3/"Z32D"3/"\$Q!\_M'82"N04"  
N>9932A"?80?". >6<A"422" \* LKR"483F4"3/"B2D04?>F>7M3/"@93 1 20;"B>"3/"92?9>4F2G?M". >6"  
80A"?82"N>94?">="H>?8"N>97A4"H2G0642"/23?829"CJ903/2"/>9"+2>9: 30"N292"3/"=0G?"







?>"A2=20?"?82"+2>9: 30/4M: 3D2/"SQ!,Q\$,QQT"?82"31 H070/G2"3/" 1 373?09. "=>9G24;"Y24M"?82"  
 C/3?2A"B?0?24M"N2"A3A"80D2"0"F9>: 90 1 M"0"?903/"0/A"2b63F"F9>: 90 1 "N3?8"?82"  
 +2>9: 30/4"09 1 . M"N8292"N2<A"S?82"C;B;" 1 373?09. T"827F2A"?82 1 M"0/A"?834"80A"?>"A>"  
 N3?8"074>"A2073/: "N3?8"?80?"J3/A">="6/: >D29/2A"4F0G24"N8292". >6"80A"077"J3/A4">="<br>
 ?299>934?4;"%6?"G29?03/7. M"?82"%648"0A 1 3/34?90?3>/"G>67A/<"80D2"A>/2" 1 >92"S48>67A"  
 />?"80D2": >??2/"3/D>7D2A" 1 373?0937. T;"

\* >NM"N80?"3?"A3A"A>"0?"?82"2/A">="82"N09"N04"?>"G6?">=">9"G>/?0G?4"N3?8"

( 64430"0H>D2"?82"A2F6?. "04434?0/?"42G92?09. "72D27W



0A 1 3/34?90?3>/M>9"A3A"?82. " 1 OJ2"?8239">N/" 1 3406A: 1 2/?4"OH>6?"SQ!,Q\_,QQT"?82"  
43?60?3>/"3/"V 0483/: ?>/` ""

BK& \* K,"L"?82"H2: 3/ /3/: ">=?82"%648"0A 1 3/34?90?3>/M?834"N04"0"F293>A"N82/"56?3/"N04"  
920G83/: ">6"?>"82"V 24?" 1 >92M"N82/"82": 0D2"?82"31 F92443>/"?80?"82"N0/?2A"  
( 64430"?>"H2" 1 >92"3/?2: 90?2A"N3?8"?82"V 24?;"L/A"0: 03/M. >6"83"?82"83: 8"F>3/?">="  
\$QQ!;"f6A: 3/: "H. "N80?"B2G92?09. " (3G2"403A"0=?29"?82"2/A">=?82")90b"V 09M=>9: 3D3/: "  
?82" ( 64430/4W)"?83/J"?8292"N04"4?377"?82"H2732=?80?">/2"G>67A"G>>F290?2"N3?8"  
( 64430;)"?F9>HOH7. "?>>J"7>/: 29"?>"6/A294?0/A"?82"/0?692">=?N80?"56?3/"N04"A>3/: M  
0/A"?80?"N04"?834"47>NM"4?20A. M"670 1 FA>N/"A> 1 24?3G077. "0/A"?82"H2: 3/ /3/: ">=?0"  
1 6G8" 1 >92"04429?3D2"=>923: /"F>73G. ;"S%. T"\$QQe"N3?8"?82"- 6/3G8"SB2G693?. T"  
G>/=292/G2M"H. "?82/M/"/>"/2"92077. "80A"0/. "A>6H?"OH>6?"N80?"56?3/"N04"OH>6?M"0/A"  
?82/"SG0 1 2T"?82"+2>9: 30"V 09;"%6?"720A3/: "6F"?>"80?M"F2>F72"A3A"=037"?>"6/A294?0/A"  
2U0G77. "8>N" 1 6G8"56?3/"80A"07?292A"?82"G>6942">=?N8292" ( 64430"N04": >3/: M"N04"  
?0 1 F3/: "A>N/">/"077"=922A> 1 ">=?2UF92443>/"0/A"A2?29 1 3/2A"?>"9204429?" ( 64430"/>?"  
>/7. "3/"3?4">N/" /23: 8H>98>>AM"H6"?82/"70?29">/3/">?829"F09?4">=?82"N>97A;"K8292"  
N292"F2>F72"3/"?82"%648"0A 1 3/34?90?3>/N8">6/A294?>>A"3?"H2??29"?80/">?8294M"0/A"  
=9> 1 "?82"H2: 3/ /3/: "80A;"52>F72"3/"?82"R=3G2">=?82"] 3G2"59243A2/?"0/A"3/"4"> 1 2"  
>?829"F09?4">=?82": >D29/ 1 2/?">9">?829"3/A3D3A6074"A3A"6/A294?0/A"?834;"%6"?82"  
>/24"?80?"4?377"N0/?2A"?>"J22F"6F"N3?8"4> 1 2"SQ!,Qc,QQT"F90: 1 0?3G"3/?290G?3>/4;"  
L=?29"077M. >6"A3A"80D2"0" 1 22?3/: "3/"B>G83"3/"\$QQdM"H2?N22/"%648"0/A"56?3/M"N8292"  
. >6"80A"0"G82GJ734?">=?077"?82"344624">/N83G8"?82"C;B;"0/A" ( 64430"/22A2A"?>="



2/: 0: 2M?80?"G82GJ734?"804/2"92077. "G80/: 2A"?80?" 1 6G8"43/G2"?82/;"%6?"F2>F72"

=0372A"?>"0/?3G3F0?2"2U0G77. "8>N"b63GJ7. "?82"9270?3>/483F"G>67A": >"A>N/"0/A"8>N"

0/?0: >/34?3G"3?"N>67A"H2M"0/A"8>N" 1 6G8"?834"N04M)"?83/JM"?32A"?>"56?3/<4">N/"42/42"

?80?"834"2UF2G?0?3>/4"80A"/>"H22/" 1 2?"0=?29"\$QQ!M"?80?"4> 1 28>N" ( 64430"80A"H22/"

H2?90. 2A;"K8>42"2UF2G?0?3>/4"N292"N9>/: "=9> 1 "834"F>3/?">="D32NM"H6"?8>42"N292"

834"2UF2G?0?3>/4;"

K82" ( 64430/4"?2/A"?>"F92=29" ( 2F6H73G0/"?>"I 21 >G90?3G"F9243A2/?4"3/"

: 2/2907M"H2G0642"834?>93G077. M" ( 2F6H73G0/"F9243A2/?4"3/"=OG?"80D2"H22/"7244"

G>/G29/2A"OH>6?"N80?"N04"80FF2/3/: "3/"?82"B>D32?"C/3>/">9"F>4?#B>D32?" ( 64430;"

K82. "80D2/?"F6482A"0"A2 1 >G90G. "0: 2/A0WG29?03/7. "?82"704?". 209">=?82"+2>9: 2"

' ;√;"%648"0A 1 3/34?90?3>/M"N83G8">D2970FF2A"N3?8"?82"F>4?#B>D32?" ( 64430M"A3A"/>?"

F648M"A3A/?"80D2"0"92077. " 1 6G8">="0"A2 1 >G90G. #H637A3/: "0: 2/A0W0/A"3?<4"

I 21 >G90?4"N8>"?2/A"?>"80D2"H22/" 1 >92"OG?3D2">/"?80?;"K82. "N292"?0J2/"H. "

469F9342M"04"?82"%648"0A 1 3/34?90?3>/N2/?">/M"OH>6?"8>N" 1 6G8"A2 1 >G90G. "

F9> 1 >?3>/M3/"=OG?M"A3A"H2G> 1 2"F09?">=?82"0: 2/A0M"?82"\922A> 1 "L: 2/A0M"0/A"/>?"

>/7. "3/"G>6/?9324"73J2")90bM"H6?"3/" ( 64430"3?427="&D2/"H. "?82"D29. "2/AM"0/A"2D2/"0=?29"

59243A2/?"%648"72=?">=3G2M"59243A2/?"56?3/"N04"/>"?80?"G93?3G07">="83 1 M"0?"7204?"

F6H73G7. ;"B>)"?83/J"?82. " 1 3406A: 2A"?82"\922A> 1 "L: 2/A0"04F2G?"SQ!,Qd,QQT">=?834"

0/A"N80?"?82. "40N"04"92: 3 1 2"G80/: 2;"K82. "92077. "A3A"H2: 3/"?>="209"?80?". 2(3)- 0. 2(A)- 0. 4(2/?"5"



%&' ( ) \* + & ( "L/A" ?82/M"3=") "G0/"04JM" ?83477"H2" 1 . "704?"b624?3>/M"0/A" ?82/" ) 77"422"3="B3 1 >/"  
 804"0/ . ">?829"=>77>N#6F4M"H6?"?0J3/ : "0"4?2F"H0GJ"2D2/" =69?829M. >6-D2"N93??2/"b63?2"  
 3/#A2F?8"0/A"27>b62/?7. "0H>6?"C;B;"9270?3>/4">D29?"82"704?" [Q". 2094;"L/A)"N04"  
 N>/A293/ : M: 3D2/"?82">D29077#0 1 3G0H72"9270?3>/483F"H2?N22/"59243A2/?4"%648"0/A"  
 56?3/"0/A" ?82W0/A" ?834"34"0"92G6993/ : "?82 1 2">="C;B;# (64430/"9270?3>/4"071 >4?M"N3?8"  
 Y27?43/"0/A"@73/?>/"0/A" (20: 0/"0/A" +>9H0G82DW34"?8292"4> 1 2?83/ : "3/"C;B;#  
 (64430/"9270?3>/4"?80?4"3/?90G?0H72M?80?"F92D2/?4"0": 90/A"H09: 03/"-9> 1 "G> 1 3/ : "  
 ?>: 2?829"=>9"?82"C/3?2A"B?0?24"0/A" (64430` ""

BK & \* K, "B>"?82"?3 1 24"N82/"?83/ : 4"80D2"N>9J2A"H24?"092M=-394?">="077M"N82/" . >6"80D2": >>"A"  
 9270?3>/4"H2?N22/"?82"F9243A2/?4W. >6"403A" (20: 0/"0/A" +>9H0G82D"N04"G29?03/7. "  
 >/2"290M"@73/?>/"0/A"Y27?43/"N04"0/>?829M"0/A">="G>6942"%648"0/A"56?3/;"L/A"3=" . >6"  
 7>>J"H0GJM". >6"G0/"40. "?82"?3 1 24"N82/"?82"9270?3>/483F"804"N>9J2A"H24?"34"N82/"N2"  
 3/"SQ!,Q[,QQT"=0G?"N292"07732A"0: 03/4?"0"G> 1 1 >/"2/21 . M"0/A"N2"80A"73 1 3?2A": >074;"  
 B>": >"H0GJ"?>"V >97A"V 09")); "V 2"80A"?82": 90/A"07730/G2WB?073/M" (>>42D27?M"0/A"  
 @869G8377;"V 2"80A"0"G> 1 1 >/"2/21 . M' 3?729;"V 2"N0/?2A"?>"A2=20?"83 1 ;"V 82/"82"  
 N04"A2=20?2AM"?80?"9270?3>/483F"=27"0F09?;"

L/A"3/?2924?3/ : 7. 2 ("N)0. 4" (21 Tf50 (6) - 01) - 0. 0. 5 (!!!?8)0. 4 (0?"9) - 0. 2 (>)0. 5 (>9) - 0. 3



H2G0642"3?"N04"?8920?2/3/: "?82 1 M?8239">N/"G>6/?9. M?0/A"G29?03/7. "?8239"H0GJ. 09A;"

K82"F9>H72 1 "?8292"N04"074>"?80?M?0=?29"?80?"N04">D29M"N2"0/A"?82" ( 64430/4"A>/<?"

/2G2440937. "48092"0"G> 1 1 >/"A2=3/3?3>/">="N80?"0"?299>934?"34;"\>9"?82" ( 64430/4M?3?<4"

1 6G8" 1 >92"=>G642A">/"N82?829"?8>42"?299>934?4"092"0G?6077. "?8920?2/3/: " ( 64430/4"

>9"/>?;"%6?)"?83/J"3"/: 2/2907M. >6"80A"?82"3/3?307"9>6?2">="?82"K073H0/"3/"

L=: 80/34?0/M?0/A">/G2"?82"/. >6": >?"077">="?8242">?829"429324">="2D2/?4M?83/: 4"H2: 0/"

?>"=077"0F09?;"

)"?83/JM?3/"?82"56?3/". 2094M?82"43/2"b60"/>/" 1 > 1 2/?M?92077. M=>9"80D3/: "0"

H2??29"9270?3>/483F"N3?8"?82"C/3?2A"B?0?24"N>67A"H2"?82"C;B;4"92G>: /3X3/: " ( 64430/"

4F8292">="F93D372: 2A"3/?2924?"3/"?82"F>4?#B>D32?"4F0G2;"L/A"?80?"N>67A" 1 20/"

02??34>/3/: "[Q". 2094">="40. 3/: "?80?"N2"H2732D2"?80?"?8242"G>6/?9324M?3/A2F2/A2/?"

G>6/?9324"/>NM"80D2"?82"93: 8?"?>"G8>>42"N83G8"07730/G24"?82. "H27>/: "?>"0/A"N80?"

J3/A">="A> 1 24?3G"4. 4?2 1 "?82. "80D2;"C/?37"0/A"6/7244"?80?"80FF2/2AM?3?<4": >3/: "?>"H2"

D29. "809A"?>"G> 1 2"?>"0": 90/A"H09: 03/"N3?8" ( 64430;"K8> 1 04"+9080 1 M"N82/"82"N04"

0?"?82" \* 0?3>/07"B2G693?. "@>6/G37M"82"A3A"8>7A"?07J4"N3?8"?82" ( 64430/4">/"?9. 3/: "?>"

?07J"0H>6?"?82"F>4?#B>D32?"4F0G2M"H6?M"H. "834">N/"OGG>6/?M?3?"N04"D29. M"D29. "

A3=3G67?;"L/A"3?<4"92077. M?6/?37"/>NM"H22/"D29. M"D29. "A3=3G67?;"

)=" . >6"80A"0"C;B;"0A 1 3/34?90?3>/"?808M2981N(374)N "TQQ. 1 2(21)- 0. 524Tm/TT456TT40. 2(/:)



56?3/"N8>"804"0"A3=292/"D32N">="(644304"9>72"3/"?82"F>4?#B>D32?"4F0G2;)"?"N04"D29. "

A3=3G67?"?">"422"8>N". >6"G>67A"G>1 2"?">"0/. "J3/A">=": 90/A"H09: 03/"N3?8"(64430M"

6/7244"?82924"4>1 2?83/: "2742"?80?"80FF2/4": 7>H077. M"N8292"0: 03/M"N2"80D2"0"

G>1 1 >/"2/21 . M"H6?"0?"?834"F>3/"N2-92"/>"3/"?80?"F>43?3>/;"



N3?8" ( 64430/"L 1 293G0/4"34"?8292"092"A3==292/?"NOD24">="2 1 3: 924"0/A"1 0/. ">="?82 1 "

A>/<?"07J"?>"20G8">?829;"B>"F09?">="?82"9204>/ "N8. ". >6"A>/<?"80D2"0/"2==2G?3D2"

( 64430/"7>HH. ">=" ( 64430/"L 1 293G0/4"34"?8>42" ( 64430/"L 1 293G0/4"092">=?2/"0?"20G8"

>?829<4"?89>0?4"0/A"?82. "N>67A"80D2"?>"H2" 1 >92"6/3?2A"3/"N80?"3?"34"?80?"?82. <92"

?9. 3/: "?>"0AD>G0?2"=>9"N3?8" ( 64430;"L/A"?80?"?82/"0==2G?4"N80?"80FF2/4"/>/"?82" 37;"

)=" . >6"80D2"0"G06G64">/?"?82" 377M73J2"F2>F72"N8>"46FF>9?M72?<4"40. M"L91 2/30/"

L 1 293G0/4M"?80?<4"F09?7. "0"92=72G?3>/">="?82"7>HH. 3/: ": 9>6F4"?82 1 427D24"8292;"B>"

?80?"4"F09?7. "3?;"L/A"3/"?82"704?"[Q". 2094M"?82" ( 64430/4"80D2" 1 0A2"D093>64"0"?2 1 F?4M

?82. <D2"8392A"5 ("=39 1 4M"?>"?9. "0/A"G920?2"0" ( 64430"G06G64;"K82"704?" ( 64430"G06G64"

N04"820A2A"H. "I 0/0" (>890HOG829"0/AM"N82/"82"N04"A2=20?2AM?3?"A>24/<?"2U34?"

0/. 1 >92;"%6?"?8>42"7>HH. 3/: ": 9>6F4"064?"80D2/<?"H22/"D29. "2==2G?3D2M"0/A"3?" 1 0. "H2"

H2G0642"N80?"?82. <92"H23/: "04J2A"?>"A>M"?82"5 ("=39 1 4M"34/<?"D29. "2==2G?3D2;)"?<4"074>"

4> 1 2?3 1 24"H2G0642M"N82/"?82" ( 64430/4"80D2"42/?"4> 1 2">="?8239"F09730 1 2/?0930/4"

8292"?>"?07J"?>" 1 2 1 H294">=">@>/: 9244M"?8>42"?07J4"80D2/<?" : >/2"4>"N27;"B>)"?83/J"

3?<4" 1 0. H2"0"92=72G?3>/">="07">="?8>42"?83/: 4;"L/A"?82/M3=" . >6"A3A"80D2"0"7>HH. 3/: "

: 9>6F3/"@>/: 9244M"0" ( 64430"G06G64M"N80?"N>67A". >6"H2"0AD>G0?3/: "=>9`")4"3?"

46FF>9?3/: "59243A2/?"56?3/`"L/A"3="3?<4"46FF>9?3/: "59243A2/?"56?3/M"?82/" . >6<92"

: >3/: "?>" 1 22?"b63?2"0"7>?">=">FF>43?3>/3/"?82"C;B;"@>/: 9244;"B>="09M)"?83/J"

SQ!;!c,QQT"?80?<4"N80?"2UF703/4"3?;"

\* >NM3=" . >6": >"HOGJ"?>"?82"F294>/07"9270?3>/4M)"A>"?83/J"?80?"?82. <92"

3/>9A3/0?27. "3 1 F>9?0/?M"04")"403A"H2=>92M"H2G0642"N2"A>/<?"90A2"D29. " 1 6G8"N3?8"





(64430;"(64430"34"/>"2G>/>1 3G077. "3 1 F>9?0/?"?">"64;")?"2UF>9?4"09 1 4"0/A"

8. A9>G09H>/4;"L/AM"2D2/"?8>6: 8"N2"092"/>N"3 1 F>9?3/: "1 >92" (64430/">37"H2G0642"

>="] 2/2X6270M3/" : 2/2907"3?<4"/>"?80?"3 1 F>9?0/?;"B>". >6"A>/<"80D2"077">="8242"

A3=292/?"H643/244": 9>6F4"3/"H>?8"G>6/?9324"?80?"3/?290G?"N3?8"20G8">?829"0/A"=>9 1 "

0/A"N3A2/"?82"4?0J28>7A294;"K82/M"82" (64430/"4. 4?2 1 "34"?>F#820D. M"FO9?3G67097. "

6/A29"56?3/;"C/A29"56?3/M3/4?3?6?3>/4"80D2"H2G> 1 2"7244"3 1 F>9?0/?;" )/=>9 1 07"

9270?3>/483F4"092"3 1 F>9?0/?M"H6?"074>"7>N29"A>N/">=3G3074">=?2/"A>/<"=227"

2 1 F>N292A"?>" 1 0J2"A2G343>/4;"B>". >6"G0/"42/A"L 1 293G0/" /2: >?30?>94"0?"82"

04434?0/?"42G92?09. ">9"?82"A2F6?. "04434?0/?"42G92?09. M"N80?2D29"72D27M"?>: ">?">" (64430"

0/A"?07J"?>"8239"G>6/?29F09?4M"H6?"82. "=3/A"3?"D29. "A3=3G67?"?>"G> 1 2"0N0. "N3?8"

D29. "1 0/. "G>/G92?2"92467?4"H2G0642"?8239" (64430/"G>6/?29F09?4"A>/<"=227"

2 1 F>N292A"?>" 1 0J2"A2G343>/4;"L/A)"?83/JM"04"?82"56?3/"92: 3 1 2"804"A2D27>F2AM"

?80?4"H2G> 1 2"2D2/"1 >92"3 1 F>9?0/?;"B>"?80?4"N8. "?82"9270?3>/4"H2?N22/"?82"

F9243A2/?4"092"D29. "3 1 F>9?0/?;"59243A2/?"%648"34"D29. ": >>A"0?"3/?29F294>/07"

9270?3>/483F4;" 2"6/A294?0/A4"?8>42"D29. "N277;" 2"0/A"56?3/"A3A"80D2"0/"

6/A294?0/A3/ ;;"K82"39>/. "34"?80?"82"D343?"?>"@90N=>9AM"K2U04"3/"I 2G2 1 H29">="\$QQ!"

N04"0"9207"F93D372: 2;" \* >?"80?" 1 0/. "=>923: /"D343?>94"N2/?"8292WF09?3G67097. M"?834"

N04"93: 8?"3/"?82"H2: 3//3/ ;;"L/A"3/"?82"H2: 3//3/: M"?82" (64430/4"A3A/<"6/A294?0/A;"

- 0. H2"?82. "N0/?2A"?82"RD07"SQ!;!d,QQT"R=3G2" 1 22?3/: "3/"\$QQ!W?82. ": >?"82"RD07"

R=3G2" 1 22?3/: WH6?"82"@90N=>9A">/2"N04"D29. "3 1 F>9?0/?;"V 82/"?82. "42/?"8239"

0AD0/G2"F2>F72"A>N/"?>"82"90/G8"0/A"?82. "N292"48>N/"?82"90/G8M"?82. "?8>6: 8?"





"