

,WHP	5DWLRQDOH	
	2SWL'RQLQFRUUHF	7RLGHQWKLXQVKDQVVFUWEKHWUDQVIRUPFKVDLQRODVKDSDHLQDJRWDFILRUCXODU PRYHPHQWHIOHFVQLRSDUDQVODQWILCRIGLODWLHRQLJMKVWXGMRXIXIDYH UHFRJQWIKDWHQVKDSLWUDQVODQWILCRIGLODWLHRQLJMKVWXGMRXIXIDYH IURPLVGHFUHDEXHQQLVZKLFKUHSHUVHEQWIKHSUHVYLRQKHQDVKDSLH WUDQVODWHGXQLWVXS HDFK\FRRUGLQDWHYHUWLFDO SRVLWLRQIU UHSUHVHQWHG E\WKH
		DQGDQGGHQWWIKLHXCORIU WUDQVODQWILQXJUXQLWRVKHLJDKVQGXQLQWRZQKHVWXGMRXIXIDYH UXOHRWUDQVODQWILQXJUXQLWRVKHLJDKVQGXQLQWRZQKHVWXGMRXIXIDYH
	2SWL'RQLQFRUUHF	FKHVWXGMRXIXIDYHUVKSHODWLRQWKLHSHRQDQWUDQVODQWILQXJUXQLWRVKHLJDKVQGXQLQWRZQKHVWXGMRXIXIDYH UDWKLHSHRQDQWUDQVODQWILQXJUXQLWRVKHLJDKVQGXQLQWRZQKHVWXGMRXIXIDYH XS7KHVWXGMRXIXIDYHUVKSHODWLRQWKLHSHRQDQWUDQVODQWILQXJUXQLWRVKHLJDKVQGXQLQWRZQKHVWXGMRXIXIDYH
	2SWL'RQLQFRUUHF	FKHVWXGMRXIXIDYHUVKSHODWLRQWKLHSHRQDQWUDQVODQWILQXJUXQLWRVKHLJDKVQGXQLQWRZQKHVWXGMRXIXIDYH WKDKSDQG

	... Đ PÆX W R XĐ 5i Z L W KH D F K Å ! ò 0

H

		<p>= 3L ZOUK 3LWFI IS W SH IV LH O KOD ED SPV ORUOD IO SV W KH IV WH HO W G H F IR UJ UGH S W OH IV RWJLWPKHI TGRUHVW WH BU FP RL LXOOHW ER U H Q FZ IDOW KD Q VO LX LPD SD VO EDI MR HS VW VL VR XO G HR OF YD HG F X O = 7 GR H W WH BU FP RL LXOOHW ER U HO VZVDDO K D Q VO LX LPD SD VO EDI MR HS VW VL VR XO G HR OF YD HG F X O D W H G = 7 GR H W WH BU FP RL LXOOHW ER U HO VZVDDO K D Q VO LX LPD SD VO EDI MR HS VW VL VR XO G HR OF YD HG F X O D W H G = 7 GR H W WH BU FP RL LXOOHW ER U HO VZVDDO K D Q VO LX LPD SD VO EDI MR HS VW VL VR XO G HR OF YD HG F X O D W H G) L VO KO VO XO G HR OG YD HG V W KO D WQORH DGO Z LD W KO Q VO LX LPD SD VO EDI MR HS VW VL LVXCO OHVDPV VR WK O W H U H V V</p>
2 S WL LV Q E R	U V W X Y Z WINKERVOX\ JI KZ OH W HW W HI VR VK HO VGOX OHVDP VR WK O W L Q W7 HV UM HO VGI WHI FOR WFDXV WWHVRC G H BMDIKL KOHLVSO W R B O H P	
2 S WL LV Q E R	U V W X Y Z WINKERVOX\ JI KZ WDWV LINA R O EU HD DP VR EK O W W IO U W W KH HD O HD DP VR WK O W HV UM HO VGI WHI FOR WFDXV WWHVRC G H BMDIKL KOHLVSO W L S U R E O H P V	
2 S WL LV Q FO R	U V W X Y Z WINKERVOX\ JI KO WH RWJLWPKH ZD RUX/HO VGOX OHVDP VR WK O W L Q W7 HV UM HO VGI WHI FOR WFDXV WWHVRC G H BMDIKL KOHLVSO W R B O H P	

7 H ([GD XV\$F JD HW QL FR \O
6 W \$ G IV OH VL Y RL IV O VR O
\$ X J X V W

,WHP	5DWLRQDOH	
	2SWL&QFRUUHFW	7RGHWHUMLQHPRXQWLQWHWHKDFRXCWUQDWWKHQGI \HDUWKVHWXGMKRXOG KDXVHVQKIRUPXOD Uci&ãp&€D&W&10D&GHTWH WKHH XVH —JVKRXOL!

%D @

67\$\$5*UDGH0DWKHPD5DLVLRQDOHV

,WHP	5DWLRQDOH	
	2SWLRQFRUUHFW	7RGHWHUPLQV DWHFKDWW

67\$\$5*UDGH0DWKHPD5DLVLRQDOHV



,WHP	5DWLRQDOH	
	<p>2SWL\$QVFRUUHFV</p>	<p>7RGHWHUZEKQFMDEVKRZWKUHODWLEEWKZLHSHQKQXPEHRUVHVRVPDUNHERXJEW WKWHDFIDQG WKWRVFRORWKPDUNHWKWXGMQRXIOGYUHFJRJQWJESWFDXVH WKWHDFKED RIIFRXSRORVWRZDWKWRVFRORWKPDUNHERXJKWKHLQWHUFHSHW YDOZKHUMKOLGHRVWHKHD[LWHUWLEFQWKHQLEHDLQQYQDRHLQHJDWLYH 7KHVWXGEGQWRKRXIOGYUHFJRJQWJESWFDXVWKWHDFERNJKWKPDUNHDMFRVW RI SHVHWKHDVRFKDDQJFRQVWLDQFVHRDUSHHFUHLVH7KHVWXGMQRXIOGYH UHFJRJQWJESWFDKRUUHVSRSGLQJGDQGYDOKEVKNDEVKRXLQWKHITXDWLRO \ = [7KLVDQHILFLZDWRROWKSHUREOKRZHYRWKPHWKRFRXGEXVHR VROWKSHUREOFPUHFVOW\</p>
	<p>2SWL\$QLQFRUUHF</p>	<p>7KHVWXGEGQMSGWHUPWQDVKFRUUHVS R[QDQCYDOXLQWKVDEIQWKHITXDWLRO \ = -{</p>

,WHP	5DWLRQDOH	
	2SWLRQVFRUUHF	7RGHWHUMLQHR OXPHPRX QW KUHH GLPHQSDRVDNOKSRIWKFI\OLQ QVHWXGHQW VKRXIDBYXIVHVQKIRUPXGDS LKZKLFUHSUHVWQUMDGLGLVWVDQRFWKFIHQWHRU WKFI\UXPIHURHDFHUFDQIGUHSUHVWQKMHMLJKWHUWGEDVDQDRFRVSEERWRP WKFI\OLQ QKHWXGMQRXIDBYFD OFXOVDRVHQJRWKWDGLEXGLYLGLQGHQJRWKKH GLDPHWHWUDDJLQMLQWKURXWKFIHQWRHDFLUFRQQRHFVWZBBLQRQWKH FLUFXPIHUEIQFH ÷ = 6XEVWLWUWLQDQ Q= LQWRKIRUPXIDVXIQQV 9= S
	2SWLRQLQFRUUHF	WKHWXG BQMMOHGKQHQJRWKGLDPH WQSDRHWKQHQJRWKWDG LXCWKIRUPXOD 7KHVWXG BQHWQWRRFXRQXQGHUVWVCKRQB XIQDGHWHUPMCKYRJOXRHDF\OLQGHU
	2SWLRQLQFRUUHF	WKHWXG BQMMOHGKQHQJRWKGLDPH WQSDRHWKQHQJRWKWDG LXCQGHYHUVHG WKSODFHPRHQWYHDOXLQWKIRUPXODHWXG BQHWQWRRFXRQXQGHUVWVCKRQB XOD IRGHHWHUPMCKYRJOXRHDF\OLQGHU
	2SWLRQLQFRUUHF	WKHWXG BQMSOYLQKQHQJRWKKH LJEW LQVWRVCKRQBHQJRWKGLDPH WQIG UHYHUVHKSODFHPRHQWYHDOXLQWKIRUPXODHWXG BQHWQWRRFXRQXQGHUVWDQGLQJ WKIRUPXIQDGHWHUPMCKYRJOXRHDF\OLQGHU

7HIDMGXFDWLRQF\
 6WXG\$QWHVVPHQWLRQ
 \$XJXVW

2SWLRFUHFV

7RGHWURSRUWKLVGHXVHGRKRZKDKVORSHWHHSQHDWWUDDLQW

ZKHQUDSKRQDFRRUGLQDWH $\frac{\backslash}{[} \frac{\backslash}{[}$ R.0 LHTXDKVORSH6WKVWXGMKXOG

KDYGHWHUPWZRIWKVLGRHDFWULDGDGHXVHGRKRZKDKVORSHMLQKH

IRUPXORSRU WKZRLGRWULDQJODGHXVHGRKRZKDKVORSHKHUH \

FDGHUHSUHVHQWGLIHHUHQKHUWYDDZKLFKWKVDPHDOXMKQJRWK

VLGHDOGWQRKSHUHASDHEHJWKEVQKMPKBRUAJRQDORL)FKWKVDPHD

YDOXMKQJRWKLG 3OXJJLQJWKIRUPXDKVORSHO FDGHUHSUHVHQWGH

$$P = \frac{.}{/0}$$

67\$\$5*UDGH

,WHP

5DWLRQDOH

2SWLRQFRUUHF	7RGHWHUMLCHV F U H W Q D W W K W P D O G H L D W R Q B Q J V Q K H W K W W X G M Q R V X I O B Y H RUGHWHKGLDJRQDQJWKK79VFUHQDWRKTDWEPATIKR'UOVHICWVW"RORQ"Y\$-WRI OHQJWRKDOGLDWRQDQJW R DUJBLWJRQDQDQ Q R Q D Q Y W K L S Q Y H U H H G X P E H U WBIUDFWZLRWKKVDPG HQRPLQ'EVWVCPPEHU R I V L Q M K G H O R P L Q R W R U L V €™• (Đ p HTXDO WR 7KH GLDJRQDO QHQJWGLBJRQDQJWV3R ð ð 0GHQRPLQWO ð 0 p€

,WHP	5DWLRQDOH	
2SWL'RQFRUUHF	7RGHWHUZKQFKFDWWHD	<p>SUORSAISORWSARHGMMKDWWRZWKUHODWLEEELWZLHSHZR VHVVRGDWDXS SRWVWHDFKREIEMUYDWARKEXP EHRUKRXUWVXGHQWVXGVHKGLU PXOWLSOLDFDWQRQHDWKGEXP EHRUHUU RUKWVXGHQDWVRQWKFLXOWLSOMFDWVLRQ GHFUHDWHQHWXGMKRXIDYFKRVWKJUDSKKDWWRZWKIR OORZLVQJRFLDDWVLRQ VWXWLPHQGHSHQYGHUQVEQGFUHDWKGEXP EHRUHUU RGM SHQGHQDQWDEOH GHFUHD,CHKLVFHQDWKSR LQRQWKFRUUJHFDVSKHSUHDIQGW DWLO RISMKWHVHHSQHV RIDVUDDLQW HQU DSKRQD FRRUGLQD VQ $\frac{\backslash}{[}$ $\frac{\backslash}{[}$</p>
2SWL'RQFRUUHF	WKHWXGEMHBYHUWKBVVRFL	<p>EDVLRQWKRE VHU YDUVLRQOLWD QUIDSKLWK SRVLWLOYSYKH WXGEMHGMRRFXVCFKRRVDQFDWWEHDSORSD GHVFULS WLRQ DVVRFLDWLRQ</p>
2SWL'RQFRUUHF	WKHWXGFIQRWJUDSKKDWWR	<p>ZDQHJDWLO RISHR V KPLGGV M KHLJKVGHW KHJUDSK 7KH WXGEMHGMRRFXVCFKRRVDQFDWWEHDSORSD GHVFULS WLRQ DVVRFLDWLRQ</p>
2SWL'RQFRUUHF	WKHWXGEMHFXVRIQWKZIRUG	<p>VQFUHDDVGHGHFUHDWKGQNLKQIDVSR LQZRXOG EHVFDWWDWIGRDERXWKJUDSKQW KHUHFRBNHJUDSKKDWWRZVRD VVRFLDWLRQ EHWZHVHWHQWXWLPHQGXPEHRUHUU RUKWVXGEMHGMRRFXVCFKRRVDQFDWWEHDSORW EDVHGHGHVFULS WLRQ DVVRFLDWLRQ</p>

7HIDMGXFDWLRQF\
 6WXGSHQWHVVPHQWLRQ
 \$XJXVW

,WHP	5DWLRQDOH	
	2SWLRQFRUUHFW	7RGHWHUMLQHDGLGLVWDDQRMKHHQWHRWKHJRIDFLUFQIMKFRQMKVWXGHQW VKRXIDYE-D,UPREQHEPjAK#uT7QKRB@DQKWKH€UYE—,U?€@GlaLVKGHQWRI R

,WHP	5DWLRQDOH	
2SWL'QVFRUUHF	7KHVWXGMRXIDYGHWHUPWVQRUGHFDVHRMIRUGHSIDGWRHSUHVHXQVWLRQ UHODWLRQKKEHDFIKQSXYDOSXWQVDRHTXDWL RQD V L Q J R X H S X D O W K D W FRPHRXWIKHTXDWLRQDFKDRHFDQQRCEHSDLUZHLGKQMDORH 7KHVHWI RUGHSIDGRQWDLQRQH YDOXHDFKYDOXH	
2SWL'QLQFRUUHF	FKHVWXGEMSGQRWHDOWLKHWKEDWZRUGHSIDGUWKVHMVYWKVDPHYDOXH LQSDOXH SDLUZHLGKLIHUAHQDORXWSDOXHVDQG 7KHVWXGEMWWR IRFXRWKGHILQLRWDLQDFWDLQDSSO\LQWSEHWHUZZKQWKHUHMIRUGHSIDGUV UHSUHVHIXQVWLRQ	
2SWL'QLQFRUUHF	FKHVWXGEMMFRQIXZKGFYDULDFOHEXOVHGRHSUHVHXQVWLRQDQPEHZDWKH LQSDOXH SDLUZHLGKLIHUAHQDORXWSDOXHVDQG DQQRWFKMDOXH SDLUHG ZLWK WZR GLIHDQW7KHVWXGEMWWRFXRWKGHILQLRWDLQ IXQFWDLQDSSO\LQWSEHWHUZZKQWKHUHMIRUGHSIDGUMSUHVHIXQVWLRQ	
2SWL'RQLQFRUUHF	FKHVWXGEMSGQRWHDOWLKHWVHFRQGDPRVGH SIDGUWKVHMVYWKVDPHY [YDOXHQSXDOXH SDLUZHLGKLIHUAHQDORXWSDOXHVDQG 7KHVWXGEMWWR WRRFXRWKGHILQLRWDLQDFWDLQDSSO\LQWSEHWHUZZKQWKHUHMIRUGHSIDGUV UHSUHVHIXQVWLRQ	

7H[DVGXFDWLRQF\
6WXG\$QWHVVP'HWLRLQ
\$XJXVW

,WHP	5DWLRQDOH	
2SWLRQLQFRUUHF		<p>7RGHWHUFLQHXQVKIEWVUHSUHVWQGLVODWLRQVXGMQRXIOBYGHWHUHPWQEDW ZKHQILJXUWGLODMROGDURJUHGXFLQGL]HLWPHDVXUHPHQFMUHPDUGHHFUHDDVHGG RQWKVFDODFWRBDWRUWKQKHQJRWKVLGRHRQHLJXWHRWKQKHQJRWKFRUUHVSRQGLQJ SLDUMGGHHDVLPLOLUXUSIVFDODFWZLUWKKRIULJISRLQKHUWK[HD[LKRUL]RQWDO DQGGL[LWHUWIRFDERRUGLQDLVQVWHUHFHRWDOVRKSRLOWSUHVHEQWHSUGHUHG SLDU DWKFKHQRHGLODVHBRQWKDWFSLRLQWKGLODMHXGZHEODFHUWDLQ QXPEHRUWLPDMDUURFKRIULJLQWDRQWKRIULJLQDXOHLQFVKORFDRVLYHQVH[ZDRULJLQHSOAHVHDQW HGDQWKORFDRVLRKFRUUHVSRQGLQVHUFUWHJRQWKH GLODMHXGUHW WKVFDODFWRRWKGLLODWLQEGHWHUPEQHLGLGWKQDORH HDFKRUUHVSRRFLQGLRQVWUWH\WKYDORHHDFKRUUHVSRRFLQGLRQVWUWH[§ ÷ = DQG ÷ = - ; VRWKHXOH to - [- \ UHSUHVWQGLVODWLRQ ©</p>
2SWLRQLQFRUUHF		<p>WKHWXGEGMGOYLQKFRUUHVSRQGLQVWUWHKRRIULJLQHDUWHUWH\WKH FRUUHVSRQGLQVWUWHKGLLODMHXGZHEODFHUWDLQ § ÷ = - DQG ÷ = - ; DQGWKHUHIRUH © FKRWHKHXOH to - [- \ 7KHWXGEGMGOVRRFXRQWKHHIHDVLODVLDRQYHCFDOH IDFWRURQDILJXDQGRZVSHWHUFLQHXQVH[SODLQHHIHF</p>
2SWLRQLQFRUUHF		<p>WKHWXGEGMGOVRRFXRQWUDQVODVILQGGGGGIIHUYDQXMMKFRUGLQDWKHV RULJLQHDUWHUWHVBRHWKHUWH[LQVWRDQOWLSDFKRRUGLEDDWHQJOFDOH IDFWRU FKRRVLQJ W6KH+UXQH 7KHWXGEGMGOVRRFXRQXQGHUVWDRQLQJ WKVFDODFWRRUHFVWKGLODWLRQ</p>
2SWLRQLQFRUUHF		<p>WKHWXGEGMGOVRRFXRQWUDQVODVILQGGGGGIIHUYDQXMMKFRUGLQDWKHV RULJLQHDUWHUWHVBRHWKHUWH[LQVWRDQOWLSDFKRRUGLEDDWHQJOFDOH IDFWRU FKRRVLQJ W6KH+UXQH 7KHWXGEGMGOVRRFXRQXQGHUVWDRQLQJ WKVFDODFWRRUHFVWKGLODWLRQ</p>

67\$\$\$*UDGH0DWKHPDWLFV

67\$\$5*UDGH0DWKHPD5DWFVRQDOHV

,WHP	5DWLRQDOH	
	2SWL'RQLQFRUUH	FWKH

,WHP	5DWLRQDOH	
2SWLRQLQFRUUHF		<p>6FLHQWRIRWEDWKRORR[SUHYWUODUDRCHUXPDQPEHUQVWHRDZULWLQJ</p> <p>WKYDORERHH[SUHVDMDPXOWIRSOH = = 7KH</p> <p>VKRUWPDQKRCVUDQVODRFLQDQGBUORFLHQWRWLFWWRORYHWKGFHFLPDO</p> <p>SRLQWIZKHQKQXPEHLUHDWIKDQRULJKZKHQKQXPEHLUHWKDXQQLKOHUHV</p> <p>RQOQRQ]HQRPEHEHIRWIKGFHFLPSRQLQV\H[WJDUFSULWLVKQWPEHDUERW</p> <p>LQFOXZLHGWLQVFLHQWRWLFWIKRQXPEHRUGHFLPSOODFMKSRLEWYHGHWHPWQH</p> <p>YDORHWKHI[SRQHQPPEHJDLVMSRZHUKHGLUHFWWKGHFLPSRQLQWRYHG</p> <p>GHWHUPZLQHHWVWKHI[SRQHLSRVLVRLYHJDWDRMLQVKGHFLPSRQLQWKHLJKW</p> <p>FUHDVGMJDWL[SRQHQRWLVQVKGHFLPSRQLQWVKEHFWHDVSRVLVVHI[SRQHQLVQFH</p> <p>WKGHFLPSRQLQWYHWVWKEHIVSODFWWKHI[SRQHQLVWUHVXOVLQQLQJx</p>
2SWLRQLQFRUUHF	F	<p>WKHWXGEMRQFRXQWKEHXPEHRUSODFMKGFHFLPSRQLQWYHGQGLQRFRQVVLGHU</p> <p>ZKLFKLUHFWKGHFLPSRQLQWYHGKH WXGEMWQWRRFXRQXQGHUVWDRQWBJ</p> <p>GHWHUPMLQH[SRQHEOWHRCWKSIODFBOZXKHQRQYHUWVLDQGBUORFLHQWLILF</p> <p>QRWDWLRQ</p>
2SWLRQLQFRUUHF	F	<p>WKHWXGEMRQFRXQWKEHXPEHRU]HUREHIRWIKGFHFLPSRQLQWVWRZLQVKRIULJLQDO</p> <p>QXPEHDWVWKHI[SRQHQRWVWXGEMWQWRRFXRQXQGHUVWDRQWBJHWHUPMLQH</p> <p>H[SRQHEOWHRCWKSIODFBOZXKHQRQYHUWVLDQGBUORFLHQWRWLFWLRQ</p>
2SWLRQLQFRUUHF	F	<p>WKHWXGEMRQFRXQWKEHXPEHRU]HUREHIRWIKGFHFLPSRQLQWVWRZLQVKRIULJLQDO</p> <p>QXPEHDWVWKHI[SRQHQRWVGLQRFRQVVLGKILFKLUHFWKGHFLPSRQLQWYHGKH WXGHQW</p> <p>QHHCWRRFXRQXQGHUVWDRQWBJHWHUPMLQH[SRQHEOWHRCWKSIODFBOZXKHQ</p> <p>FRQYHUWVLDQGBUORFLHQWRWLFWLRQ</p>

7H[DMGXFDWLRQF\

6WXGSRWHVVP'HWLQ

\$XJXVW

,WHP	5DWLRQDOH
<p>DQQTHTXLYDO YDOXDURRUUHF</p>	<p>H7RWHWHUMLQHRWDOIDFUHWRDDEFDWKVXUIDRHWKUHHLPLHQVXRFIDCH SULVFKWVXGFRQVXGXYKIVHVKIRUPXGD-%KZKHU3UHSUHVWQSMHULPHRWMKH EDVHUHSUHVWQKMLJRWWKSULVDPQ%UHSUHVWQDMURDIWKEIDVFRGHWHUMLQH SHULPHRWMKHUHFWDQEDOBMKVWXGMRXVIOBYDIGGHWKIRXVLGRWVWHHFWDQJOH 3= + + + = 7RGHWHUMLQHUFDWKUHFWDQEDOBMKVWXGMRXVIOBYH PXOWLSOEHGUHVXOWLQJ7KHVWXGMRXVIOBYHGHWKDLVGIURVKGILDJUDQG HYDOXDWHG + ZKLFKHTXVOR 7KLVQCHIILFLZDWRROWKSHUREOHP KRZHYRWWKPHWKRFRVGEVHVGRROWKSHUREOFRPUUHFWO\</p>

7H[DVGXFDWLRQF\
6WXG\$QWHVVPHQWLRQ
\$XJXVW

,WHP	5DWLRQDOH	
	2SWLRQFRUUHFW	7RGHWHUZRKUDSKDORSHWHHSRHWUDDLKWHQUDSKRFRFRUGLQDWH JUL 0 = $\frac{\quad}{\quad}$



,WHP	5DWLRQDOH	
2SWLRQLQFRUUHF	7RGHWHUFLQHLQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSRKWKIKQFWMRKH VWXGFRXVGYHGHQWWIKSHLQVWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH \D[LWHUWLZFLQFLKDW7KLVDGHILFLZQWRROWIKSIUREOKRZHYRWKPIHWKRGV FRXGEXVHVRROWIKSIUREOFRPUHFWO\	
2SWLRQLQFRUUHF	FWKHVWXGEMFRQIXWHHLQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH OLQRXSDVWVKURXJKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH GHWZIKHGHQWLMKVLQJQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH	
2SWLRQLQFRUUHF	FW 7KHVWXGEMFRQIXWHHLQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH GHWHUPMCKVDRSHHVXOVLQJ = - 7KHVWXGEMFRQIXWHHLQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH DWWHQWLRQZIKHGHQWLMKVLQJQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH	\ \ ZKHQ []
2SWLRQLQFRUUHF	FWKHVWXGEMFRQIXWHHLQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH P = [] ZKHGHWHUPMCKVDRSHHVXOVLQJ = - 7KHVWXGEMFRQIXWHHLQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH RQSD\LDJWHQWLRQZIKHGHQWLMKVLQJQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH	RQSD\LDJWHQWLRQZIKHGHQWLMKVLQJQWHUFIHQHJOLFHURVWHKHDLRLRWKJUDSZKHUMKOLQSSHDVSDVWVKURXJKH

,WHP	5DWLRQDOH	
2SWL'RFRUUHFWS! s!		7RGHWHUZEKQFKWDWHDEBWWUWMKWHXGMKQWIDPHGHWHHUPWCEPKH LQWHUVHFVLRVCRWUDQVYHOLVQWLVKKWZSDUDOOQEDQCSURGXSDGRV DQJOWKDWFRQJUXHVDWRHDVXUDQSDLEIDQJOWKDWMXSSOHPHQWYD RI f 7KHVWXGMKQWIDPHGHWHHUPWCEPKH`0ip

, W H P	5 D W L R Q D O H	
	2 S W L R L Q F R U U H F W	7 R L G H Q W K B K U D W K C W V F U M E K W U D Q V I R U P F K V D I Q F R D V K D S H V L O J J R W D W F I L R U E X O D U P R Y H P H Q W H I O H F W O L R S Q U D Q V O D O W L C R O G L O D W L H R V L J M K W W X G M K R V X I O G Y H G H W H U P W C B W U D Q V I R U R D W Z E R V Q U R W D W L J R Q O R F N Z L E V F X W K R I U L J S Q L Q K H U H W K [H D [L V K R i A L S R Q W H D O ð 0

,WHP	5DWLRQDOH	
	2SWLRQFRUUHFW	7RGHWHUZEKQFKURSRUWRQDUIRWQBDWLLRWUXRVLPLOLDJXUHWZRLJXUZLWK FRUIULHXSRQDAGEPARUdPZR
		-

,WHP	5DWLRQDOH	
	2SWL/RQVFRUUHFV	7RGHWHUZEKQFLKQHTXDULSWLHVWQMLWXDWKHWXGFRQVGDYXIVHVQKIQIRUPDWLRLQ IURFKSUIUREOVIKDWKQIHQJRV\$% [XQLWVUHDWIKDWKQIHQJRV\$ [+ XQLWVHVXOWLQJ > [+ 7KLVDQHILFLZDQWRROWIKSUIUREOKRZHVRWKHU PHWKRFVXGEXVHVORROWIKSUIUREOFRUUHFVW\
	2SWL/RQLQFRUUHFV	WKHVWXGQMPDVLQWHUWVUHQHTGDQPEWRDKHVWXGQVWQVRRFXRQXVLQWKH FRUUMFVEROULWVHPXDRWLHV
	2SWL/RQVótiFTTWóti	&Arç.2.âóti p qâ, ó0 ,óWQEP`pFT\lxP`p/R

67\$\$5*UDGH0DWKHPD5DWLVRQDOHV

,WHP	5DWLVRQDOH	
	2SWLRLQFRUUHFV	7RGHWHUZEKQFKHDVXUHPLVQW

,WHP	5DWLRQDOH	
2SWL'QVFRUUHF	7RGHWHUZRQFKWDWHEWQVXMKVWXGMKRXIDYUHFJRJQWJKIDQQRQSURSRUWLRQ UHODWLRQKHYLSOXVQRMTXDVRZKHQKFRUUHVSRQGLQHYDOXW,QWKLVDSK ZKHQKHYDOXWITXDVRWKFRUUHVSRQGLQZRXCHTXDOUHVXOWVQVHWDPHQW WKDKJHDSMKRZVQRQSURSRUWDPVDFEFAKWKJHDSKRHQVFRQWVKBULJLQ SRLQKHUMKHD[LKRUL]RQDDCKHD[LWHUWIRFDERRUGLQDLVFRQDOHV DOVRKSRQLQWSUHVHEQWKRBUGHSBGU	
2SWL'QVFRUUHF	FKHVWXGQMHGHQWWIKVGRSHWKOLQNDQHJDWLYRISHWHHSQHDWWUDDLQMH ZKHQWDSKHQDFRRUGLQDLVFRQGGQWHUSWKVHHJQWLYRISPHDQLQKOLQKRZHDG QRQSURSRUWDPVDFEFAKWKJHDSKRHQVFRQWVKBULJLQ	UHODWLRQKHYLSOXVQRMTXDVRZKHQKFRUUHVSRQGLQHYDOXW,QWKLVDSK ZKHQKHYDOXWITXDVRWKFRUUHVSRQGLQZRXCHTXDOUHVXOWVQVHWDPHQW WKDKJHDSMKRZVQRQSURSRUWDPVDFEFAKWKJHDSKRHQVFRQWVKBULJLQ SRLQKHUMKHD[LKRUL]RQDDCKHD[LWHUWIRFDERRUGLQDLVFRQDOHV
2SWL'QVFRUUHF	FKHVWXGQMHGHQWWIKVGRSHWKOLQNDQHJDWLYRISHWHHSQHDWWUDDLQMH KRUL]RQDDCKHD[LWHUWIRFDERRUGLQDLVFRQGGQWHUSWKVHHJQWLYRISPHDQLQKOLQKRZHDG FRQWDDQGGQWHUSWKVHHJQWLYRISPHDQLQKOLQKRZHDG	UHODWLRQKHYLSOXVQRMTXDVRZKHQKFRUUHVSRQGLQHYDOXW,QWKLVDSK ZKHQKHYDOXWITXDVRWKFRUUHVSRQGLQZRXCHTXDOUHVXOWVQVHWDPHQW WKDKJHDSMKRZVQRQSURSRUWDPVDFEFAKWKJHDSKRHQVFRQWVKBULJLQ SRLQKHUMKHD[LKRUL]RQDDCKHD[LWHUWIRFDERRUGLQDLVFRQDOHV
2SWL'QVFRUUHF	FKHVWXGQMHGHQWWIKVGRSHWKOLQNDQHJDWLYRISHWHHSQHDWWUDDLQMH WKURXJKUTXHDGUDQVHDQLVQKOLQKRZHDGURSRUWLPVDFEFAKWKJHDSKRHQVFRQWVKBULJLQ UHFRJQLVYKQDSURSRUWLPVDFEFAKWKJHDSKRHQVFRQWVKBULJLQ	UHODWLRQKHYLSOXVQRMTXDVRZKHQKFRUUHVSRQGLQHYDOXW,QWKLVDSK ZKHQKHYDOXWITXDVRWKFRUUHVSRQGLQZRXCHTXDOUHVXOWVQVHWDPHQW WKDKJHDSMKRZVQRQSURSRUWDPVDFEFAKWKJHDSKRHQVFRQWVKBULJLQ SRLQKHUMKHD[LKRUL]RQDDCKHD[LWHUWIRFDERRUGLQDLVFRQDOHV

,WHP	5DWLRQDOH	
	<p>DQ@QHTXLYDOH YDOXDURRUUHF</p>	<p>GRGHWHUMLQHQJRWKWDPSQHHWKVWXGMQRXIDYGHWHUHPWQKFWFDXWKH GLDJUDIPSUHVBIQWVWLDQDFORVHGXZHWKKUWHGBOBQHGHJUBBJOZLWK OHJM IHHDQG IHHWKHWKDJRUWHCRUHOULJKWLDQWHTXDBWKH K\SRWHQ@RQJMV@VHTXD@VKVXPWRW@VKVHTXDURHWKRWKW@RLGHV</p>

,WHP	5DWLRQDOH	
	2SWL'RQVFRUUHFW	7RGHWHU ZKQ FKHDVXUHL FCOR VW RV WWK OH QJ WK K GL DJR R DK WT XD U FHQWLP HW W WX G FR X W G Y GHWHUP W Q W FDEHVROYI R Q E\WDN W K H VTXDUR RM ERW L G R W K H T XD W L R Q √ RU=√ UHVXO W L Q F J H Q W L P H W H U V EHL Q DRV W W K P H D V X U H F H Q W K L V D Q I I L F L Z Q W R O W K S I U R E O K R Z H Y R W K H U PHWK R F R X G E X V H G R O W K S I U R E O F R P U H F W O \
	2SWL R Q L QFRUUH	F W K H W X G E Q M S O Y L G H E \ LQVWR I D G N W K H T X D U R R W H V X O W L Q F J H Q W L P H W K H U V VWXG E Q M S O W R R F X R Q X Q G H U V W D R Z M Q L J Q G K W T X D U R R M D Q X P E H U
	2SWL R Q L QFRUUH	F W K H W X G E Q M S O Y L G H E \ LQVWR I D G N W K H T X D U R R W H V X O W L Q F J H Q W L P H W K H U V VWXG E Q M S O W R R F X R Q X Q G H U V W D R Z M Q L J Q G K W T X D U R R M D Q X P E H U
	2SWL R Q L QFRUUH	F W K H W X G E Q M S O Y L G H E \ LQVWR I D G N W K H T X D U R R W H V X O W L Q F J H Q W L P H W K H U V VWXG E Q M S O W R R F X R Q X Q G H U V W D R Z M Q L J Q G K W T X D U R R M D Q X P E H U

7H[D~~M~~XFD~~S~~L~~H~~~~O~~~~F~~\
 6WXG~~S~~~~Q~~~~W~~~~H~~~~V~~~~V~~~~P~~~~H~~~~Q~~~~W~~~~L~~~~R~~~~Q~~
 \$XJXVW

,WHP	5DWLRQDOH	
2SWLRQLQFRUUHF		<p>7RGHWHUZKQFMZR\OLQKDUWKVDPEDWWUDODFUHDRWDEFDWKVXUIDRHV WKUHHGLPHQVKROFMQFOXGWKHUHDWKEDVHWKWXGFRXVOYXVHVKH IRUPXIRDWKEDWWUDODFUHRDF\OLQ6HUSJKZKHUHSUHVWKMDGLGVVWDQFH IURWKFHQWHMKFLUFXPIHURHDFLUFROMKFLUFXODVHQEUSUHVWKMLJKW YHUWGEDVDQRWRSERWRWKF\OLQGRGHWHUFLKDWWUDODFUHIRU &\OLQGHWKVWXGFRXVOYXEVWLWKLHGOXHVGOSSUR[LPDVHRSLQWKH IRUPXIRDWWUDODFUHDQEYDOXDWHG ZKLFKDSSUR[LPDVHRS VTXDUGFKFRGHWHUFLKDWWUDODFUHIR&\OLQGHUKVWXGFRXVOYH VXEVWLWKLHGOXHVGOSSUR[LPDVHRSLQWKIRUPXIRDWWUDODFUHD DQEYDOXDWHG ZKLFKDSSUR[LPDVHRS VTXDUGFKFR GHWHUFLKDWWUDODFUHIR&\OLQGHUKVWXGFRXVOYXEVWLWKLHGOXH DQEOSSUR[LPDVHRSLQWKIRUPXIRDWWUDODFUHD DQEOSSUR[LPDVHRS VTXDUGFKF 6= ZKLFKDSSUR[LPDVHRS VTXDUGFKFKHWXGHVRXOG KDYFRPSDUHGDOXHMVXOMG\OLQGHDE\OLQGKDYLWKVDPEDWWUDODFH DUHDKLVDCHILFLZDWRROWKSUREOKRZHYRWKPHWKRFRXEXVHRROYH WKSUREOFRUHFW\</p>
2SWLRQLQFRUUH	F	<p>WKHWXGEQMEQWLWKOMKVXPWRWDODFKDGURV\OLQGHDQGLV + = DQEKGLIHUHROFDHFKHLJKV\OLQGHDQGLV = DQEKHUHDRVHPESWK F\OLQGKHUVKVDPEDWWUDODFUHDKHWXGEEWGRRFXROXQGHUVWDQGLQJ SURSHDSSO\MKIRUPXIRDEHWHUPMKDWWUDODFUHRDF\OLQGHUV</p>
2SWLRQLQFRUUH	F	<p>WKHWXGEQMEQWLWKOMKVXPWRWDODKHDGLDQEKIHLJKV\OLQGHV + = DQEKIHLJKV\OLQGHV DQEKHUHDRVHPESWFKOLQGHUV ODWWUDODFUHDKHWXGEEWGRRFXROXQGHUVWDQGLQJ IRGHWHUPMKDWWUDODFUHRDF\OLQGHUV</p>
2SWLRQLQFRUUH	F	<p>WKFRUUEQWZH\OLQGHDQG ZDVSUHVHQURCRIWKRWKDQVZRSWLRQV</p>

7HIDMGXFDWLRQF\
6WXG\$QWHVVP'HQWLRQ
\$XJXVW

, WHP	5DWLRQDOH	
1F	2SWL&QFRUUHFV	7RGHWHUMLQHHVSUHGLFRWRKJLJWHPSHWUXIUGHJUHDKUHQRKQWVZKHQWKH ORVHPSHUDLWXJUDKUHQKMLWVFDWWHDJLORSKISORWSRHLGMMWWRZWKH UHODWLEQWZLHSHZORHVRVGDWVQKHWXÂCÂÀHÂ@WZR Áñ—@DVKEH p WWRW UH!HPSHEJ10VHWVWKVHWV ð Ä!pð €ÄHCO Áð 0“ ð0VHWV E411 E0€Â
ÂDWWp`€EgXlpD`€p`		

,WHP	5DWLRQDOH	
2SWLRQLQFRUUHF		<p>7RLGHQWIKIUDSZLWVKVORSWHHHSRHDWWUDDLKQWQHQUOSKRIGDFRRUGLQDLVGH</p> $P = \frac{\backslash \backslash}{[[]}$ <p>WKIUVUHSUHVWIKRWRWHDFSHQDLWKWWRWHKHWXGFRXVGYH</p> <p>GHWHUPVQIKFRVRV FHQVRWVSHQFLDVTXLYDVIDEVRV FHQVRVHDFSHQFLO</p> <p>÷ = 7KHQKWWXGFRXVGYGHWHUPVQIKJUDSKSSHDVSDVWKURXWKH</p> <p>SRLQVRFDVWG DQG DQVKVORSHWZHWIHSRLQLWHSUHVHQWHSXTDWLQRQ</p> <p>P = — = — — ZKLFKHTXVOR 7KLVDQHIILFLZHQWRROWKSHUREOKRZHYHU</p> <p>RWKPHWKRFRXGEXVHVRROWKSHURECFRPUHFWO\</p>
2SWLRQLQFRUUHF		<p>WKHWXGQMDVLDQWHUSSHOVFDQVSHQFUDVXOVDQORRH 7KHWWXGQWGV</p> <p>WRRFXRQXVLQWKIRUPXVBLQVQKVDORHWKVDORRGGGHQLWKLQJDSKKDWSUHVHQWV</p> <p>WKVORSH</p>
2SWLRQLQFRUUHF		<p>WKHWXGQMDDOFXODKVDORSRUUHFVWGXWKRWHKJUDSKZKLFKHYDOQBG</p> <p>WKHYDOQHDHDFKTXDOR 7KHWWXGQWGVWRRFXRQXQGHUVWVQKPHDQLRQWKH</p> <p>YDORHDVORRGGGHQLWKLQJDSKKFWUUHFMSUHVHQVQVORSH</p>
2SWLRQLQFRUUHF		<p>WKHWXGQMDDOFXODKVDORSRM DQGKRWHKJUDSKZKLFKHYDOQVDOZDHTXDO</p> <p>WR 7KHWWXGQWGVWRRFXRQXQGHUVWVQKPHDQLRQWKHYDORHDVORRGGGHQLWLI\LQJ</p> <p>WKJUDSKKFWUUHFMSUHVHQVQVORSH</p>

7HIDMGXFDWLRQF\

6WXGSHQWHVVPHQWLRQ

\$XJXVW