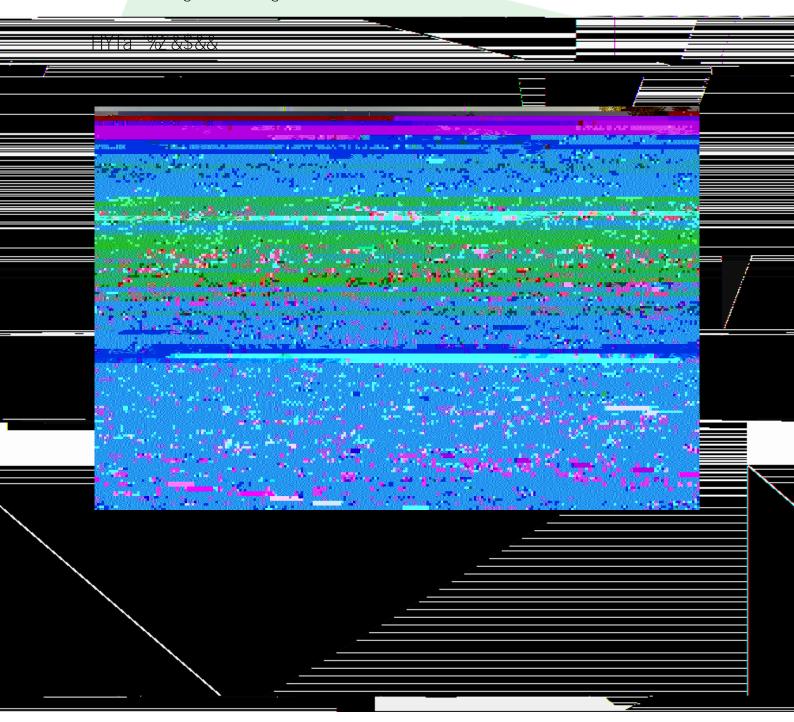


# **ENGG2400**

A YWXUb]WgʻcZGc`]Xgʻ%



# 7ci fgY Cj Yfj ]Yk

#### GHJZ:7cbHJWh'8YHJ]`g

#### 7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cWUh]cb	D\cbY
8 Ub]Y``C fG\YU	X"cg\YU4 i bgk "YXi "Ui	9a U]`Zcf Uddc]bha Ybh	F cca '%\$, ž < &\$	

#### @YWhi fYfg

B Ua Y	9a U]`	5j U]`UV]`] <b>m</b>	@cWUh]cb	D\cbY
9`YbU 5lfcg\W.Yb_c	Y"Ulfcg\WXYb_c4 i bgk "YXi "Ui		Fcca '*\$+ž <&\$	

#### GWXcc~7cbhJWh~abZcfa Uhlcb

<u>9b[]bYYf]b['Ghi XYbhGi ddcfhGYfj]WYg'-</u>'H\Y'Bi WYi g'!'Ybfc`a Ybhž'dfc[fYgg]cb'W\YW\_gž'W`Ug\'fYei Yghgž Wci fgY']ggi Yg'cf'dfc[fUa!fY`UhYX'ei Yf]Yg'

9b[]bYYf]b[ +bXi qlf]U HfU]b]b[ -- +bXi qlf]U lfU]b]b[ ei Yql]cbg

<u>I\_BGK\_'Gh\_Xm5VfcUX</u>'--gh\_XmUVfcUX'gh\_XYbhYbei\_]f]Yg^fZcf^]bVci\_bX^gh\_XYbhgŁ

LBGK '91 WXUb[Y'-'ghi XYbhYl WXUb[Y'Ybei ]f]Yg'fZcf']bVci bX'ghi XYbhgŁ'

LBGK : i h fY Gh XYbhg - dchYbhJU gh XYbhYbei ]f]Yg Y"[ "'UXa ]gg]cbgž ZYYgž dfc[ fUa gž WfYX]hhfUbgZYf

#### D\cbY.

fŽ\*%%L-',),)\$\$-BiWYigGhXYbh<iV

fŽ\*%'&Ł'-',) '+\*\*%'-'9b[]bYYf]b['=bXi ghf]U``HfU]b]b['

fŽ\*%%&L-',) " %+- '-1 BGK 'Gh Xm5VfcUX'UbX'I BGK '91 WXUb[Y'fZcf']bVci bX'gh XYbhgL

## 7ci fgY 8YW] g

#### $I b hg c Z 7 f Y X h^*$

#### Gi a a UfmcZh\Y'7ci fgY

H\]g`Wci fgY`dfcj ]XYg`Ub`]blfcXi Wf]cb'hc`h\Y`Z bXUa YblU`g`hc`h\Y`a YW\Ub]\Wg`cZgc`]Xg"`H\Y`hcd]\Wg`]bWi XY dfcdYff]Yg`cZd`UbY`Wfcgg!gYWf]cbU``g\UdYg`]bWi X]b[`W\blfc]X'/ `df]b\\]dU``gYWcbX`a ca YbhcZUfYU/ \\&b\W\drg`cZglfYgg`UbX`glfU]b/&8 `lfUbgZcfa Ulf]cb'cZglfYggYg`UbX`glfU]bg`i bXYf`Ul ]g`fclUlf]cb/df]b\\]dU` glfYggYg`UbX`glfU]bjA c\f'g`\\]f\Wf\x'cZglfYgg`UbX`glfU]b/glfYgg!glfU]b`fY`Ulf]cbg\]dg/Y`Uglf\\]m\xih\Yfa U` glfU]b\z`Dc]ggcb'g`fUlfc`UbX`<cc\_Y'g`@Uk /\Ufg`i bXYf`Ul ]U``Zcf\\Y'=\bXYhYfa ]b\UhY`Ul ]U``Zcf\\Y'gmghYa g/Y`Uglf\\W\ybX]b[`glfYgg`Zcfa i `U/\capya dcg]h'`VYUa g/XYZY\\floog\Xi Y`hc`VYbX]b['ghYd`Z b\\floog\g]a d`Y ]bXYhYfa ]b\UhY`VYUa g/g\YUf`Zck /g\YUf`Xck /g\YUf`\Xhfy\fra ]b\UhY`VYUa g/\XYZY\\lf`\g\\Zhg\"

#### 7ci fgY 5]a g

H\Y'cVYW]jYg'cZh\]g'WcifgY'UfY.

Hc'fY]bZcfW'\_bck `YX[Y'cZghUh]Wg'UbX'hc'Yl dUbX'h\]g'\_bck `YX[Y']b'h\Y'UfYUg'cZghfU]b'UbX'ghfYgg UbU`mg]gž'h\i g'YbUV`]b['ghi XYbh'hc'XYU'`k]h\'a cfY'Wca d'Yl 'UbX']bhY[fUhYX'Yb[]bYYf]b['dfcV'Ya g']bj c'j ]b[ A YW\Ub]Wg'cZGc`]Xq/

Hc']blfcXi Wrgh XYblg'hc'h\Y'VUg]Wdf]bWjd'Yg'UbX'`Uk g'i bXYf'm]b['A YW\Ub]Wg'cZGc`]Xg/Hc'ZJa ]`]Uf]nY'gh XYblg'k ]h\'h\Y'a cXY``]b['UbX'UbU'mg]g'hYW\b]ei Yg'k \Yb'Zcfa i `Uh]b['UbX'gc'j ]b[ dfcV'Ya g'Zcf'dfYX]Wf]b['h\Y'ghUhYg'cZghfYgg'UbX'ghfU]b'Zcf'VcX]Yg']b'ghUhJWYei ]`]Vf]i a /Hc'[']j Y'gh XYblg'Ub'cddcfh b]lmhc'XYj Y`cd'UbX'fYZYWhcb'[fUXi UhY'Uhff]Vi hYg'gi W\'Ug'Wf]hJWJ'`h\]b\_]b['UbX'dfcV'Ya 'gc'j ]b['z`]ZY`cb[''YUfb]b['g\_]``g'UbX'Wc'``UVcfUhj Y'g\_]``g''

### 7ci fgY @YUfb]b[ 'Ci hWca Yg

5 ZYfiqi WWgqZ ``mWca d`YHb[ 'th\]q Wci fqYžmci 'q\ci `X'VY'UV'Y'tc.

@YUfb]b[ 'Ci hWca Y	95 GHJ[Y %7ca dYhYbW]Yg
%"FYdfYgYbhid\mg]\WJ``gmghYagʻ]b``U`aUbbYf`hc`giZZJ\JYbh`m\WJdhifYh\Y`ghfi WhifU``Y`YaYbhg`fYei]fYX`hc`dYfZcfa`Ub`Yb[]bYYf]b[ghfYgg#ghfU]b`UbU`mg]g"	D9%"%ŽD9%"&
&"`8]gWYfb'h\Y`fY`Yj Ubh'df]bW]d`Yg`h\Uha i gh'VY`Udd`]YX`hc UgWYfhU]b`ghfYgg#ghfU]b`cf``cUX#XYZYWI]cb`ghUhYg`cZYb[]bYYf]b[ gmghYa g`UbX`X]gWf]a]bUhY`VYhk YYb`fY`Yj Ubh'UbX`]ffY`Yj Ubh ]bZcfa Uh]cb`]b`h\Y`WcbhYl h'	D9%"
' "'8 Ya cbglfUhY 'Ub 'UV]`]hmihc 'Wca a i b])WJhY 'WY Uf m'Ub X 'dfYW]gY`m UVci h'hY W.b]WJ`a UhhY fg 'fY`UhY X 'hc 'h\ Y 'A Y W. Ub]Wg 'c ZGc`]Xg	D9%" ž'D9%")
("'5\W\card`]g\`dfU\\j\\U``HJg_g`h\UhfYei]fY`h\Y`Udd`]\WJhjcb`cZ _bck`YX[Y`cZh\Y`AY\\Ub]\\g`cZGc`]Xg	D9%" ž'D9%") ž'D9&"%
) "'8 Ya cbglfUlY'dfcZYgg]cbU``Wca a i b]WUl]cbžVch\`k f]lHYb`UbX cfU`ž'h\Uh]bWi XYg`a Uh\Ya Ul]WU`ž'[fUd\]WU``UbX`X]U[fUa a Ul]W Y`Ya Yblg"	D9%'&ž'D9%''

@YUfb]b[ 'Ci HMca Y	95 GHJ[Y %7ca dYhYbW]Yg
*"'DfcXi WY']bX]j ]Xi U`'k cf_'Vm`Yj YfU[ ]b[ 'U'Wc``UVcfUh]j Y Ybj ]fcba Ybhz`\Y`d]b[ 'UbX'UbX'fYW]Yj ]b[ '\Y`d'Zfca 'dYYfg']b'U dfcZYgg]cbU`'UbX'Yh\]WU`'a UbbYf"	D9%"&ž'D9%"' ž'D9&"&

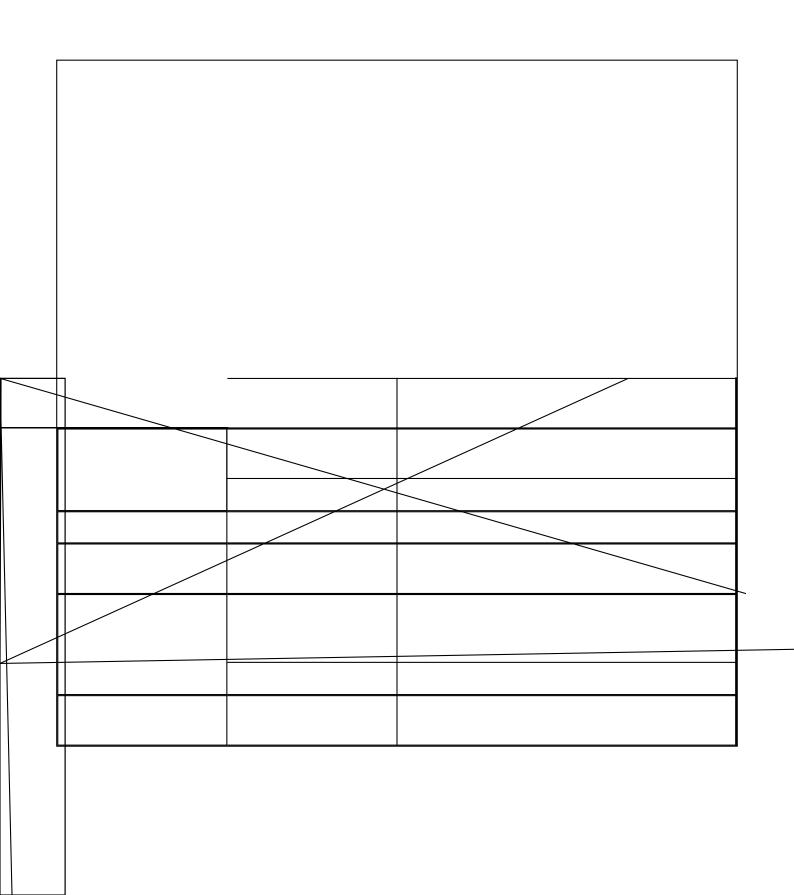
#### HYUWX]b[ 'GhfUhY[]Yg'

H\Y'hYUW\]b['ghfUhY[]Yg'h\Uhk]``'VY'i gYX']bWi XY.'

- @YWi fYg'h\Uhk]``ZcW g'cb'h\Y'XYj Y`cda Ybh'UbX'Udd`]WUhjcb'cZ[YbYfU`]gYX'dfcV`Ya!gc`j ]b[dfcWggYg'Zcf'h\Y'ghfYggžghfU]b'UbX'XYZcfa Uhjcb'UbU`mg]g'cZghfi Wi fYg''@YWi fYg'k]``U`gc Yad\Ug]gY'h\Y'fY`Uhjcbg\]d'cZh\Y'WcbhYbh'rc'Yb[]bYYf]b['dfUWjWY'UbX'k]``dfcj]XY'Ub'cddcfhi b]hm Zcf'fYZYWhjcb'cb'`YUfb]b["'H\Y'`YWi fYg'UfY'fYWcfXYX'UbX'g\ci`X'VY'Uj U]`UV'Y'cb'h\Y'AccX'Y Wci fgY'dU[Y"
- DfcV`Ya 'WUggYg'k ]``'WcbWYbhfUhY'cb'ghfUhY[]Yg'Zcf'gc`j ]b['gi W\'dfcV`Ya g"''Ghi XYbhg'k]``'VY YbWci fU[YXž'Zfca 'h]a Y'hc'h]a Yž'hc'k cf\_`]b'ga U```[fci dg'hc'gc`j Y'dfcV`Ya g"
- A ccX`Y`7 ci fgY`DU[Y`dfcj]XYg`U`ghYd`VmghYd`[i]XY`cb`fh\Y`Wci fgY"`H\YfY`]g`U`X]gW gg]cb`Zcfi a hc`\Y`d`dfcj]XY`]bhYfUWfjcb`UbX`\Y`d`Zfca`dYYfg"`@]b\_g`hc`j]XYc`fYWcfX]b[g`UbX``YUfb]b[`acXi`Yghc`\Y`d`ghXYbhg``YUfb'h\Y`gc`i h]cb`hYW\b]ei Yg`Zcfa UbmcZh\Y`gi VYWhUfYUg"`
- A ]WfcgcZhiHYUa g

# 5ggYgga Ybh

5ggYgga YbhhUg_	K Y][\h	8i Y <sup>.</sup> 8UhY	7ci fgY`@YUfb]b[ Ci HWca Yg`5ggYggYX
%"·Cb`]bY·@YUfb]b[ ·A cXi `Yg	%) ၊		



## FYgci fWyg

#### DfYgWf]VYX F Ygci fWYg

HYI hVcc\_. ~A YVX.Ub]\Mg`cZA UhYf]U`g. `HYbh\ `9X]h]cb`]b`G=I b]\mg^"! F 7 < ]\VVY`Yfz`DYUfgcb '9Xi \WUh]cb

#### 7 ci fqY'9j U'i Uhcb'UbX'8Yj Y'cda Ybh

H\Y'GW\cc``cZ7]j ]`'UbX'9bj ]fcba YbHJ`'9b[]bYYf]b[ 'Yj U'i UhYg'YUW\ 'Wci fgY'YUW\ 'h]a Y`]h]g'fi b'h\fci [\'f]Ł h\Y'A m9I dYf]YbW''Gi fj Ymgž'UbX'f]]Ł: cW g'; fci d'A YYh]b[ g"'5g'dUfhcZh\Y'A m9I dYf]YbW''dfcW'ggž'mci f ghi XYbhYj U'i Uh]cbg'cb'j Uf]ci g'UgdYWg'cZh\Y'Wci fgY'UfY'[ fUXYX/h\Y'7 ci fgY'7 ccfX]bUhcf'dfYdUfYg'U gi a a UfmfYdcfhZcf'h\Y'< YUX'cZGW\cc`"'5bmdfcV'Ya 'UfYUg'UfY']XYbh]Z]YX'Zcf'fYa YX]U`'UWn]cbž'UbX']XYUg Zcf'a U\_]b[ ']a dfcj Ya Ybhg'hc'h\Y'Wci fgY'UfY'bchYX'Zcf'UWn]cb'h\Y'bYI hiha Y'h\Uhih\Y'Wci fgY']g'fi b'': cW g ; fci d'A YYh]b[ g'UfY'WcbXi WhYX'Vmh\Y'Zci f!MYUf'A UbU[Yfg'fUWUXYa ]WghUZŁZcf'Ubmghi XYbhg'k \c'k ]g\'hc UhhYbXž']b'YUW\ 'mYUf'cZh\Y'Wj ]''UbX#cf'Ybj ]fcba YbHU``Yb[]bYYf]b[ 'dfc[ fUa g"'Ghi XYbhiWca a Ybhg'cb'YUW\ Wci fgY'UfY'Wc``YWhYX'UbX'X]ggYa ]bUhYX'hc'h\Y'@YWhi fYfg'WcbWfbYXž'bch]b[ 'Ubmdc]bhg'k \]W\'WUb'\Y'd ]a dfcj Y'h\Y'Wci fgY''

# 5 WUXYa ]W + DZcfa Uhjcb

: ]bU`'9l Ua ]bUh]cbg.

: ]bU``Yl Ua g`]b`H%&\$&&`k ]```VY`\Y`X`cb`]bY`VYlk YYb`&- h\`5df]`'!`'&kh\`A Um`]bWl g]j Yž'UbX`gi dd`Ya YbhUfm Yl Ua g`VYlk YYb`&' fX`!`&+h\`A Um`]bWl g]j Y"`Mci 'UfY`fYei ]fYX`hc`VY`Uj U]`UV`Y`cb`h\YgY`XUhYg"`D`YUgY`Xc

# 5ddYbX]I . '9b[]bYYfg'5i ghfU`]U'f95Ł'DfcZYgg]cbU` '9b[]bYYf'7ca dYhYbWm GHJbXUfX

Dfc[fUa =bhybXYX=@YUfb]b[ 'Ci hWca Yg	
?bck `YX[Y`UbX'g_]```VUgY	
D9%"%7ca dfY\Ybg]j Yž'h\YcfmVUgYX'i bXYfghUbX]b[ 'cZh\Y'i bXYfd]bb]b[ 'bUhi fU`'UbX d\mg]\WJ`'g\WJYb\Wg'UbX'h\Y'Yb[ ]bYYf]b[ 'Z bXUa YbhJ`g'Udd`]\WJV`Y'hc'h\Y'Yb[ ]bYYf]b[ 'X]g\WJd`]bY	
D9%"&"7cbWYdh U``i bXYfgHJbX]b['cZh\Y'a Uh\Ya Uh]Wgžbi a Yf]WJ``UbU`mg]gžgHJh]gh]Wgž'UbX Wca di hYf`UbX`]bZcfa Uh]cb'gW]YbWYg'k\]W\'i bXYfd]b'h\Y'Yb[]bYYf]b['X]gW]d`]bY	
D9%" '=b!XYdh\'i bXYfghUbX]b['cZgdYW]U`]ghVcX]Yg'cZ_bck `YX[Y'k]h\]b'h\Y'Yb[]bYYf]b[X]gW]d`]bY	
D9%'( '8]gWfba YbhcZ_bck `YX[ Y 'XYj Y`cda YbhUbX'fYgYUfWX 'X]fYWf]cbg'k ]h\]b'h\Y Yb[ ]bYYf]b[ 'X]gW]d`]bY	
D9%) '? bck 'YX[Y'cZYb[]bYYf]b[ 'XYg][b'dfUWjWY'UbX'WcbhYl hi U`'ZJWcfg']a dUWjb[ 'h\Y Yb[]bYYf]b[ 'X]gWjd`]bY	
D9%"* I bXYfgHJbX]b[ 'cZh\Y'gWcdYž'df]bW]d`Ygž'bcfa gž'UWVci bHJV]`]h]Yg'UbX'Vci bXg'cZ gi gHJ]bUV`Y'Yb[ ]bYYf]b[ 'dfUWfJWY']b'h\Y'gdYW]ZJWX]gW]d`]bY	
9b[]bYYf]b['Udd`]WUh]cb'UV]`]hm	
D9&"%5dd`]WUh]cb`cZYgHUV`]g\YX`Yb[]bYYf]b[`a Yh\cXg`hc`Wca d`Yl `Yb[]bYYf]b[`dfcV`Ya gc`j ]b[	
D9&"&": `i YbhiUdd`]WUh]cb'cZYb[]bYYf]b['hYVXb]ei Ygžhcc`g'UbX'fYgci fWYg	
D9&" '5dd`]WUh]cb`cZgmghYa Uh]WYb[]bYYf]b[`gmbh\Yg]g`UbX`XYg][b`dfcWYggYg	
D9&"('5dd`]WUh]cb'cZgmghYa Uh]WUddfcUWXYg'hc'h\Y'WcbXi WhUbX'a UbU[Ya YbhcZYb[]bYYf]b[dfcYWng	
DfcZYgg]cbU`'UbX'dYfgcbU`'Ultf]Vi hYg	
D9' "%'9h\]WU`'WcbXi Wh'UbX'dfcZYgg]cbU`'UWWci bHJV]`]hm	
D9' "&'9ZYWAj Y'cfU`'UbX'k f]MYb'Wcaaib]WUAjcb']b'dfcZYgg]cbU`'UbX'`Um'XcaU]bg	
D9' "' '7 fYUhjj Yž']bbcj Uhjj Y'UbX'dfc!UWhj Y'XYa YUbci f	
D9' "( 'DfcZ/gg]cbU`i gY'UbX'a UbU[ Ya YbhcZ]bZcfa Uh]cb	
D9' ") 'C fXYf'mia UbU[ Ya YbhcZgY`Zi'UbX`dfcZygg]cbU``WcbXi Wh	
D9' "* '9ZZYWNjj Y'NYUa 'a Ya VYfg\]d'UbX'NYUa 'YUXYfg\]d	