

TCVN

! " " # \$%

Specifications for design of foundation for buildings and structures

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< 3 U ! 8 M E Z R \$ 8 & X & 3 K) ! 5 O "#
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-0 *1 2 1-3 43 5 16 76 *8 9 ;; 1

Specifications for design of foundation for buildings and structures

<1=> 7-?@ A) 9

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< I)" # # . ! : #0 # (/ # 10 8 # 6 9 ' 56 7 r # # @! #0b 5W
. (/ # p! N "# (/ e 5W # . UW 5 (!* s UB p! , -
 $I_p t 787$ If

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- I hV B I #V # E# #0 : #0 # ! 56 R_n f

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%

I)E ! - K_{ph} N#z UB D- #0b 5W # + #L , - o < ! - 6 #0b 5W # + #L
, - o 5- ! - , - = " |

, - ! "# . F #3 # @! MF !* MF %U- (n# # 6 9
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 9 8# @! #0 , - GUB ! - K_{phd} - 0- # @! MF
 I 9 J < 1G H = - /

+H=- / 1N O 76 / *?	<1G M *PQ 1= 1RH /S O I 1 U 9@1 :V> :W 9 XY 9 *PQ / 1H 9418
A. Đất hòn lớn)" #F e N(# UC b . - (B I)" # E N(# UC b . " # e l)" # U { N(# UC b . "# U I	&0b 5W , - # 6 9 77 ' #03 7 r &0b 5W # 6 9 7 ' #03 7 r &0b 5W # 6 9 ' #03 7 r
B. Đất cát O # U { O ## / O ## / Y- O # O # <	&0b 5W # 6 9 ' #03 r &0b 5W # 6 9 78 ' #03 7 r &0b 5W # 6 9 78 ' #03 7 r &0b 5W # 6 9 78 ' #03 ; r !* &0b 5W # 6 9 78 ' 56 ; r

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$$K_{ph} \frac{K K}{K}$$

N I

#0! [

K . #z UB #0b 5W # (L # 56 { 9 U! 6 #0b 5W , - #
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B)" # q 6 . " # 5W - # @! E ! 56 G N 56 V- #0! # + #L 0, , -
" #1 #0! MF

I 9 E J < 1 G H = - / 1 R H / S H X O *

0 / 1 N O 76 / *? 1 R H / S H X O *	\ S H X O *] G
x# K	7 t G • 78
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$$G \frac{W_s}{e_w}$$

N I

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e . GUB 0, , - " #: #0 # . EK #R 3

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({ " # " I # ! * # L G 03 , - ! q 6 . ! " # " I #

&0! #05 W # L G 03 # 1 EK , - " # q 6 2 # @! / # V [

$$W W K_{phd} W W$$

N I

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W . W 5W # . EK , - " # " I # . , - q 6 N # 6 9 If

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η . 5W q 6 # <i UB# J f

K_{phd} . G UB ! -82 # @!

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N2@ . %I

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S #0 UB : MF ? &3 <= 5W S # @! sUB p! 3 : >

I 9 J [LM:g 9 *PQ h Lb

+H=- h	[LM :g 9 e
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E ! 56 G t 78> . sUB 4 56# s 2 # @! / # V N;I { 9 #0 UB : MF 7

I 9 J -O- 1= *PQ *1KLM s *1H / i XO

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$$s \frac{e_{nh} e}{e} \quad N; I$$

#0! [

e . GUB 0, , - "#: ('# " . EK #R 3 f

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$$e_{nh} W_L \frac{\quad}{w} \quad N>I$$

u8 < j ...- 5 #0! / # V N I

B E)"# 4 56# 5W * #05 <i E 4 56# #59 B . R 4 56# <-

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$$s \frac{h h_n}{h_o} \quad N?I$$

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h . \$ -! o "#K #R 3 I (/ : / 56 R p8<i R #
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Q R #59 : p_m . R #03 o "# . 56# . I (/ : / <' #59 :
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)EK #59 : W_m . EK 5W U- (('## 4 #59 : , - E# o "#(< I (/
 : / 56 R ! #56

)E ! #59 B ("#(/ 5W 2 <i / # V [

$$^c \frac{h_p h_{pc}}{h_p} \quad N \quad I$$

#0! [

h_p . \$ -! , - o "#(I (/ : / 56 R pf

h_{pc} . \$ -! , - o "# d : R . U- (o < (/

B ^ &0! ! g- V . "# -0- ! "# A B
)"# A B . ! "# . #X 5W V- B A q- #- . q- #- Y- (/ { 9 #0 UB
 : MF

I 9 J <1G H=- / 1-j >> M-

<p>0 ***/ 1-j >> M-</p>	<p>k 9 XY 9 *1ZQ > M-Aj 1NQ Q 76 1NQ Q 7`QLH 70- :W 9 XY 9/ 1H 9 418] r</p>	<p>1i 1i*1</p>
<p>) g- V A B)"# q 6 A B -a 5W V- # { 9 7r !* 5W V- UI# { 9 7r -a 5W V- # 6 9 7r -a 5W V- UI# 6 9 7r</p>	<p>78 78</p>	<p>O ! B A q- #- k []-O8 aO8 O-O 8 | O 8]-vOE 8 O-NvOE I 8 | NvOE I 8]- OE 8 | hE 8]- hE | B q- #- Y- . # -![O-hE v E</p>
<p>)"# # A B)"# UI# A B [-Q # . UI# 4 56#N "# 6# !* 6# -Q # . UI# (/ 4 56#</p>	<p>78 N !* 78 ' s B A q- #- I</p>	

B a O #. G 3 V , - "# # . "# UI# F UB G 8 #. # R J# ' 5W
 V- #59 B , - # # @! #0b 5W q ~ 787 B 6 "# # . q ~ 787 B 6 "# UI#
 5W V- #59 B #. # R J# S #0! "# N E# - <= I . #z UB #0b 5W , - o "#
 U" : G# E 77^O ' 7^O #03 #0b 5W (! J# , - &= # @! 5W q .
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)"## - <= * #05 <i V E , 8<+ G <i 5W V- UF K ,
 , - #X V # R J#

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0 / *? 76 / Lb *. *1ZQ 6 T*1 1l * 7m	+XY 9*1ZQ Xe 9 /M-?* 6 T*1 1l * 7m q n/S 1Q h o
H)"# V-#. #L # R J#	
)"# # #. #L # R J#)"#UI# #. #L # R J#	787 t q • 78 787 t q • 78
M)"# # - <=	
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)"# k B # ! !* "# 5W . ! "# C 8 "# 5W - B !* • *##Y "#
 k B #R 3 <i 59 (-

B)"# C - 0- 5 : MF

I 9 J<1G H=- / /p@

-0 *1 2 /q *1-0 / /p@	?* H=- / /p@ 76?* /_ * :X 9 *PQ /
H & @! 59 C)C <i 59 (/N = #0! -! # / 5 <E !* 5 UC# <i , !* I)C 56#N<i 9 6 -# , R I
M & @! UR k "# \$ # . " #04	)"# C # @! (' ! 2 R N "# C 5W I . "## - #' NG I ! "# . * #05 <i # . " #04 k "# # I \$ O <n # F "# . ' G UF 2 "# ! "# . # . " #04 k "# 5 E *# . #L I (/ \$)"# k 8 ' G UF 2 "# . 0 U ! # ! . (/ k "# \$ # . " #04 8 E *# . #L I (/ \$ V- # "# D 9
O & @! k B J# G L , - "# C	)"##R 3 ["# q 6 8 "# #8 "#UI# ' G UF 2 "#[2s8 #0!8 "## ! o J## F , - . . . 3 G O "## F #0! U ! #
P & @! E *# ! #0b 5W <F # 0-	)nX S #01 I *# ! #0b 5W <F # 0- n('## 4 O 5- X S #01 I *# ! #0b 5W <F # 0- q #' A

B)"# 5W - B8 R- .! 59 - B . - 0- - B + -! E <\$ 8 F
 #L I 4 . F (F e # " 56 NU -# R-82 e 8< # 8 "#UI# - B<i G# I

&= # E .! l - B . "# 5W - B F * #05 <i E<\$ 8# l 4 . (F
e # " , - U- (- B

)"# • *# 5W - # @! 59 . *# N4 8 X 1 l . 5W * #05 <i E
*# , - " #04 U- (. *#

&3 b , - "# - B . "# • *# k #3 b , - "# : #0 # #R 3 # @! MF
!* MF % 0€ 59 - B !* • *#

E 1-3 43 5

EB 1KAr *1 9

EB B a # '#(' \$. . / #01 #! U-! !<' , - \$ (/ 5W 5W# S
#0 UB 6 ! l + Ug / #01 <l # 5 8 q UV #F F , + (/ 2F
0- "#X !* ! \$

EB B `G # '#(' \$ N# @! 3 , - l F R- .! ('#S F# #! + b [

_a+ \$ N#R 3 8 • *# # !8 - B - b !* - B <i G# l

_a+ ('# " (l # 56 . J# G , - 8 N <e 8 <F 8 #0 8 <3 #/ B## l 8 <3 #/ 8 <3
#/ E / !* U 8 b 8 #0 U l

_O <G 3 : > 8 > 8 > 8 > 8 > 8 > % . > ; (F F 5: <' , - \$ ' G Ug . . / #01

EB B]\$ F #! # @![

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5 . . / #01

] \$ #! # @! UV #F #0! D #05 W 3 : . # @! <' (\$ (/ F .

a #! # @! #0 # 6 # 1 <' 5 #! #! . UV #F , - \$ F U! U 6
<' 6 ! l . UV #F #B # + # '# 2l# ' * + ('# " , - . .
/ #01 8 59 2 R . ' #B (

EB BE &l #! \$ # @! UV #F F #' . #0! D #05 W [

-l &F #0b - (+ #0 \$ 3 \$ N#5 C , - D / #01 R K l (+
F #05 W E "#

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l]\$. V f

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I] \$ k "#UI# ! 56 . "## - <= 3 : %>

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Ovw &vxOv[]' R # / . !* / #01 - U- (2 2! . 5- " "##1 F (+ #0- UV
#F , - \$ # @! #F #0b # # R # #0! S #01 2 R

EB BF h9 k #! , - G / #01 _ \$!* _ \$ F b (+ ' ' #B S -
#0b "#S '# #0 # V U "# . <' , - \$. , - ('# " / #01 NU9 k #..
b , - / #01 8 * #05 6 . # " , - "# \$ 8 * + 2 R I &0! #05
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(/ % 56 8 # "# \$ p! . 5 <' , - J# G . "# d 5 (F e # - X
"# .

EB 1s 9 - :W 9 /XY* 4q /3 :H 9 I 1 H? 5

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03 p F 2 <i # #! 2 "# #Y G 2I#UR . G k # , - . N / #01 I .
\$!* 6 \$

] D #F #0b . # E 3 . N / #01 I !* 3 #Y " (G 03 p d 5 #X W
! #F #0b . # E . F " # @! 3 , - #3 K \$ #F #0b . # E

&F #0b #03 \$! I 2 . (/ (+ ' UR <B #F #0b . : ('# "
i l- #03 . " # @! U9 k #.. b , - . !* / #01 #0! D #05 W U- [
-Ia # \$. . / #01 " zzz c l`f

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Ia # # @! <' #0! D #05 W 3 : %

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&L \$ # @! UV #F F R- #03 9U: #X W #F #0b 9 <F . (#F #0b , - #
E * <G# F R- #03 #X W 9 <F . #X W * <G#

a * E#UB #F #0b C #1 G # \$ # @! UV #F F = G UB #X W 8 q
D #F #0b C #03 U. , - . \$ # F = G UB F # " 8 i (+
' 2 U "# , - UR - #F k # 3 U. # @! 3 , - #3 K \$ #F #0b . # E

EB B &0! G # \$ F (+ ' #F #0b , - J# G (! . # '# < *# #03 B
#5 . #03 *# \$ 2 #OR #' 3 "# &F #0b . " # @! #! . <E G # - #F # R
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a # \$ # @! <' (/ (+ ' D E R #0! ('# " !# E , - G# E
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EB BE a # \$, - B . B 8#F #0b . # E F " # @! 3 , - #3 K
'#(' . B

EB :D -0 *1 2 76 :D I 1 H? ***/_* :X 9 *PQ /

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\$. * #05 \$ E <\$. <' , - "#N - U # #0! •8 R L 9 C . /
<' , - "#E8 5 E R \$ I E# #0 , - V R_n I

&0! #05 W <G#(# '#(' \$ (/ R- #03 * #05 \$ E <\$. <' , -
"## 1 ! I = # / UB (* #05 ! # S - D- 6 "# \$. 2
<i # R G N GUB V , - \$ 8 I

Ovw &viOv[&Y #: 8 ' (/ 1 * <G## 1 - #Y† * #05 , - "# F + (/ s . * #05
9 b . q . * #05 J# j , - "# d 5 # / UB Y- ' : \$.

EB B &0 #3 K * #05 , - "# 2 #03 9 U: D # L G #0R #' . #
G #05 !* #0! q # L G B 6 "# ('# " #R 3 d 5 B 6 "# k
B # ! . "# 5W

EB B &0 #3 K , - #'# F * #05 , - "# N#0Y R L 9 . - U # #0! I . #0
#0 <1 E ('# S F # L G 03 0Š &0 #3 K , - R L 9 . - U # #0!
. # / UB #1 5W <i 59 <1 59 <I "# #Y S - G 5 # % D- UV
B C# . R \$

EB BE &0! b #05 W 8(# \$ F = #0 # # ! * #05 , - "# H8 2 # @!
/ # V [

$$A \frac{A^{tc}}{k_d} \quad N \quad I$$

#0! [

A^{tc} . #0 #3 K , - * #05 - 2I#S : f

k_d . GUB - #! . \$ "#

EB BF a #1 #0 # # ! , - * #05 \$ E <\$ NR L 9 c8 - U # #0! φ , - "#
. 5 E 6 \$ I E# #0 R_n , - V I d 5 (B 5W # + # γ #1 GUB -
#! . \$ "# k_d = + # \$ # @! UV #F . # @! <' S : # = # E . ! UR
- X , - * #05 " 8UB # L G . #0 2 U ""# J α

)B 6 * #05 \$ E <\$, - "# c8 φ . R_n . (B 5W # + # F 2 # @!
59 #01 <. : H

>

)B 6 * #05 (, - "# ! I " k_d • 8#V . #0 #L #! d . #0 #3 K

EB B Z U ""# J α , - #0 #L #! * #05 , - "# 5W " <i [

α • 78? (#L \$ # @! UV #F f

α • 78> (#L \$ # @! <'

)E# J α + #L \$, - . B " # @! s o :

PR- #03 # {- # J , - #X V # '#(' . #X V (F! U #B 6 / #01 " Ĩ ! I =
2 U ""# J 6 9 5 (/ S 78?? +2 #0 #L #! * #05 , - "#

Ovw &vxOv[

I F R- .! <! ! (F! U # - "# / #01 + b #0 UB2 U ""# J (#L #0 #L #! * #05 , - "#
I Z U ""# J . 2 U ""# . #0 #0 <1 # R , - * #05 (/ 5W#S 6 56 N!* #03 I , - (! F #
J f

I a #L #! # @! UV #F #1 #0 #L #! , - * #05 • 8 . (j G . • 8 2 . if q + #L # @! <'
#1(j G . • 28 2 . 2

EB B^)+ #L #! U9 <E \$. . / #01 # E b " d 5 + #L #! B = \$.
. / #01 " Ĩ c Ĩ` . #0 5 #F G . # / # (/ # E .! " , -
4 8 ! I 2 #0 #3 K . #0 #L #! * #05 \$ E <\$. <' # @!
* #05 J# j ' 5 2g j # B (3 , - \$ # L G 2 5W S - G D- *
#05 9 b N \$ E <\$. <' I 6 * #05 J# j , - "#

Ovw &vxOv[

I a #L \$ # @! <' , - . . / #01 3 #03 8 #0 #3 K , - - U # #0! φ8 R L 9 . /
<' T ! I " # @! tMF \$ #0 #3 K * #05 <\$. <' , - "#: Mf q #0 #L
#! #0! #05 W . " <i #0 #3 K 6 k_d•

I)B 6 D = <G# 5W UR k j , - 9S - # K S \$ 8 ! I # - MF <i <F * #05 "#
* # = ! = "

EBE XO* :H 9 /

EBEB a # '#(' \$ 4j ' UR -! E R 56 #0! ""N 56 # *#I # @! #Y
-- . #0! \$ e d 5 (F e 1 # . V 56 #0 <1 6 -! 9 !* # "
9 V d

EBEB &= # E . \$ (G - "# . - ""#, e , - = 2 R 8 * + , - . .
/ #01 - (/ S #01 / G 56# d 5 <G (\# J# = #0!
S #01 2 R . Ug N .! 8S ! n # X82 R . Ug . 56 # ! #
56 8 o 56 8 " 56 8 " G# I . R < ! UR# - X V 56 # +2F 0-

EBEB PR < ! UR# - X V 56 F 4j 2 U ""# 6 ""([

H_o . \$ -! E# 56 (+ #Y 6 56 8 (+ #0- ' R 56 -! "#
. #0 #L #! , - #0b 5W # + #L ""# E 6 (+ #0-f
h_o . (!F #Y B !* I #03 U. # "# ' 6 "# (+ #0-
]' \$ (G . (/ 5W # {- n # 1 #0! # '# (' F R (' E# 56 , - 6 "#
N 4# !* . ' #R F I
`G E# 56 F . .! 4 5- , E < \$ + #' J #F #0b ! R 56
0-8 5 (/ 5W ('## 4 #056 (" "# B
EBF 1-5 LG /_ >. 9
EBFB O \$ U *# 5W S '# <: [
-I O V e d 5 * + ('# " , - . . / #01 N L - (/ # 8
5 B 8 , - # '# < 8 If
<I & 0 UB . * + , - #F #0b . # E # 3 \$ f
I O \$ U *# , - .8 / #01 . # '# < < 3 f
I) - 1 G # . - 1 # '# (' , - 9 2 R f
@I) \$ (G - "# , - 9 2 R N#L "# 2 R , - "# * + # . 6 , - #Y !
"# 6 "# i 3 A #05W# - , ! ! - !* ! q- #- B 8 If
'I) \$ (G - "## , e N R 56 8# 56 *# . (F e # - X (2 R .
Ug . . / #01 8#L e q , - 56 8 If
I hR 2 q "#: / #01 2 : q U/ N B 8#0 5 B 8 I
EBFB O \$ U *# F , + (#L # @! #0 # 6 \$. G 5W C
C
EB I 1 H? 5 1RH -3 A= 9
EB B | L #L \$. . / #01 # @! < ' . ' < ' , - \$ 8 . ('#
" #03 #0! F <F! (/ 2F 0- #1 1 F #0: G Ug <1 # 5 , -
. . / #01 8 - , - #Y ('# " !* F #L <\$ D . , - 4 ! 2 "#
G + (/ ! I N E 4 8 3 8# - X E -! # '# (' . #0L ('# " 8 !
3 ('# , - 4 8 I
a F 4 j #L #! E < \$. #L B V# , - . ('# " #03 6 E R 2 "#
G (# S - D- . . / #01 6 \$ I 4
EB B M' # % V , - \$ 5W - 0-[

-I)E 4 . <' 2F 0- ! I *# "# . (/ . # - X \$ " #04 , - 56 #
 E , - #F #0b !. 8 . #0! #05 W <G# k F #0b 5W <F # , - "#
 <l 4 56# . <' 2F 0- ! UR I *# . # 5 . # - X 9 <F " #04 , - "# 56 #
 , - #F #0b !. 8 #0b 5W <F # , - "# d 5 # (l 5[
 # " 56#8 "# 4 56# f
 I &059 : . ! # . D <' 3 S - ' UR# - X # + #L , - E#UB ! "#
 UI#(# - X EK 8 G# E , - "# !* (# , - "# - b f
 I h # 4 . <' , - *# "# 0- ! UR(- # (! UF !* !# - X \$ (G -
 "## , e
 EB B &= # @! 3 2 "# G . <' , - \$ 5W - . - 9 <F [
 -I & V "# . <' , - "# ! #F #0b #0 \$ 3 \$. !* / #01 0- NE 4 . 4
 56#f
 <l & V - . <' (/ 3 S - ' #F #0b , - . . / #01 2 "# G :
 + V . - , - <\$ *# \$ NU # 4 8 4 56# ! #0b 5W <F # 8 #059 : . ! I
 EB BE ` G #L \$ # @! <' 2 "# #Y \$ (G . G k # D- . N / #01 I
 6 \$ N<-! k F G <B #F #0b , - ('# " #03 3 \$ I
 O ! I 2 <' , - \$. (/ 4 j ' UR = . G D- . N / #01 I
 6 \$ #0! D #05 W 3 : d 5 ([
 -]' B 6 . . / #01 3 : % (/ S #0 <' 6 ! I , - \$
 \$ E <\$ 8 EX . #L B V# , - ('# " #03 S_{gh}^b N2@ % <II
 _a 2 <' (/ \$, - \$ 3 S - ' # '# (' + 1 6 \$ (G -
 "# - 59 8 # @! % <18 ' #0! # '# (' . #01 <. #0 S 56 \$ <' 6
 ! I S_{gh}^o f
 _a 2 #0 <' #0 <1 , - . . / #01
 EB BF ` G = <' , - \$. . N / #01 I # + 5W * #05 <i [
 -I)E 4 # G# B , - \$ # E 03 0Š S_i f
 <l)E 4 #0 <1 , - \$. !* / #01 S_{tb} f
 I)E 4 #59 B . (/ \$ $\frac{4S}{L}$, - - 8 #V . G UB + V , - 4 - !
 (! F D- - " f

I)E 3 , - !* / #01 8#V . #sUB D- G UB E 4 , - D + R <3 6
<\$0E !* <\$. , - f

@I)E € !* E € #59 B ^{f L}#sUB D- E € !* E € 6 "# 6 \$. , -
! < B , - . . / #01 If

'1)E ! , - ! < B κ , - . . / #01 f

I „ 2!C #59 B λ , - . . / #01 f

IO + - ∪ , - !* , - . N / #01 I

Ovw &vxOv[O * #5 #59 #R \$ <' d # + S B 6 "# 4 56# #59 : N ! I8U # 4 , - *#
"# !* <' (

EB B &L #! \$ # @! <' F 2 "# #Y \$ (G [

$$S \leq S_{gh} \quad N \quad I$$

#0! [

S . #0 <' , - \$ 6 . !* / #01 2 <i #L #! # @! s o , -

Of

S_{gh} . <' 6 ! I , - \$ 6 . !* / #01 S : % ' % ;

Ovw &vxOv[

IO 5W S . S_{gh} # + + . <"# (* * #5 <' .! n(+ ' : % f

I &0! D #5 W # '#N + R #L # . #B EX E 4 8 #0 # V U "# <' , -
(# " . . / #01 (+ ' S #01 . I F #' . #L #! E 4 # @! # - f

I a #L \$ # @! <' 4j ' (F e # - X #0 <' #L #! d 5 #0 <' 6 , - \$
! <G 3 : > ' >;

EB B^ h9 k #L #! , - \$ = +2 UR = <' , - \$. / #01 N< (/
- . k # ' #L !* < (/ - <' # ' f \$: 6 \$. D
f \$ 5W * #5 <i GUB \$ (+ F #5 W GUB . # - X I F b <-!
k 5W #L "# 9 b , - "# * #5 # . 6 #0! \$. * + , - / #01

EB Ba &L #! <' , - \$ # 5 F = U9 k #L #! , - \$: [

-IM (/ - <' # ' #L ' S 56 \$. , - 6 \$ I 2 "# #
#Y S - G #0 R # 3 p_{oz} , - N# @! #0 V S - # I . #0 R #R 3 = :

\$ U p_{dz}

<I 6 <' # ' #L \$. D ' 5[

_ &0! \$. I , - \$ 2 5 B 6 < (/ - < ' # ' #
 6 "# 6 / < ' Eu 77 | -f

_ | (L # 56 6 N<\$ 0E !* 5 (L 6 9 7 I . / < ' , - "#
 Eu 7 | -8 (/ # E .! \$ U , - 6 "#L# I

` G # #! < ' , - \$ (= U9 k # #! #03 F . 4 # @! 3 3
 :

EB B a # #! < ' , - \$. = U9 k # #! 3 : %>8 # 1 R #0 <1
 # 3 \$: 56 ! #F #0b 3 : 0-8 (/ 5W 5W# S R
 # #! R N(-I# 3 \$ # # @! / # V [

$$R = \frac{m \times m}{k_{tc}} (A \times b \times \gamma_{II} + B \times h \times \gamma_{II} + D \times c_{II} - \gamma_{II} \times h_o) \quad N \quad I$$

#0! [

m . m 5W# . GUB \$ (G . G , - \$ "# . GUB \$ (G . G , - . !*
 / #01 # S - 6 \$ 8 " # @! % 7f

k_{tc} . GUB # J " # @! % f

A, B và D . GUB (/ # V 3 " # @! MF # E .! #0 #! #! , - .
 U # #0! $\varphi_{II} 2$ # @! ' ;

b . <I N<\$ 0E I , - 8 # <i I#N If

h . \$ U *# U! 6 B#S << # !* C # 3 8 # <i I#N If

' . #0 #0 <1 N# @! #Y 6 I , - #0b 5W # + # " # i L- #03 EU *# 8 #
 <i (/ #9 #03 I# (B N[] ^ If

j ... 5 #03 8 5 , - "# i L- 56 8 # <i (/ #9 #03 I# (B
 N[] ^ If

c_{II} . #0 #! #! , - R L 9 , - "# i #0R #' 56 8 # <i (/ -U -
 N(-If

h_o h_{hd} . \$ U ' \$ # # <i I#N I a (/ # # 1 " $h_o \cdot 7f$

h_{hd} . \$ U *# # X (+ #Y \$ # <3 #0! . # 8 # # @! /

V [

$$h_{hd} \quad h \quad h \quad \frac{kc}{II} \quad N \quad \%I$$

h . \$. 6 "#: L- #03 8 # <i I#N If

h . \$. , - (' # " U. # 8 # < i I # N I f
 . # 0 # ! # 0 < 1 , - # 0 b 5 W # + # , - (' # " U. # 8 # < i (/ # 9
 # 0 3 I # (B N () ^ I

I 9 E J ? * 1 [L M A , B 7 6 D

:D I 1 H? *PQ 9. * >QL? :H 9 φ _{II} N ⁷ I	?* 1 [LM		
	A	B	D
7	7	877	8
	787	8	8
	787%	8	8
%	78 7	8 ?	8 ;
>	78	8	8?
7	78 >	8 ;	8 ;
	78	8?	8
	78 ?	8 ;	8%?
%	78 %	8	877
>	78	8 ;	8
7	78	87%	8% %
	78%	8	%87
	78 ;	8 > ;	%8
%	78 >	8 ;	%8?7
>	78? >	8?	; 8 7
7	8	8 ?	; 8?
	8	%8	>8
	8	; 8	?8
%	8 >	>8	?8? >
>	8	?8	78 > 7
7	8 %	78 >	8 ;
	8 > ;	8 7	8 ; ;
	8 ;	8 >	8? %
	8% %	8%	8%

Ovw & vxOv[

I O / # V N I ! I = 6 < " # (• 1 . ! # 0 3 * # < i) B 6 1 # 0 q ! * -

\$ # 1 # 0 U B b " < i \sqrt{F} I # 0 ! F . G # I

I a \$ U * # { 9 + # ! } # @ ! / # V N I " h • f # 0 Y # 0 5 W (\$. # < !
 5 6 ! * " # U I # s U B U G # I _S ~ 7 8 8 4 . \$ U * # " # @ ! # R # 8 (+ # Y B # S !

I a \$ 0 E # 6 9 7 # 1 \$ U * # h " < i h_{td} N \$ U # # Y U . # I

I ^ G 2 R B 6 \$ # 0 F R - # 0 3 3 V * < G #

E B B & 0 U B \$ (G . G , - " # \$ m . G U B \$ (G . G , - . ! * / # 0 1 #
 S - 6 \$ m " # @ ! M F

I 9 FJ ?* 1[LM m 76 m

<p>+H=- /</p>	<p>[LM m</p>	<p>[LM m /M-70- 1676 *8 9 ;; 1*. Le /t 43 * *Z 970- uLM9-sQ *1-5 A6- *PQ 16 n*8 9 ;; 1o1H_* ` 9/e 9 C0 70- *1-5 *QH L/H :H 941H 9</p>	
		<p>. 6 9</p>	<p>;8 . { 9</p>
<p>)"# q 6 "# I# . # . "# #(/ (+ "# " . < O # [_a / . l#K _]! 56 O #< [_a / . l#K _]! 56)"# q 6 "# I# . UI# . "# UI# s UB UG# I_S•78] 5 #03 s UB UG# I_S~78</p>	<p>8 8 8 8 8 8 8 8</p>	<p>8 8 8 87 87 87 87</p>	<p>8 8 8 8 8 8 87</p>
<p>Ovw &viOv[h9 k ('# " V . D . . / #01 . ('# " , - (F e * <G# + E R # 3 0- <: <' , - \$ 8 B # ' F = <G 3 : >;)B 6 . U9 k ('# " \$ # 1 GUB m " <i a #zUB \$. #03 \$ -! , - . / #01 i D- #0 UB #03 # 1 GUB m 2 <i E U</p>			

EB B &= # E .! 59 2 * #05 #! #! , - "# . GUB # J #0 UB
(- 8 #0! [
] ' R- .! ('# S F # L G # ' o "## 9 2 R # 1 k{tc} • f
_] ' # @! #. G # ' N(/ # L G #0R # ' I = <F R- .! ('# S F # B (3 N L
5 MI # 1 k_{tc} • 8
EB B]' "#: S - . \$ - #F . "# ## 1(R 56 -! 9 8
R #! #! R # @! / # V N I F # 6 #0b 5W # + #! , - "# (+ ' #
K X , - 56
EB B Q R #! #! R #03 \$ "# q 6 F #! # @! / # V N I R- .! ('# S F 2
#0R # ' * #05 <\$, - "#
a (/ ('# S F # L G # 1 R #! #! F 2 # @! * #05 , - J# G
" I# ' 5W V- "# . 5W#S 7 r #0! #05 W "# " I# . # !* 7 r
%

#0! #05 W "# " I# . UI# a 5W V- "# " I# { 9 # 1#0 UB R # #!
#03 "# q 6 ! I " # @! MF P

EB B EQ R # #! #03 \$ R #0! #05 W *# "# !* . G "# F
2 2 "# #Y #0 # #! ! #056 #0! # '(\$ * #05 9 j , - "# *#

EB B FQ R # #! #03 \$ R # # @! / # V N I # + 3 8 ' 2 <i
#! <' , - \$ N 56 R R I (/ 5W#S 7 r #0 6 ! I \$ <'
S # @! 3 , - % 8 % 8 % 8 % f(R 5W -! (/
5W ! \$ <' S 7 r #0 6 ! I . 5W#S #0 R , - \$ (G #
\$ # @! E <\$ 5 3 , - ; ' > EB B Q R # #! R #03 \$ #0! #05
W = <e ! 4 Um 8 5W 2 5 B 6 <e 3 # # @! %? '
% 8 -! #0 R #1 5W <i G UB m_v + (+ ' F 5: \$ (F e <B , - "#
\$. G V q D- <B , - !

vG UB m_v ! I " [

-I)B 6 ## F ! "#N#0Y "#UI# G UB 0, e u 8 I " $m_v \cdot 8 f$

<I)B 6 "#UI# e u 8 # 1 $m_v \cdot 8$

Ovw &vxOv[| <e 4 Um i 56 #5 8# / #5 . ! !

EB B ^ a #e #F #0b #03 \$, - . !* / #01 n2 R N(9 # 8 Ug- D-8 C
*# D # '# < * 9 I R # #! #03 \$ F " V 6 #. G # R #' \$! 8
#0 # . # "# 9 j , - "# \$ 8 (+ ' (+ . #1 1 . ('# " #03
, - . . / #01 8 d 5# Ug 4 6 E 4 # 3 ! I (#e # 3 #F
#0b #03

] ' #0 R # #! 6 #03 "# \$ # { 0- (/ , + #' J #F #0b 6 # 1 F R ('
D <G + #e 5 \$ 8 8 ('# " #03 !* ' #0 UB #F #0b 6

EB B a O (L # 56 U9 <E , - S # @! " # ! !* #Y \$ (G + R #0
<1 3 \$ - 56 ' <i #0 4 B9585735(3471(0) -3.86671() 2.4418(35() -35() -1.42935()

V , - ('# " #03 a 8#0 UB R : I (/ @ B # # @! E#
 #0 , - (/ 5W 5W# S 8 xR . : # + # 1 (/ 5W# S 8 xR NR . R
 #L #! 3 \$ 82 # @! 3 , - % ?8 % 78 % 8 % 8 % I

Ovw &v1Ov[a #L \$ #F #0b G # F # @! 3 , - #3 K # '#(' . B
 EB B)E 3 , - 03 0Š N !* , - / #01 I F #L #! (+ ' [
 - &0 / @ B # : f

- " 5: , - J . , - #F #0b #03 *# \$. #03 G #L #' f
 - &L I (/ \$, - \$
] !. 0-8(2 E 3 , - 8# 5 F (+ ' F 5: , - [

_)EU *# #0! "#
 _)E V , - ('# " #03 . UR 3 ('# , - ('# " " 6 f
 _)E G # , - #F #0b # + #e ! #Y <E J N / #01 I < 3

Ovw &v1Ov[) + 2 E 3 , - 2 / V- J# G 0 ! - #F G # U- (n I U9 <E \$ <i #F #0b
 <B \$ N(2 / n "#F # @! # '#(' I # 1 #L \$, - "# \$ F " V 6 E *# , - "# . # +
 # 5W (I I

EB B a #0! # I , - \$: \$ U z ' 8 6 "# E <\$ {
 9 E <\$, - 6 <3 #03 # 1(L # 56 F S U-! ! F <F! 5W \$ (G [

$$p_{oz} p_{dz} \leq R_z \quad N ; I$$

#0! [

$$p_{oz} \cdot R \# 3 : \$ U z (+ #Y . !* / #01 N2 \# @! Olf$$

$$p_{dz} \cdot R ! #0b 5W <F \# , - "#: \$ U zf$$

$$R_z \cdot R \#L #! #03 , - 6 "# E <$ # " N i : \$ U zI 5W #L # @! /$$

V N I ! E# S 56 <\$ 0E . b_z f

$$b_z \sqrt{F_z} a a \quad N > I$$

&0! / # V N > I # - (j G [

$$F_z \frac{p}{p_{oz}} \cdot a \frac{L b}{}$$

#0! [

$$p \cdot #F #0b , - #0 \$ 3 \$ f$$

L . b 5W# . \$. . \$ 0E , -
EB B &0 6 ! I , - < ' k # D- \$. . !* / #01 F S
2 "# ##Y[
-I ^3 / G !* (' #04 B 6 < ' , - / #01 8UR# - X B## '# (' .
#0L , - . !* / #01 N . \$ # 8# 8B (I , - #Y " (G 03 < G#
. # '# < 8 < - ! k 3 \$ UR . G < 1 # 5 , - # - 8# '# < #0 8 # '#
< (j G . S_{gh}^{cn} f
< I ^3 \$ E < \$ 8X . B V# , - ('# " < - ! k F X , - / #01 (j
G . S_{gh}^b
EB B &0 6 ! I , - < ' k # D- \$ 156 () 6.307.2r () -1.42935 () 1.45741.6156 ()

, - "##! *#<i , - . . / #01 !* * #05 <i #0 UB (- , -
 E 4 #0 <1 , - \$. !* / #01 $S_{ib} N2@$ % %If

b) &0 S 56 \$ <' 6 (/ \$, - \$ S_{gh}^o [<' . # + = #0! #
 #! \$ # @! <' . (/ (+ ' F 5: , - E V , - . !* / #01 ' UR
 <B #F #0b 3 \$ N2@ % ;If

c) G#(3 ! "#N (• # @! * #05 9 F \$ # "# . #0 # d 5 * #
 # . 6 , - ! "# . I[(! "#" #0! \$. !* / #01 # 1(/ #
 \$ # @! <'

EB B ^ | V E # - X # I , - \$ α_E N# @! % -118 E# #0! D #3 K ! I
 = # '#(' 3 : % 8 5W 2 <i #UB D- #0 # X 6 "# 6 #0 <I "# , - /
 <' # @! \$ U "# \$ #0! *#<i , - . . / #01

| / <' # X , - "# \$ $E_{td} 2$ # @! / # V 56 * #05 ! " # ! -
 "# , - "# 9 2 R \$ *# 5 # . 6 8 # I ! , - #Y 6 (L # 56 . EU
 *# . #F #0b # 3 [

$$E_{td} \cdot \sum \omega_i / \sum \frac{\omega_i}{E_i} \quad N ?!$$

#0! ω_i . G # , - <+ k R # 3 3 "## @! # # #0! \$
 . 6 "## V i / <' $E_i 2$ # @! O

&0 #0 <1 / <' , - "# \$ $E_{ib} 2@$ 5 #3 K # V - + = # '#(' 3
 : % -18 2 <i #UB D- #X /_ # X E_{td} , - #Y 6 "#(- \$ " # !
 - "# ! G # #59 V . #X G # , - . . / #01

EB B a M' 6 ! I , - \$. . / #01 S_{gh} " # @! MF % ' ('# "
 #03 (/ # # @! <' (/ \$, - \$. (/ 2 5W #0 UB S_{gh}^b N# @!
 % <II !* S_{gh}^o N# @! % <II . (# '#(' . (/ S #0 S_{gh}^{cn} N# @! % 8 % 8
 % I &0! #05 W . (" S_{gh} : MF %8 F 4 j[

-I`G # #! <' , - \$! I #' . . (/ (+ ' F 5: , - E V
 , - ('# " . !* / #01 ' UR <B #F #0b #03 \$ f

$$I \ 9 \ J \ :D \ -3 \ A = 99-O-1 = *PQ \ 5 \ S_{gh}$$

0 76 /_* /-q> 43 * *PQ *8 9 ; 1	:D -3 A= 9 9-O- 1= *PQ 5 S _{gh}			
	M'	#59 B	)E 4 # G# B #0 <1 . 6 "#	
	P	)E 6	P	)E 6
1. Nhà sản xuất và nhà dân dụng nhiều tầng bằng khung hoàn toàn	)E 4 G #59 B	7877	)E 4 # G# B 6 "# S _{gh}	>
a <3 #/ B# # I (/ #5 .	)E 4 G #59 B	7877	)E 4 # G# B 6 "# S _{gh}	
a # I (/ #5 .	-	7877	-	>
a <3 #/ B# # I #5 .	-	7877	-	
a # I #5 .	-	7877%	-	
2. Nhà và công trình không xuất hiện nội lực thêm do tải không đều	~ € !* € #59 B	78777 ;	)E 4 #0 <1 S _{ghib}	7
3. Nhà nhiều tầng không khung, tường chịu lực bằng	~ € !* € #59 B	7877	)E 4 #0 <1 S _{ghib}	7
&" 6	)E € !* € #59 B	7877	)E 4 #0 <1 S _{ghib}	7
a B 6 . # + 2 <i (/ B#	)E 3 # @! 56 - i _{gh}	7877	-	
a B 6 . # + 2 <i B# !* i <3 #/ B## I	)E 3 i _{gh}	7877	)E 4 #0 <1 S _{ghib}	7
a / # E J# G , - #5	)E 3 i _{gh}	7877	)E 4 #0 <1 S _{ghib}	7
4. Công trình cao, cứng	)E 3 i _{gh}	7877	-	
O/ #01 <i ('# "	)E 3	7877	)E 4 #0 <1 S _{ghib}	7
<3 #/ B## I [	- . b i _{gh}	7877	-	
-I] . . G . # 2 / ('# " #! . (B *# #03 = E# <F	)E 3	7877	)E 4 #0 <1 S _{ghib}	7
<I] 5 #03 8 ('# " C I	- . b i _{gh}	7877	-	
I] . . G *# 03 0Š	)E 3	7877	-	
	- i _{gh}	7877		

0 76 /_* /-q> 43 * *PQ *8 9 ; 1	:D -3 A= 9 9-O- 1= *PQ 5 S _{gh}			
	M' #59 B	)E 4 # G# B #0 <1 .	6 "#8	
	P	)E 6	P	)E 6
I & 2 / *# 03 0Š8 ('# "	)E 3 - . b	7877	-	7
#!. (B @l] 5 #03 8 ('# " C I	)E 3 - . b	7877	-	7
" (\$ -! HN I H• 77	] 3 i _{gh}	7877	)E 4 #0 <1 S _{ghtb}	7
77 tH• 77	] 3 i _{gh}	<u>H</u>	)E 4 #0 <1 S _{ghtb}	7
77 tH• 77	] 3 i _{gh}	<u>H</u>	)E 4 #0 <1 S _{ghtb}	7
H~ 77	] 3 i _{gh}	<u>H</u>	-	7
O/ #01 (8 -! ' 77 . V	] 3 i _{gh}	7877	)E 4 #0 <1 S _{ghtb}	7

<l a "# \$ #0! #!. <E G #L . !* / #01 # '# (' k 6 i - N 6
E 3 (/ S 78 l # 1 #0 6 R . #0 #0 <1 , - E 4 # G# B 3 : MF %
! l #e 3 7 r

l)B 6 \$ "# #059 : 8 #0 <' 6 3 8 #0 6 "# . #0 <1 " <i
78 #0 E 4 6 6 "# . #0 <1 3 : MF % q E € , - . " <i 78 #0 6
3 d : <F .

Ovw & viOv[& 03 9U: : 0E (G # '# (' 2 R . Ug ! . . / #01 (- 4 j #6
G S F , - F ('# " i F <F! 3 ! \$ <' 4 (/ \$ 0- ! l S #0
<' 6 (6 #0 3 : MF %

EB B ` G #L \$ # @! <' 2@ 5 F <F! ' R #0 <1 # R #' 3 "# :
, - . !* / #01 # '# (' (/ 5W#S R #L #! 3 \$. <F! F 5W E#
#0! \$ (G U- [

-l & L (/ k "## R #' , - \$ α_e { 9 #0 UB 3 : % -lf

<l) \$ (G - "# , - 9 2 R = W 6 # '# (' + 1 3 : % lf

I]' ! . 3 : MF ; 5W 2 R #03 ! "# d : <F . . 2' 5W . !
 ; 59 \$ (G - "#

I 9 ^J ?* @1Xe 9? /-5 4-[/DQ *1 418 9* I 1 i

<p>+H=- 16</p>	<p>?* @1Xe 9? /-5 4-[/DQ *1 418 9* I 1 i /M-70- 16 0 v *S</p>
<p>A - Nhà sản xuất của các xí nghiệp công nghiệp</p> <p>_] . E## ('# " R L# 8 4 (/ \$ N l 5 (# l !* <3_# / #03 9 6 B #R- (6 , - U. . # - i \ . k F # UV 7 &</p> <p>_] . \$ # N ' % # I 56 E# (/ S % 2?</p> <p>M _] . : . . / E</p> <p>] . D J# #03 *# <i (/ <56 F # @! \$ -!8 (!. #!. !* (/ (#5 R <i <i (B 6 !* #" 6</p> <p>-I P. k \$ 9 3 -! ' ?#</p> <p><l] . (+ # (/ #!. (B -! ' #</p> <p>O _] . . / #01 UF 2 "# / G</p> <p>| E# . \$ # (/ # E . U9 k ('# " . 1 #03 *# <i</p>	<p>_)"# q 6 . 5W #L# 9 7 r . UI#L# 9 7 r</p> <p>_ O # E# / <"# (•8 #0Y # < 8 *# . *# Y-</p> <p>_ O # E# / <"# (• 5 *#</p> <p>_ O # E# / <"# (• 5 *# Y-</p> <p>_ Q #8 UI# . UI#: sUB UG# I_s t 78 . G UB 0, e #0! (!F #Y 78 ' 78?</p> <p>% _] 5 + #03 8 5 G UB 0, e #0! (!F #Y 78 ' 87</p> <p>;-)"# # e t 78; ('# W 6 #UI# k B /0@ e t 78; . I_s t 78 (/ # E . ! # V #R # ' i , - "#</p>
<p>Ovw &vxOv[</p> <p>_ MF ; ! I Ug ([-l)"# k \$ 6 i - #0! \$. . / #01 NE 3 (/ S 78 l# E D ! "# G#(3: <F . f</p> <p><l]' <\$ 0E <e 03 <G# i 56 ('# " R !* G #l , - #0 (/ 3 - S f</p> <p>l)B 6 . . / #01 V e (6 V e 3 : <F 5 B - \$ ('# " #F #0b . "# # l (/ 5W#S # l , - "# 3 #0! <F f</p> <p>_ MF ; (/ ! . UF 2 "# #F #0b #03 U. 6 9 | -</p>	

EB B `G !# R #' : <' , - \$. F R (' # R G ([
 _ & '# (' . . / #01 S - #0b 2 #03 ' \$ (/ k "# . <' 6 8 ' <'
 R #l 6 #0 6 ! l B 6 . . / #01 . f

_]' = ('# " 6 ! . . / #01 !* , - 4 5- 5W 3 V
 , #0! 2 R . ! #f

_ a D 3 * <G# 4 # '# (' . \$ *# ! <' i 3 V UR . G , -
 \$ 8 ('# " , - . . / #01 !* , - # '# < / G

` G R- b B #5W ! < ' F # {- # J 6 O , #5

EB^ T 1 5 1RHLZ* *1D -

EB^B | L # \$ # @! UV #F N# @! #0 # I 6 # V "# . F <F! E <\$
, - \$. # X , - \$ "#N(/ F I8 d 5 (/ ! I #05W## @!
(/ ! I J# 1UŠ o ' UR + (+ , - #Y !* , - #! . <E / #01
. ! / #01 (/ # + Ug 5W a = #0! #! #! U9 k ! , - \$ N4 #
' #0 # 6 , - \$ I F 2I# F \$ *#... d 5 *# E B 6 !* /
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$$N \leq \frac{\Phi}{k_{tc}} \quad N \ 71$$

#0! [

N . #F #0b #L #! #03 \$ 82 # @! ' % f

Φ . UV #F , - \$ f

k_{tc} . GUB E# J ! 9S - # '#(' S # = # @! #L "#S - #0b , - . !* /
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U *# [

$$R_{da} \bar{b} \bar{l} \quad N \ 1$$

#0! [

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$\bar{b} \ 8 \ \bar{l}$ 5W# . <\$ 0E . \$. #L X , - 2 # @! / # V [

$$\bar{b} \ b \ e_b \quad N \ 1$$

$$\bar{l} \ l \ e_l \quad N \ 1$$

e_b . e_l 5W# . E G # , - + *# W R # @! 56 #0 b . - , -

EB^BE hV #F , - \$ "#(/ F F 2 #Y \$ (G . #0! "# 1 # . *#
#05W# , '# !* / #01 f(S - G D- V U "# p . V U "# τ #03
#! . <E *# #05W# V 6 #0 # <i 6 , - \$! 5# # @! S J#

$$p \ t g \ _1 \ c_1 \quad N \ 1$$

#0!

8 ' . #0 #L #! #0b 5W # + #L , - "# #0! (B e #0 : L- 56 .
L- #03 5W 2 N(56 I B 6 "# # (+ ' # K X , -
56

c_l . #0 #L #! R L 9 , - "#f

h . \$ U *# f #0! #05 W #F V (/ B - : L- , -
1 F " V 6 L- #F #0b <l "#N L L- # I

Ovw &vixOv[O G UB UV #F λ, G UB F 5: 3 , - #F #0b i . F 5: , - #z UB
n 5W 2 # @! / # V . <+ k , - T tO GUB + #L #! UV #F , - \$ †

EB^Ba hV #F , - \$ 2 <i 59 k F _ F #L 2 R *# #05W#
#0q ! I = #0! #05 W ([

-l] \$ k "# (/ k "#f

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I | *# #03 8 56 B !* #03 6 "# E 3 6 f

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) + 2 UV #F , - \$ <i 59 . F 2 #0L # . E 6 <

(L q #0q + "# , - # + #L < #05W# , - "# \$ hV #F , - \$ 2@ 5

F <F! ' #z UB D- / @ , - R D #03 *# #05W# 5W 2 / 2(U) 0.4992(/) -108093() -88.0808(

#0! [

$\bar{b} \ 8 \ \bar{l} \ j \ \dots - \ 5 : / \ # \ V \ N \ \text{If}$

$q . \ #F : \ L- \ "# \ F \ # \ '# < \ K \ #0k \ N \ (+ \ ' \ #0b \ 5W \ , - \ \$ \ # \ ! * \ #$
(\# J#If

$c_l \ j \ \dots - \ 5 : / \ # \ V \ N \ \% \ \text{If}$

$\pi \cdot \ 8 \ f$

$\delta . \ 3 \ N\# \ <i \ 0- \ - \ l \ , - \ W \ R \ #F \ #0b \ ! . \ U! \ 6 \ 59 \ \# \% \ V \ 8 \ " \ .$
59 N-l ' # . i - , - W R 56 \$ L- "# F# '#< K #0/ . . N_l
#0! #05 W 5W

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6 &05 W . GUB# J $k_{ic} \ 2 \ # \ @! / \ # \ V \ N \ I \ (/ \ 5W \ \{ \ 9 \ 8 \ [$

$$k_{ic} = \frac{\sum T_g}{\sum T_i} \quad N \ I$$

#0! $T_g . T_i . \#X \ 1 \ ' \ #03 \ * \ #05W# \ , - \ R \ # \ #! \ \$ \ D . \ \$ \ #05W#$

EBa ?* -[@! ? @ 1U > 9- > 1 1Xv 9 -3 A= 9 *PQ 5 /3 7-[* Lw A) 9 1 m -[16
76 *8 9 ;; 1

EBaB]' #0! S #01 # '# (' \$. . / #01 # " <' 2 <i # #!
. (/ ! I !* UV #F , - \$ (/ , # 1 2l#(F e . # W j + #e (L
56 . \$ U *# !* + U- (\$ (F e \$ q- <'
(/ \$ N L <e # - <i #0 I !* = [

-lO <G + F <' # + , - \$!* #e UV #F , - \$ N2@ >
' > If

<lO F ('# " i F E , - .8 / #01 . # '#< (\# J# B 6 <'
#e , - \$ N2@ > %If

lO <G 2 R + F F 5: <' , - \$. !* / #01 N2@ > ; l

`G R- b E# !* E#UB <G ('# W #03 F (+ ' 3 3 : 8 8 8
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EBaB O <G i F <' # + , - \$!* #e UV #F , - \$ N2@
> -ll k [

-lO K < * <G# B 6 \$ N2@ > If

<I O <G <F! G "# \$! D # - X # +2F 0- \$ #L "# 2 R , - #!
(# / . Ug . . / #01 d 5 D UR# - X #F #0b #03 U! 6 #F
#0b n = #0! # '#(' N2@ > I
a b <G 3 : \$. 3 # " 0i <' , - \$ # E ! # V "# N2@
% I , ' . ! #F #0b #03 0- . UŠ 2 "# G D E R . 6 #0! ('#
" , - . . / #01 (#L I ! , - "# \$. 6 f q <' ! - (/ 3
S - ' #F #0b # 1 5W
&0! b #05 W 3 b F (#' "#8 (F e F <' (/ \$
+ , - \$. F <F! UV #F , - \$
EBaB `G K < * <G# ! \$ 5W = + # - X #L "# 9 j "# : # ' i #R 3
!* X "# #L "#2 R (/ = W <i "# * #05 \$ E <\$ <' #B#
9
`G K < \$ F # R G <i [
-I]I *# E# !* #!. <E "# \$ #L

I • *#03 *# "# #<i 0 8 0
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. . / #01 d 5 D UR# - X #F #0b (6 #F #0b = (# '#('8 k
[
-IMG q # , - 56 ! <B #0L *#<i ! # L W 8 S ! ("#8
2 R 0n 56 S - . . / #01 8 *# 5 B 56 . <+ V- 56 :
(!F - #!. 8(/ ! 56 F #0. 82 R #0! \$. . / #01 . L#
" 5W 56 <i "# 5W • *#8#X V (+ #- 56 . # +(# +< 0q 0s f
<IO <G i D('# " . #0 # "# \$ #R 3 ({ # E , - (L S +
N# E (L #5W # , e l8# E , - 56 8# E R , - . "# . J
#F f
IO <G ! #0Y(F e # - X #F #0b NU! 6 #F #0b n = #0! # '#('l #03
! #F E#<3 !* ! E 8UR 5W# #F , - \$ d 5 ! UV , -
B 8 <n V- "#8 V- J# G 2 R 8 V- " (G . ' K
EBaB O <G ('# " + F E , - .8 / #01 . # '#< (\# J# B 6 <' , - \$ N2@ > <ll k [
-I] -! E<\$. E V (/ - , - . . / #01 <i [
_) *# i <3 #/ B## I D- # !* i 2 B#
_OC# . . / #01 # . #Y ! 6 \$. f
- . V E B## I ('# " = W 6 ('# S F #L #! . . / #01 ! <' # + , - \$ 0- N#0! . . / #01 <i " (G - 6 # 1 ('# W 6 *#
B B , E<\$ I
_&e 5 @! . 3 ('# V " (G 4

l)*# # '#< + . <i \$ ('# " .8 / #01 . # '#< (\# J#N k F #0 8
- l(\$ <<' 6 f

lO <G F <F! UR . G <l # 5 , - # '#< (\$ <' N l = (l
56 #59 V , - # '#< B 6 ('# " 2 R l

Ovw &v1Ov[a b <G ('# " #03 8 # " 0i E R # 3 !<' , - \$ 0- #0! ('# "
, - . . / #01 U\$#e 3 = 6 UR#e E V , - ('# " . # / # 5 . = 6 UR(! . ('# " 0- `1
J 8 G #e E V , - . . / #01 F (* # @! #e E <\$, - ('# " . C# . N / #01 l# . #Y !
! . s

EbaB^ O <G 2 R i F F 5: <' , - \$ ' ('# " , - . . /
#01 N2@ > ll k [

-l) \$ s #0 UB . # - - #F ! "# \$ B ('# J f

<lO # + 3 ('# B B , - ('# " 4 Um . 4 Um _ X# , J . (/ F #0:
' E C l . - #! . + #e # - <' , - \$ 4 . E V , - . . / #01
q # " . ! F E R #0! ('# " ! 4 (/ \$ 0-f

l e V #01 #R2 R (- , - . . / #01 \$ -! . #F
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l,, F # E - 3 ('# " # , - . . / #01 2 : D 9
<' ! - # @! % N#056 '# . : D 9 (- # {l<i .! .!
F " 8 F G #' 24 , - ('# " 6 "# F R - U # , - "# 6 / U , - .
. / #01 ' UV #F , - \$! l

F _ * /-q> 1-3 43 5 *PQ 16 76 *8 9 ;; 1 dGC :0 / i XO

FB]\$ "# 4 56# F # '# ('# @! * + , - ! "# . [y #0 # V U "# , - #F #0b
! . !* #0b 5W <F # , - "#< 56# "# U\$ <' # 3 ! 4 56# O s (+ ' <'
4 56# (#0 4 56# #59 B , - "# δ_s u 787

FB M' # 3 , - "# 4 56# 5W 0-[

-l M' 4 56# # %o V S_s ! #F #0b #03 0- #0! = <' , -
\$ (+ #Y ' EU . : " #X V U "## %o V , - #F #0b #03 . #0b
5W <F # , - "#<i R 4 56# <- p_s f

<l M' 4 56# # %o V S_{sd} ! #0b 5W <F # , - "# 0- : 56 , - 6 "#
4 56# <C# #Y EU . : V U "## %o V , - #0b 5W <F # "#<i R 4
56# <- p_s ! ' 0- 6 56 = , - 6 4 56#f

l M' - U_s 2 "# G ("# 4 56# ! #0b 5W <F # , - #0!

! , - A 4 56#

FB)\$ (G "# - 9 2 R 8#=# @!(F e 2 "# G UR 4 56# ! #0b 5W <F #
, - "#8 (! "# 4 56# . - 0- . - ! [
-I 4 56# ! ž (. UR 4 56# S_s 2F 0- \$ 9 <F : #0! = <' ! #F #0b , -
!* , - #F #0b !. (0-8 q UR 4 56# S_{sd} ! #0b 5W <F # , - "#
0- # R #' . (/ !* (/ 5W#S f
<I 4 56# ! žž (. UR 4 56# S_{sd} ! #0b 5W <F # , - "# 0-8 , ' . :
56 , - 6 4 56# . (#F #0b !. # 1 !. S_{sd} q UR 4 56# S_s 2F 0- : #03 , -
6 4 56# #0! = <'

FBE ! \$ (G - "# \$ 4 56# 5W S ((F! U # - "# / #01 R- .! ('# S F
L G #0! q 8 (L 2 # 1 UR 4 56# ! #0b 5W <F # 0- F # L
G : G #05 <i . 56# "# #0! B# L G

FBF a # '#(' \$ "# 4 56# F 4j (F e < 56# . EK , - "# #e ! [
-I ~ 6# <E \$ o ' 4 56# "# #03 G ' #0! E# UB = !* #!. <E <\$. 4
56# #

<I ~ 6# #0 #0b #!. <E <\$. 4 56# #03 E# G 6 . 2 "# G '# E 4 56# "# ! #F #0b
#0 \$ #03 d 5 ! #0b 5W <F # , - "# 0-f

I hR -! R 56 0- 4 56# 6 "# L- 56 , - \$ <: #0b 5W <F
, - 6 <3 #03 !* <: #X #F #0b #03 , - . . / #01 . #0b 5W <F
, - "#

I) EK , - "# 4 56# #e #Y #Y8 . ! \$ (G #R 3 \$ <B 9 K , - "# ! 2
R . , 6 R- 5 #03 *# "# . ! UR # # EK (56 <\$ *## " .! "#
Ovw &vxOv[] 3 (- \$ 56# "# \$ # @! ;8 >8 78 8 . %

FB]\$ "# 4 56# F # #! # @! 3 3 :) \$

&X <' V , - \$ k E 4 ! #F #0b #0 \$ 3 . E 4 56# ! #F #0b
, - . #0b 5W <F # , - "# 0-) E 4 ! #F #0b #0 \$ 3 0- F 2
@! 3 #01 <. :) \$) B 6 "# (/ # 4 56# # 1 R- .! * #05
<' , - "# K #R 3 q B 6 "# 4 56# # 1 # @! 3 : 78 8

Ovw &vxOv[a # '#(' \$ "# 4 56# 4j (F e Ug <G 3 : > . %

FB^ Q R # #! R #03 \$ "# # + < 4 56# ! 3 3 : -I8 <I8 I8
2 (+ ' 3 U- [

-l a (C 5W (F e 2 "# G 4 56# , - \$! #F #0b #03 . . .
/ #01 #03 0- <i F R #03 ""# 1#0 UB R (/ 5W 5W#S R 4
56# <- p_sf

<l a F <F! E <\$, - . . / #01 <i = #X W <G B 56 6
<G ('# " 5W S # @! #! \$ #X E 4 . 4 56# # + , - \$ 8# 1(
#0 UB R 2 # @! / # V N I F Ug #0 # * #05 φ_{II} . c_{II} , - "# 4 56# :
#0 # ! 56 U- (4 56#

l a • *# . - B "# 4 56# <i 59 (- # 1#0 UB R 2 # @! /
V N I F Ug #0 # #! * #05 φ_{II} . c_{II} , - "# • *# . - B E *# !
#056 . E <\$, - "# : #0 # ! 56

Fba Q R #! R #03 \$ ((/ # + 4 56# N s < K # @! 3 3 : II
F 2 # @! / # V N I &! #05 W . * #05 , - "# F " [

-]' W u W_p [& @! ('# S F # L G "# : #0 # K #R 3 W f

-]' W • W_p [& @! ('# S F # L G "# : EK 6 p! W_p

FB al # 56 U9 <E , - . . / #01 2 #03 "# 4 56# F S 2 "# #Y #0
R #! S 56 R_o MMF P I

&0 S 56 R_o d ! I = + S (L # 56 B = , - (# '# (' D
! . 3 56 ' 4 (/ S #01 / G 56#[

-l O . UF 2 "# (! 8 . / G . E# #59 #R (('# " R L#
6 4 (/ \$ 8 #F #0b #03 #0 ' 77 (] . #03 <e ' >7 (]^

<l] . : . . / E (/ (8 -! (/ S <- # 8 #F #0b #03 <e '
77 (]^

FB 4 56# , - "# F 2 <i #! #! (+ ' D \$ (G "# - N2@ . I
" 56# # + N2@ I . ' #B (

a #! #! 4 56# , - "# ! žž ! #0b 5W <F # , - "# 0- 2 [

-l &0 4 56# 6 "# , - S^{mal} 2 "# G (# " 56# #! . <E \$. 4 ! . 56# #Y #03 8 6
G # <\$ 0E { 9 \$. 4 56# !* (-! R 56 f

<l &0 4 56# # + S^{ci} , - "# (. 56# <E E# G # <\$ 0E { 9 \$. 4
56#

FB)E 4 56# , - \$ 8 E G 4 . E 3 , - 03 <G# F # ! (+ ' UR . 56# (/ \$ "# 4 56# ! 56 #0. # @! l- (- #Y k # " 56#: #0L <"# W "# B 6 # !

FB &0 + - , - \$ (4 56# ! #0b 5W <F # , - "# 0- N2@ II F 2 2 "# ##Y UR 1 # . A 4 56# #03 *# "# ! , - A # E . ! "# ! - "# * #05 9 j , - "# . .! \$ (G # " 56#

Ovw &vxOv[

I ` G # ! <' 3 : 7 ' 3 #' . # @! O

I &0 # ! , - E 4 56# #59 B δ_s d 5 #0 R 4 56# <- p_s . #0 #3 K . GUB - #! . \$ "# #0! / # V N I " <i 9 k_d .

FB O 3 # ! \$ # @! <' V N E 4 . 4 56# ! 5W 2@ 5 # {- n . <' # + # ! . (/ (+ #0- B 6 "# 4 56# ! ž ' 5 R # <1 # R #' 3 \$ 56 #' # F , - . (/ 5W#S [

-IQ R 4 56# <- p_s %

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FB E)E 4 56# , - "# \$! 56# <E . 56# \$ #Y #03 2 B N2@ -I . <II 3 = #0! # ! (' # " , - . . / #01 (+ ' D \$ (G "# - . <G b = #0! # '# ('

y D 9 "# 4 56# ! ž F (+ ' UR# - X # I , - \$! 56# <E "# 4 56# 0-8 q B 6 "# 4 56# ! žž !. UR# - X # I q UR # " *# \$ ("# 4 56# <: #0b 5W <F # , -

FB F]\$. . / #01 2 #03 "# 4 56# #0! D \$ (G . : " (/ # + # " 56# <E . 56# \$ N2@ -I . <II . d (/ # + UR -! V 56 N2@ I18 L #0! D #05 W (. . / #01 (/ C 5 B " # ! # 56 8 . 56 5 B <3 !. *# : (!F 6 9 8 <\$. 4 56# # 1 3 # '# (' 5 B 6 "# (/ 4 56# 5 F (+ ' (F e #e EK , - "# ! D 3 #01 <. : I

FB a # + < 4 56# ! D 3 : -18 <I . 18 R (' D <G + ! #0Y D F 5: ! 4 56# # + ' G Ug # J W . . / #01 [

-I a C # 4 56# , - "# N2@ ; I <i *# !* - B "#

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l a'# W \$ <G N2@ l k ! #0Y E# #l 4 56# , - '#8 <G
('# " . B 56

` G b <G 3 #' . # = # @! ! \$ (G - '# \$ 4 56# N2@ l # +
! \$ < 56# F \$. 4 !* E# \$. 8UR# S - D- . . / #01
'# (' 6 / #01 . 5 -! # / (' J

Ovw &vOv: ` G *# . - B '# 4 56# !* 2 3 S - '# 6 '# . 3 # R G #! #!
<E \$. 4 56# !* s. : #03 , - ' 5#X <' #l #! NE 4 . 4 56#l # + , - \$
. ! l 2l## @! \$ (G <\$, - ('# " . \$ (G Ug , - . . / #01 5W # '# ('

FB ^ ! #0Y #l 4 56# , - '# <i [

-l &0! = <' !* E# = . [• *# <i * 8 . G '#8
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<l &0! # 4 56#[U <i b '#8 . 56# #056 6 4 <3 56 8 #0!

F X 1 56 U 8 - B <i - b . G#

FB a O \$ U • *# '# <i * S '# <: (l # 56 . #0b 5W 8 ' E
G 8! '# Oq • *# '# <i X 56 56 # 1S '# <: #0b 5W # B X8 J#
E *## B X8 ! '#8 \$ -! E# 56

&0! #05 W ' G G (/ # + F <F! . *# '#: EU # '#8 3 2l# '
G . ! <{ 6 '# 4 56#8 . G <i '# . • *# G . # @! #Y 6

&0b 5W # + #l # '# #0! 6 5W • *# (/ 5W { 9 #0b 5W # + #l
'# , - 6 4 56#f q #0! G '#8 (/ 5W { 9 %8 (]^ ' ; (]^ # = # @! !
"# 5W =

Ovw &vOv: &0! #05 W (\$ U , - = <' 5W# S 6 5W • *#8 (+ F G '# #1 59
• *# '# : 5W 2@ 5 <G F UR 4 56# 56# # + , - \$

FB ` G *# B F # R G <i * # ! 5W B 1
. \$ U ! #056 6 '# 5W • *# 56 B . : # . 3 , - B

&l #! \$ #0! B 5W • *# F #' . # @! E *# . * #05
<\$, - 6 • *#8 \$. , - d 5 #0 R 4 56# <- , - '# <3 56 6 5W
• *#

FB O # / UB • *## @! \$ U , - '# 4 56# <i b '# NUB 5W 8 (!F 8 (l
56 b 8 l F 5W S #Y \$ (G # 5W E *# 3 , - '# \$ 8 #0! n (C
' #UR 4 56# , - '# ! #0b 5W <F # , - '# . #F #0b #0 \$ 3 0-f q
(l # 56 , - G #l l *# #03 *# <i F 2 '# # #Y \$ (G F <F! UV #F
, - (B '# 5W • *# . , - 6 *# \$ l- 56 ('# " #04 #R 3 : 2 S - <
4 56#

FB . 56# #56 "# \$ 3 2@ 5 < G . *#N(C #L 4 56#l s B 6
6 "#<3 56 i #0! = 4 56# ! #0b 5W <F # "# 0- al # 56 G
• *# . 59 . 56# F S <i #L #! U-! ! #0! 2 R
/ #01 (/ UR 4 56# ! #0b 5W <F # , - "# 0-
) + ! #0Y UR 4 56# , - "# #0! = <' ! #F #0b #03 0- G . 56# #56
"# \$ #0! D #05 W # '# # 3 [
_ • *# 6 "#<3 #03 <i X 1 56 56 f
_ • *# "#<i * !* . G "#f
_ . U 8(+ F b 2 3 '# 6 "#<3 #03
] i l -! G S F G . *# "#: <3 56 #0! D #05 W # '# N L
[(#F #0b #03 \$ 6 l F # R G k # G . 56# "# 6 X 1 56 U
FB `G 2 3 '# 6 "# 4 56# , - \$ 3 . # @! E# #0! 59 U- [
_Z R <i b 8 b k 8 b (!- k . ! b #59 #R(f
_P= #0 !* <e <i "# 5W - B <i 59 - b 8 G# !*
59 (. 5W (+ #0- # R #' f
_&e EU /
FB a'# W <G B 56 . ('# " d 5 • *# . - B "#: = <<'
/ # 5 3 = : D 9 "# 4 56## E ! žž
y D 9 "# 4 56# ! ž8 <G B 56 . ('# " s 3 2l # #0! D #05
W (! E# 3 .! (/ # + ! #0Y 5W #L 4 56# , - "# #0! =
<' !* F = U
FB E hV #F , - \$ "# 4 56#(k #0 <i "# - B F 2 (+ '
5 E , - "## @! *# / , - N† 59 † B 6 "# 4 56# ! ž† † B 6 "# 4 56#
! žžl
_*/-q> 1-3 43 5] 16 76 *8 9 ;; 1 dGC :0 / :Xe 9 v
B]\$ "# #059 : F # '# (' # @! * # = , - "# . (# " 56 < #e # + #L c
#059 : a F EK , - "# #059 : # 12F 0- S #01 5W c ! #
`G #e # + #L # + 2F 0- : "# UI## / # 5 ' < . 56# <i "## F - b , -
UF 2 "# / GN L -2#U ' 0 l
Ovw &vxOv[a # '# (' \$ <i 2s# - 3 4 j 0i (56# E# UB 2s# - (F e #059 : N L 2s# - (G (<i G l

B &0 UB #059 : , - "# \$ # E .! R # : 8 ! . #0 # "#
\$. , - 6 "# #059 : 8 G < 56# # "# J# j . - b , - "# { # " .! \$
B M' , - \$ "# #059 : # + 2F 0- ! 3 U- [
- hR #059 : ! # " . K "# ! 56 UF 2 "# 56 (LS + !* ! -! R 56
f
- hR # # EK 56 / #01 # @! #Y = : EU ' ! ! \$ (G #R 3 \$
<B 9 (2 R . , R- 5 N6 . C #03 *#f
- hR #059 : . ! # , - "# : #03 , - = V- !# - X ' E# , G#N ' #B (L
J # @! =-I d 5 UR ! # ! (/ <: # E , - k G#
Ovw &viOv[a "# \$ #059 : . ! #U\$ 2 "# G R # 3 : 56 - 8 R . F (+ ' (# '# ('
U , - . . / #01 N 8#5 # 8 I
BE]' "# #059 : F # # @! <' V 6 D 3 #01 <. :) \$
. (# '## 1 d # # @! UV #F
] !. 0- F 2 #0 # #! \$ <' # 3 , - \$! #059 : !* ! # "#
0-8 <i " #X <' 6 "# \$ 03 0\$ 2 "# #Y #0 #059 : #59 B ,
!* ! # #59 B δ_c 2 # @! O ! R #X # # 6 "# - 2l# k
#0b 5W <F # , - "# #F #0b #0 \$ #Y . !* / #01 . R # 3 !
(/ # " 56 , - (B "# 0-
BF &0 #3 K , - * #05 $\delta_c . \sigma_m$ 2 # @! (' # S F # L G "# #0! q # L
G (+ ' s o : % \$ D 3 # - X # + \$ EK , - "# \$
&0 # #! , - * #05 $\delta_m . \delta_c$! I " <i #0 #3 K (#0! / # V N I " G
UB - #! . , - "# k_d •
B]' 2 <i # #! #0 <' , - \$ 6 9 #0 ! I B 6 . . / #01
'# (' # 1 F R (' [
- O <G + F <' , - \$ N2@ > . % ; If
- O <G B 56 D ! "# \$ (/ < 56# N2@ > I !* ' V E 56#f
- O <G (' # " B 6 . !* / #01 + # + #' J <' N2@ > #l
&0 6 \$ <' ! "# < : 0- ! I " # @! MF % 4 j ' 3 :
% >
B^ O <G i F !* ! #0Y <' # + ! "# < : 0-8 k [
_ a C # "# #059 : , - "# \$ #0! #! . <E !* E# \$. <i
. 56# #056 f
%

_P= G ## - #'f

_& - #'#!. <E !* E# 6 ""#059 :<i ""(/ #059 :f

_| 2 3 S -N#!. <E !* E# 16 ""#059 :

Ba O \$. , - 6 "" \$ 5W . 56#056 8 \$. , - ""#059 : <# - #' !*
EU , - 6 ""< 2 3 S - F S # = # @! #0 <' F ! #059 :

0-

B a 2 #03 \$ ""#059 : . 56#056 F 21# ' G . G <i
#U{ !* e - . *# 6 ""<3 #03 , - \$ <i J# G ('# L N L [/ I

B)G ## - #' F *# #03 *# !* #0! 6 ""#059 : (R #0 \$ 3
\$ (/ { 9 77 (-)+ . G 8 5W = # <'# (• - # .! #0Y # < 8 *#
' (B 5W # + #L (/ { 9 8 &^

B `G # - #' ""#059 : 3 " ""(/ #059 : # ,8 ' E *# ! #056
&0! #05 W . G 2 R . F . 5 B 6 ""<1 # 5 (/ #059 :

^ _*/-q> 1-3 43 5] 16 76 *8 9 ;; 1 dGC :0 / 1Q h H XO*

^B]\$ ""# - <= F # #' (' # @! #L * # = , - ! ""# . [! 56 8#L I ! 6 8 (I! .
E 4 # @! # - 8 * #05 <\$ 8 <' . # " 56 # , - #F #0b U\$ # - X
\$. (/ % 56

]56 #0! ""# - <= # 5 #L e q B 6 J# G . i
#0! "" , - . / #01 8 F (+ ' \$. (b J# G . 59 B #
e q , - 56

^B O * #05 <\$. <' , - ""# - <= d 5 S #01 5 <' (# - X
#0 # V U ""# F S # = # E . R (- #0 \$ 3 o ""# - <= (I
I E# #0 #0! \$ (G (/ : / N<i # L G I I

^B O ('# S F # L G ""# - <= 8 (+ ' #L (/ % 56 , - 8 F (• # @! s
o \$ 59 #R 3 U! 6 #0 # % V , - #Y o ""# 5W " . \$ 56 , - S
#01 # L G 9 b U! 6 #0 .

a / ! I (+ ' #L (/ % 56 , - ""# - <= ' #0 * #05 , - ""# B 6
56 - 3 (/ S 7 r U! 6 #0 . # @! 56 # % V

^BE a / ! I # #' (' \$. ""# \$ # - <= . # - <= N2@ MF I . , #R- #0R
#' ! 8 (/ # = # E .! \$. , - 6 ""# " . .! #0 #L #! <' , -
\$

^BF]' #0 #L #! <' , - \$ ""# - <= !* UV #F , - (/ 5W . .
/ #01 # #' (' # 1 #0! # #' (' F R (' [

;

- O <G F <' # + , - \$ N2@ > . ; %lf
- O <G ('# " + . N / #01 I#' # <' R# , - \$ N2@ >%I
^B &0! <G F <' , - \$ "## - <= ! 56 F R (' [
- | 2 3 S - N#!. <E !* E# I 6 "## - <= #0! (+ F b f
- ,, #<{ !. #!. !* E# "## - <= # @! G S ! . # - <i "## , N(/
F "## - <= I !* <i G #8 U{ N e lf
-]I *#056 9 2 R
^B^ O 59 #G 9 <F = + I #056 "## - <= .[
- ,, - #F <i "# C # # !* # 5 2 3 . 6 # " 8 0n !* B#! # 56 f
- v R 56 # # !* # 5 2 3
^Ba `G R- b <G !* ('# W 4 F #' . (+ ' \$. , - 6 .
#L "# "## - <= d 5 #L "# . \$. , - 6 "# i - <3 56 !* ,
<3 #03 "## - <=
^B a # '#(' G - #F F S [
- &0 R #03 B# "# 5W I *# F # 5W B 6 . !* / #01 # '#('8 *
#05 <i #L I , - "#
- & - # '#8 * #05 "# 5W I *#
) + 2 #0 R d 5# - 8 * #05 , - "# F #8 ! I = 59
j # '# B ('## ' #L , - "#
^B)E *# , - "# #0! 6 - #F <i # . #0! G # C #03 "## - <= F (+ #0-
@! UB G 2 3 #.. 3 : MF
Ovw &v1Ov[a / ! I = 2 3 E + (+ #0- E *# , - "# #0! G # . #0! 6 - #F #0! \$ (G
"## - <= ! 56
^B `G #L #! \$ "## - <= # @! UV #F . # @! <' F #' . (+ ' [
- &B E "## #03 *# "## - <= f
- O R # , E U 0- #0! S #1 "## #F f
- hR # - X V U "# #03 B# "# ! S #01 B (' #
- &L (/ % 56 \$ E <\$, - "## - <= f
a #L #! ! I = 59 j # '# B ('## ' #L

a _* /-q> 1-3 43 5] 16 76 *8 9 ;; 1 dGC :0 h

aB]\$ <= F # '#(' # @! # # * # = , - ! "#[# I ! 6 8 (I! . E 4 # @! # - 8
UR # - X (+ . # (/ % 56 , - * #05 <\$ 8 <' 8 # " . 5 <'
, - <= (# , - #F #0b d 5 # 24 <' (6 ! G #5W - { # #
, - <= (# , - #F #0b E

aB O UB G \$ <= ! # '#(' \$ F # # J #03 9 U: \$ #0- - "# / #01 <i
59 (- #0Y 59 E]3 = 59 5 I - #0!
B (!- 82 3 #.. 8 C#S -

aB O 5W * #05 S - G D- R 6 # <' 8 E <\$. # (/ %
56 , - <= d 5 * #05 \$ S #01 5 <' S B 5 B 6 "#
- <= ! 56 # @! 3 3 : ; . ;

aBE a = <= + . \$ F <G# #05 W (<= . [
-) k -! . #R- #03 "#UI# !* #
- 6 D- "#UI# . "# #

aBF]' \$ <= . k8 -! # 1 #03 *# \$ F C E# 6 # + F <F! 56 # ! # A .
(\$ <= # , - #F #0b I , - 6 # . U- . #F #0b , - . !* / #01
O \$. 6 # F 2 <i # #! S - UV #F , - \$. 6 # C <3 #03 d
i #0! \$. "

&0 # V U "# , - <= #0! # #! F " V 6 # # 5W I *# , - <= #0!
(#0 \$ #F #0b 3 \$

aB]' \$ <= k 6 i D- "#UI# !* "# ## 1 F (+ #0- UR X NUV #F I
B 5 \$ \$ 6 , - . !* / #01 # '#('

&0! #05 W . # "# 9 j , - <= 3 " V 6 # # V U "#R 3 , - "#

a UV #F , - \$ (/ , !* #0 <' # #! (/ ! I B 6 . !* /
#01 # 1 R (' . *# \$ <i 59 #59 #R 5 . *# "## -
<= N2@ ; ; . ; ?!

aB^ &0! #05 W F E , - . . / #01 2 #03 <= B 6 <' (/
\$, - \$ # 1 F R (' <G (' # " # @! 3 , - >%

aBa &L \$ # @! <' . # @! UV #F F #' . # @! D s o : ;

_* /-q> 1-3 43 5] 16 76 *8 9 ;; 1 dGC :0 / 0 7-

B]\$ "#3 F # '(' # @! # * # = , - "# . [. UF K ! - , - # ,
.: V E .! " D 5W " #04 . #X V , - 1 #0! { ! - d 5 D *
\$ # ' i , - "# P! (# '(' 4 j[

-)"#3 0"# # + (/ k "# . #0! G 2 R # @! \$ U . # @! *#
<i k E#UB ! (- [! - ' . ! - "# q 6 8 "# # . "#UI# (
- 0"# \$ \$ * #05 E <\$. * #05 <' f

-)"#3 8 L 5 "# q 6 . < ! - N <= / | < ' . < ! #0!
(5- " B f

- Q #3 . # < #0! #05 W ! 56 4 .! B . 4 2 # + o '
#0 # { f

- O # < 3 G UB 0, e ~ 78% . E ! 56 G t 78; (56# # + # "# 4 56#

B) + (+ ' E# , . L 2 9 * + , - "#3 ((F! U # - "# /
#01 2 "# B 8 " #04 . *# C# { ! - 8 # "# V # # . ' 8 # .
6 8 < . < < .! q 8 *# #05W# #0 UB 8 1 . UB 5W # + < < -! "# q 6

` G " o 8 S ! . 59 # L G #0! q . G #05 B 6 "#3
F # R G # = # E .! *# C# { ! - . # . "# B

B a # '(' \$ "#3 F 4 j S # L G #0! S #1 (F! U # \$ (F e
. #0 UB F E <\$, - \$ "#3 #0! # - R # 5- < " (L B) + U9
< E (F e F E <\$, - "# ! I = 59 #' R- .! UR# - X #0!
- ! #056 \$[

- &0b 5W # + # _ B 6 f

- hV (2 3 9 _ B 6 "#UI#

- v. 5W #59 B # @! #0b 5W # (L # 56 { 9 78 B 6 "# # .
(L # 56 { 9 B 6 "# q 6

Ovw &viOv[" 5: , - # E (L S + : 6 <3 #03 , - "#3 < E ! I 2 #0! \$ (G
L G #0! q o "#N 3 I 5W " 3

BE]' \$ k ! "# # I # - X 6 . # + U 0- <' (/ ! I
B 6 . . / #01 2 R # 1 3 R (' [

- . G "# • *# < B < i # e ! * "# q 6 (/ < ! - #Y "#
B f

-). ! < { = < 3 #03 , - "# I # E # + < - ! f

- . U \$: = <3 #03 8 ! <{ , < 0 0 †#4 † . † B † ! - #0! . U- k
e !* # *#f

- . <i % <\$ *# "# ' = 4 Um

&0! #05 W D <G . # " 5- , 3 2I# ' G = b !* <G
('# " # @! 3 , - >%

BF &0! # '# (' \$. F R (' <F! G "#3 ({ < ! <: # E
(L S + . 56 #0! # - .! B | B . J (/ 5W I Y # / \$
U- 6 . f F = <G <F! Gf (/ 5W .! "#: B ' -
EU # '# (' [6 "#<F! G . F . L# "#78 B 6 "#UI# . "# #< . 78 ' 78
B 6 ! "# # (f 59 X 1 + .! s ! I = <C 1 /
B ` G #L \$ "#3 # @! <' . # @! UV #F F (+ ' * + , - "# . V
6 3 S :) \$

_* /-q> 1-3 43 5] 16 76 *8 9 ;: 1 dGC :0 / 1-j > > M-

B]\$ "# A B F # '# (' # @! #L * # = , - "# .

- v1 # . E 4 ! 2 ("#< 56# . N . # " 56 S - "#1 #0 E 4 . # E
. S #01 1 # . . # ' i , - "#B . ! # . # . # . (! J# " #04 8 G
UB 0, . EK #R 3 , - "#B . ! 5W V- . # . #L , - B q- #- #0!
56 8 # E .! E # . <B , - "# A B #0! \$ 8# . - b , -
"# { # " S - \$. \$ (G # " 8 d 5 # E .! # E , - #F #0b #03 \$ f
- hR # - X #L "# 9 j , - "# #0! S #1 < 0g- #0/ . # 5 . F * #05 <\$, -
"#f

- hR #059 : , - "#UI#< A B #0! #05 W # " 56#f

- & e q J# G . , - . . / #01 ! "# A B < 56#
. ! UR q- #- B #0! "#

B]\$ "# A B F #L #! # @! 3 3 :) \$]' "# A B . ! 4 56#
!* #059 : # 1 F (+ ' D 3 <XU 3 :) \$.) \$ %

B) E 4 ! 2 2 <i #X E 4 , - #Y 6 "# #0! \$ R- .! 4 #59 B
! 2 # @! #L "# , - "#B UB# - # " 56# . R #

` G 2 #0 E 4 ! 2 \$ # @! s o : O

BE &0 #59 B , - E 4 ! 2 ™₂ F 2 <i # L G G #05 <i #F #0b
#... ((F! U # - "# / #01 . + 3 V #' #Y (- , - G . +
3 V #' #Y (- , - G 2 R F # L G <XU #0! q # L
G

BF `G (I! . # L G "# +2 E 4 #59 B ! 2 (/ 5W C 9
. 3 (5W B #0! "# # ' #0 UB 5 U- [
-l &0! "# q 6 [
- ; r #0! "# l # . UI #8 ' 5W UI # 9 7 rf
- r #0! "# l # . #8 ' 5W # 9 7 rf
- r #0! #F "# q 6 f
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<l) B 6 "# 5W V- B 6 9 8 + # '# (' \$. . / #01 " Ĩ . " Ĩ8 # L G
F (I! . L# "# # q B 6 . " Ĩ . Ĩ` ! l # L G L# 9 #
B M' #! . , - \$ "# A B F " <i #X <' ! [
- hR l *# , - "#
- vG #5W 2 N E = ! 2 lf
- P! 4 56# , - "#N ' "## E ! 4 56#lf
- &059 : . ! # , - "#N ' "## E ! #059 : l
B^ a B <B (/ \$ #0! 6 "# . (F e # #0+ <' #X (/
\$ 8 5W#S #0 ! l B 6 . !* / #01 #1 F R (' <G e * \$ <
56# . #0! #05 W # '# F R (' <G (' " # @! 3 , - >% !* F
*# #03 "# (/ < A B <i 2 3 S - \$. 6 "# A B
_ * /-q> 1-3 43 5] 16 76 *8 9 ;; 1 dGC :0 / /p@
B]\$ "# C F # '# (' # @! #l * # = , - 5 [
a / k "# \$ # . 8 # l ! (/ \$ 8 (F e #R • *# ! #0b 5W <F #
, - "# * <G# #0! #05 W # " E ! # '# < . G 8 ! -! # / # .
B . -! # / / G 8 ! UR# - X \$ (G - "## , e 8 G . 56# "# C 8 ! UR
F "# D 9
Ovv &vıOv[&0! "# C <i # - 2s . "# UI# 4 j (F e #059 : , - (< 56# <i 56 . "## F
- b , - UF 2 "# / G
B &L l ! (/ \$, - "# C 5W 2l# ' #0! #l #! \$ F 2 # @! (' # S F
L G #0! q . G #05 # = # E # . " #04 , - "# C 8 59
C 8 ! J# G ' l , - "# C | / <' , - "# C F 2 #03 9
U: # L G <i <. l

B]\$ "# C F # @! 3 :)\$ &0 <' #!. 2 <i # #!
F 5W # 5 #X E 4 , - \$! #F #0b #03 0-8 E 4 # 3 ! #R • *# "#
C # @! 3 3 : . E 4 !* 4 56# , - 6 "# #R- ! # , - #0b
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% 8 % 8 % 8 % %8 % ; . % > R- #03 (' # S F # e q - "# / #01 . (+ '
(/ k "# \$ # . . #X V , - "# 59 C 8 ! J # G L , - "#
C 8 E *#8 EK . # X , - "# C

BF Q R # #! #03 \$ #0! #05 W = G #8 e NU{I F 2 2 "# # #Y
* #05 9 j , - "# # 5W E *# ! #056 #0! # '# ('

B al # 56 <- , - . . / #01 2 #03 "# C F S 2 "# # #Y
R # #! S 56 R_o 3 : MF P

&0 S 56 R_o d ! I = + S (L # 56 B = , - . #F #0b #03
9 ' 77 (] . #03 <e ' >7 (]^

B^]' <' #!. , - \$ 2 <i # #! # " 6 9 #0 ! I !* UV
#F , - \$ { 9 UV #F + F <F! G Ug <1 # 5 . . / #01
1 #0! # '# (' R (' <G # @! 3 , - > 8 > 8 > 8 > 8 > 8 > %
. > ;

] D <G 9 <F (# '# (' \$ "# C . [

- • *# \$ N2@ >If

- . G <i #8 e NU{I !* <i "#N2@ ?If

- O <G ('# " + F E , - . . / #01 B 6 <' 6 , - \$ N >%If

- P= U N(+ F b I +2 3 S - "# C

Ovw &vxOv:]' 6 <' # #! , - \$ 2F 0- ! "# C < 56##1 F R (' <G B
56

Ba • *# \$ "# C <i [

-) *# <\$ *# <i * ' \$ U ("# 5W *# EK G • 78; f

-) *# <\$ *# <i " E . 0 ' \$ U 8 ("# C . #
0 f

-) *# <i 0 56 ' \$ U % ("# C . # ! 56

B . G <i #8 e NU{I !* <i "# . i X "# C # I ! 6 . (/
\$ O \$. , - G 8 ! "# = 8 V E *# , - G F S # @! (' # S F # \$

V 6 3 :) \$ (+ ' \$ (G 2 R - 59 8 ! "#59
V d 5 # '#<# / G

Ovw &v1Ov[a <3 56 6 "# C "# 4 56#! Ź#1 G F . <i "#UI##3 #!. <E G # 2 R
B & '#(' \$ "# C V-#. #L # R J## # @! . 5W #59 B 6 9 78 N2@
?I F 4j ' s o : ; ' ; [3 < "# "# . . # / G !* =
2 3 S - 6 "# V-#. #L # R J#

_*/-q> 1-3 43 5] 16 76 *8 9 ;; 1 dGC v 1s 9 e-41?*

B]\$. . / #01 2 : D 9 (- # F # '#(' (+ ' UR U # (/ \$, -
*# "#8 o ' <' - , - "#05W# ! # / { . UR + , - "# #0!
(/ - < . ! 26

O # / UB <' , - *# "#8 (+ F E € <\$ *#8 E 3 . + - d 5
, / -! F 2 # @! 3 , - #3 K # '#(' . . / #01 : 9 (- #
O # / UB . 5W = , ' + #L \$ 8 #03 , - . . / #01 .
4j (#' . (F! U # - "# / #01 . 2 * #05 , - "#

B &0 #L #! * #05 <\$ φ . c . * #05 <' E + 2 E R #
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/ # V N I <i 9 *k_d* •

&0 #L #! , - / <' - N 56 I , - "# *E_{ng}* ! I " <i 78 B 6 "#

UI# . 78% B 6 "# #U! 6 #0 #L #! , - / <' N 56 V I E , - "#

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% 78 % 8 % 8 % . % a GUB \$ (G . G , - . m # S -
6 \$ (+ ' F 5: E V ('# " , - . 3 " # @! MF > ' . !* / #01
'#(' # @! U9 k ('# " V i #5 . <e (I (L # @! f #0! D
#05 W q " GUB *m* •

BE Q R <3 , - <• B 6 . . / #01 (+ # N . \$ # 8# 56 8
B (8 I d 5 9 , - . / G F #L #! (+ ' / @ # 3
! <' , - *# "# ((- # 0-

&0! #05 W . R <3 (/ 5W 5W#S 8 R . : + (/ S 8 R% q
W R , - #F #0b . # E # 1 (/ 5W#0- !. € #' # G

BF a / #L <' , - \$ #0! D #05 W 3 : MF ; d 5 (('# "
R , - . . / #01 5W # '#(' (+ ' EU # (/ \$, - *# "# y d 9 "#
4 56## 1 ('# " , - . . / #01 F # '#(' (+ ' UR E # # + \$ <'
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I 9 aJ [LM *m*

[LM *m*

+H=- /

-l „ F <\$ *# #' 24 6 "#
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 I) *# : = E# EU f
 I " "# .! B . . G <i J# G #L L . - U #<l : , #' 24 6
 *# f
 @l . G "#03 \$ "## R #' (/ < I !f
 'l MB #0L # . # (\# J# 56 , , - .f
 I).! 0n # # N#056 ((- # I# @! , - . . / #01
 _ * /-q> 1-3 43 5] 16 76 *8 9 ;: 1 dGC v 1s 9 7h 9 /S 9 /
 B]\$. . / #01 2 : D = E "# " E "# #L #! ;8> . ? F # '#
 (' # @! 3 , - #3 K # '# (' . . / #01 : D = E "#
 y D = " E "# { 9 <F # 1# '# (' \$ (/ (+ ' # E E "#
 B `G # '# (' \$ (+ ' # E E "# F # R G #03 9 U: #L #! UV #F
 <i #X W * <G# #F #0b 2 # @! 3 , - #3 K \$ #F #0b . # E d
 5 #3 K \$ # '# (' . . / #01 : D = E "#
 al # 56 U9 <E , - ! I 2 <i #L #! \$ # @! <' 5 3
 , -) \$ <i #X W 9 <F #F #0b N(/ (+ ' # E E "#
 B &l #! \$ # @! UV #F # 5 s #L 6 # . V , - #F #0b #0 \$ S -
 2 "# #Y \$ (G [

$$N_d \frac{m_{dd}}{k_{tc}} \quad N \quad I$$

#0! [

N_d . # . # % V , - #F #0b f

. UV #F , - \$ f

k_{tc} . G UB # J 8 " (/ { 9 8 f

m_{dd} . G UB E "# \$ \$ (G . G 8 " 5 U- [

$m_{dd} \cdot 8$ B 6 8 "# q 6 . "# #L# K N#0Y #0 I d 5 "# UI# s UB UG#
 $I_S \cdot 78$ f

$m_{dd} \cdot 78$; B 6 #0 ! 56 . "# UI# s UB UG# $I_S u 78$; f

$m_{dd} \cdot 87$ B 6 ! "# q

BE `6 D # E , - #F #0b # ! 0- / @ # @! - 56 , - ' # 1UV #F Š
 3 2 03 !# E , - R . / @ # @! , 56 E J -
 BF a # \$. 6 #X W * < G# , - #F #0b (+ ' # E E "# ! I #R-
 (/ !. #!. 3 "#N ! E# I (# {- n \$ (G U- [
 -I)E G # e_p , - #F #0b # #! (/ 5W# S ^ < \$ 0E #! *# % / @
 J#

$$e_p \leq \frac{b}{3}$$

N I

<I hV #F , - \$ F 2 # @! < \$ 0E S 56 , - $b_c < i$ < \$ 0E = I 56
 N 6 $e_p \geq \frac{b}{6}$]

$$b_c \left(\frac{b}{6} e_p \right)$$

N I

I > U "# #! #! 6 "# 56 (+ ' UR #R- (/ !. #!. , - 3 "#
 (/ 5W 5W#S # E I , - < + k R 6
 B O \$ U *# #! = E "#N#3 K # '# (' . . / #01 : = E "#I

$\Delta\varphi$. E F # #! , - φ_1 8: = E " " ; " <i - EN_ 7If " > " <i
 <B EN_ 7I . " ? " <i <F EN_ ; 7If

c_1 . #0 # #! , - R L 9 f

p_{ib} . R #0 <1 56 , - i -! 9 # 6 #X W #F #0b * <G#

O #0 - <: (@ 4 F : = EU

E _ * /-q> 1-3 43 5 /X, 9 AGC - /-[:0 418 9

EB O 3 : . , - #3 K F # # @! (# ' # (\$ 5 #F G #03
 (/ . \$ #0 B G G # ' #Y (#0: 3

Ovw &vixOv[O #0 G UF 2 "# . ! # . (# " X# / = : 5 #F G #03 (/ . :
 #0 B G 5W b . #0 <1 # 5 & @! * # #F . #0 G 5W - 0- #0 # - 8 #0 @! .
 #0 &0 G . (# " 5 #0! , 5W # * <G# 5W b . #0 3 = F <G# '
 E . G U- , - 5 #F G [<1 # 5 8UR B . C R

EB O * #05 , - "# = #0! # #! \$ #0 G ! * #0 B G ! . #0 F
 " # @! (' # S F 3 V "#

] \$, - #0 G <1 # 5 N #03 \$ # 3 3 I ! I # #! <i =

#0 #3 K * #05 "# #01 <. : M &0! #05 W . 8 G UB - #! . $k_{tc} + 2$

#0 # #! * #05 , - "#8 (+ F (B 5W # + # = + # \$ # @! <' 8 "
 $k_{tc} \cdot 8 . (\# \# @! UV \#F 8 \# @! MF ?$

Ovw &vixOv[

I &0 * #05 $c^{tc} \varphi^{tc} E 3 : <F \# E M B 6 "# UI \# sUB UG \# #0! I_S \cdot 78 ' I_S \cdot 78;$
 ! I " 5 B 6 "# sUB UG \# #0! I_S \cdot 78 ' I_S \cdot

I &0! #05 W = <F #03 9 U: # B (3 (\$ * #05 , - "# 5W 3 V # @! 3
 , - ; 8 #0 k_{tc} F S #03 9 U: D 3 V * <G#

I 9 J [LM $k_{tc} / q d ? * / D 1 : D T 1 H ? ** * / _ * : X 9 * P Q / 41 - T 1 5 1 R H L Z * * 1 D -$

+xy \z	1M- XY 9 1q I*1 γ	. * > Q L ? : H 9	+I * A I 1 / e 7 D
) "# #	87	8	87
Q # sUB UG # $I_S \cdot 78$ 8 UI # . UI # sUB UG # $I_S \cdot 78$	87	8	8
Q # sUB UG # $I_S \sim 78$ 8 UI # . UI # $I_S \sim 78$	87	8	8

EB &0 #3 K , - (B 5W # + # "# C γ^{tc} (# \$ #0 G #F #0b X ! I

" # @! MF 7

>

I 9 J { @ I * T 1 H ? : 0 / / p @ = -

+H=- :) /-[	\S *18 Xe 9 /M- *PQ >. 9 :) h/d	{ @ I * T 1 H ? : 0 / / p @ = - v *13 /S 6 > 7-[* ; 1 1X, 9 R /M- 7O- / N(-I			
		) "# UI # sUB UG# I _S • 78	O # #0 . # L# K . K		
		a (B 5W # + #L , - "# C γ _d ^{tc} 8 & ^			
		8	8; 7	8	8; 7

#0! [

N_{nh}^t . R X# #! #0 \$ S - !* <F @!f

k_{tc}^{nh} . GUB# J " # @! MF f

γ_d V . #0b 5W "# C N #0b 5W # + # γ_d I #0! # + # 1 J# " (+ # V
! <: "# < #0/ #0! 5W i #0! "# # + # (B # < #0k V 5W 2
<i D *# % S - I #03 = , - . 3 6 59 V E# -
" # @! s o : 7f

g_m . #0b 5W , - <F @! !* , - f

N_b . UV #F , - \$ <F @! 2 # @! s o : 7

Ovw &v1Ov[a 56 8 #0b 5W , - . "# i : 56 R 56 F 2 (+ ' #
K X , - 56

I 9 J [LM - *mC

+H=- :) /- [	[ LM - *mC
_ &0 G # % 8 #0 - 8 ! <1 # 5	87
_ &0 # % <1 # 5 8 @! (/ (! ! G	8
_] @! <1 # 5 8 #0 - 8 . (3 8 @! (! !	8
G . F# '# < B G ! . #0	8
_ &0 + * <G#	8;

EB hV #F N_b , - \$ <F @! #0! / # V N 7I (# R X 56 E#
, 6 59 # % V 8 ! 1 # . (B "# < #0k . *# , - 3 6 59 -
E# α 2 <i / # V [

-I y I 56 , - <F [

$\cdot - -_o \frac{1}{}$ N I

<I y I #03 , - <F [

$\cdot - -_o \frac{1}{}$ N I

I y I , - <F [

$\cdot (- -_o$ N I

hV #F , - \$ <F @! N_b # # @! / # V [

$N_b = \gamma_d \times V \times \beta + \sum \omega_i \times c_o \times 10 \beta + \alpha_i$ N I

%

#0! [

) . #0b 5W # +# , - "# C 2 # @! s o , - . f

V . # +# (B "#< K #0k 2 # @! s o , - ?f

$\psi_0 . c_0 . \# / UB \# \# ! , - "# C 2 \# @! / \# V [$

- c_0 c_1 N I

. GUB 3 : MF f

$\varphi_1 . c_1 . \# \# \# ! 5W \# . , - - U \# \# ! , - "# . R L 9 82 \# @!$

3 : B 6 #05 W # #! UV #F , - \$

I 9 EJ [LM η

+H=- / /p@	1M- XY 9 1q I*1 *PQ / /p@] &^	
	8	8;
O #8 #0Y #< K . ! 56	78	78>
) "#UI# sUB UG# I_S t 78	78	78%
Ovw &vxOv[vG UB B 6 #< K 8UI# . UI#: sUB UG# 78 t I_S • 78; . # 6 78 t I_S • F F r		

F _*/-q> 1-3 43 5]>. 9* 76 *M 9

FB]\$. B , - 5 UC# . 5 /#/(+ F 5W# . \$ F

'(# @! * # = ('# " , - ! / #01 . . #F #0b # 3 / #01 8 \$ (G

Ug N 3 E - #!. -! 4 / #01 . G I d 5 (+ ' \$ (G - "#8 -

"## , e . # , e B 6 2 : q U/ . <n <k q 56 #

5 2 3 !* # @! =-

FB O \$ U *# #0 !* G "# , - B F S 2 "# # #Y 3

3 : . d 5 s o U- [

-I]' "#: q F # +< 56 2 #1 #0 F *#U L# "# 8 (+ #Y B#

" "# , - q F U- (< 2 <: q d R# f

<Ia "#(/ # +< q 56 2 q #1 #0 #0! b #05 W 8 #0Y F *#U

"# ! q F L# "# f

I &0! 8 F / U ' B#2 # @! #! (+ ' V E ! - .

"# 9 b , - 5 (/ { 9 78 B 6 #0 . #0! . (/ { 9

78 B 6 #R- #03 <\$. (/ ! -

Ovw &vxOv[&0 2 q q 56 F 2 # @! s o , - #3 K # '(. B 5 UC# . 5 /#/
5W R- b

FB Z U "## J α , - #0 #! #! D * #05 E <\$ 2 # @! 3 : 8

<1))*

N I

C p* 1-3 m@ :D -0 *1 2 76 :D I 1 H? ** /_* :X 9 *PQ /

B |0 * *1 9

B B #C . F # # @! (#1 #0 #3 K . #0 #L #! * #05 , - "# #0 #3
K . #0 #L #! * #05 , - "# #0! (R 2 R N(. :8 (.
8 G# B e /I !* #Y <E J , - ("# !* (R , - / #01 Ug- D- !*
2 R 03 0ŠN . :8 25: I

B B &0 #3 K \$ #0 #L #! * #05 , - "# 2 # @! ('# S F , - UB G # L
G #0R #' 8 q B 6 * #05 <' . E <\$ % D # @! ('# S F , - # L
G #0R #' . q # @! * #05 J# j = <F # @! s o : ; a
#0 03 <G# , - * #05 = + # '# J #0 #3 K . #0 #L #! F 2 # @!
= E# 59

B B &0 #3 K . #0 #L #! * #05 , - "# F # '# J B 6 , 9 3 -
"# / #01 5W - #03 (R 2 R

Ovw &vxOv[&3 b ! 8# # . * #05 , - "# #0! E# 9 3 - "# " # @! #3 "# :) \$. 2 J
#03 9U: D UB G # L G 2 #0 #3 K * #05 #59 V , - "#

B 1-3 m@ :D -0 *1 2 76 :D I 1 H? ** /_* :X 9 *PQ / 1RH 43 } 1I
91- [> :I * -3@

B B &0 #3 K A

□□uoIkeo□

#! [

τ . UV B C# , - o "#

p . R # ' #0 \$ 3 o "#

&0 #3 K c^{tc} . # ϕ^{tc} 5W #! # @! / # V [

$$c^{tc} = \frac{1}{\Delta} \times \left(\sum_{i=1}^n \tau_i \times \sum_{i=1}^n p_i - \sum_{i=1}^n p_i \times \sum_{i=1}^n \tau_i \times p_i \right) \quad \text{NH I}$$

$$tg \phi^{tc} = - \times n \sum_{i=1}^n \tau_i \times p_i - \sum_{i=1}^n \tau_i \times \sum_{i=1}^n p_i \quad \text{NH I}$$

#! [

$$\Delta = n \times \sum_{i=1}^n p_i - \left(\sum_{i=1}^n p_i \right) \quad \text{NH I}$$

n . UB # L G , - 5W τ

B B \sqrt{G} UB - #! . \$ "# (N2@ . I (2 #0 #! #! , - R L 9 c8

- U # #0! ϕ 5 E 6 \$ I E# #0 R_n . (B 5W # + #! "# γ 5W #! #! # @!

/ # V [

$$k_d = \frac{1}{\pm \rho} \quad \text{NH \%I}$$

#! ρ . sUB E L 2 #0 #0 <1 * #05 , - "# 5W S # @! s
o : H

Ovw &v1Ov[&0! / # V NH%I " #056 5W 5W b U-! ! F <F! E# J 6 "# (#! #! \$

B BE O sUB E L 2 #0 #0 <1 * #05 , - "# 5W #! # @! / # V [

$$)B 6 c . \&1\phi[\rho = t_\alpha \times v \quad \text{NH ; I}$$

$$)B 6 R_n . \gamma[\rho = \frac{t_\alpha \times v}{\sqrt{n}} \quad \text{NH > I}$$

Ovw &v1Ov[a #! #0 #! #! c, ϕ = #X UB # L G τ . n N2@ H I

#! [

t_α . G UB " # @! MF H # = # E . ! 2 U "# # J n ! α N2@ %I . UB <J #R !

Nn-1I (2 #0 #! #! R_n . Nn_ I (# ' # J #0 #! #! c . ϕ

v . G UB <' X , - * #05 [

$$v = \frac{\sigma}{A^{tc}} \quad \text{NH ? I}$$

%%

#0! [

$$\sigma_{\tau} = \sqrt{\frac{1}{n} \times \sum_{i=1}^n p_i \times \text{tg} \varphi^{ic} + c^{ic} - \tau_i}$$

NH I

Δ j ... 5 #0! / # V NH I

<1)B 6

<1)) * I

N& - (F! I

?* 9 :D -0 *1 2 *?*/_* :X 9 /S 5 76 -3 A= 9 *PQ /

I B O * #05 , - "# #0! MF M ' MF M 5W = #0! #! #! <'
\$. . / #01 3 : O 4 # L #0! ; 8 6 G UB - #! . $k_d \cdot d$ 5 + #! #!
\$, - E# #F G -! # ' . #0 B G 3 :

I B O * #05 , - "# #0! MF M . , - ## - 6 # . q (- 8
V- (/ S 7r @ _U -# . (/ S r # "# (N -8 - ! # I (+ F #.
#L # R J# (/ # E .! E ! 56 G.

I B O * #05 , - "# UI# #0! MF M . MF M . , - "# V- (/ S r #. #L
R J# . E ! 56 G > 78 >

I B E) B 6 "# # . "# UI# D #0 #0 - @ (/ #0! MF M ' MF M
5W I 2 5W $c^{ic} \varphi^{ic}$. E < i E U

I B F a #0 e B 6 "# # . "# UI# d 5 (#0 G . I_s B 6 "# UI# 5W# , -
MF M ' MF M #1 #0 #3 K , - * #05 , - "# $c^{ic} \varphi^{ic}$. E 3 2 # @!
UB G 3 V - "# / #01

I B a #0 e B 6 "# # . "# UI# d 5 G . I_s B 6 "# UI# { 9 6 56
, - 4 3 #0! MF M ' MF M #1 * #05 $c^{ic} \varphi^{ic}$. E 8 #0! V E - #! .
J 8 ! I = # @! 6 56 #59 V , - e, G . I_s

& 3 8 + # 5W D F (#' 9 \$ \$ 8 #0! #05 W . * #05
, - "# $c^{ic} \varphi^{ic}$. E \$ 2 # @! UB G 3 V - "# / #01

I B ^ ` 1 #0 #L #! * #05 , - "# E e, G . I_s # @! 5W b < i #0 #3 K !
3 + 9 F ('# (j G , - #0 #3 K * #05 . 4 #- (/ '# s UB tct :
L- #03

I 9 I B J :D -0 *1 2 *PQ I * At 1 *1H /e 7D c^{tc} N(-I] 9. * >QL? :H 9 φ^{tc} N'I 76 >8 /
 -3 A= 9 E n(-o *PQ / *? n418 9@1) 1 S* 76H 9 t 9M*] k-76 /S 2>o

+H=- / *?	~ 1-[*?*/ /_* :X 9	_* :X 9 *PQ / Z 9 70- 1[LM :g 9 e			
		78	78	78%	78;
O # o U{ . ## /	c^{tc} φ^{tc} E	7 7 777	7 7 777	- > 7 777	- - -
O ## / Y-	c^{tc} φ^{tc} E	7 7 777	7 777	- > 7 777	- - -
O #	c^{tc} φ^{tc} E	% > 7 777	% > 777	> 777	- > > 777
O # <	c^{tc} φ^{tc} E	> % ? 777	% > 777	7 > 777	% 777

I 9 I B J :D -0 *1 2 *PQ I * At 1 *1H /e 7D c^{tc} N(-I 76 9. * >QL? :H 9 φ^{tc} N'I *PQ /
 Lb : > T*1 4u 1Z X

+H=- / Lb 76 9-O- 1= :D -0 *1 2 *PQ *1K LM L[	~ 1-[*?*/ /_* :X 9 *PQ /	_* :X 9 *PQ / Z 9 70- 1[LM :g 9 e							
		78	78	78%	78;	78>	78?	87	
Q #	$7 \leq I_S \leq 78$	c^{tc} φ^{tc}	7	?	> ;	- -	- -	- -	- -
	78 t $I_S \leq 78;$	c^{tc} φ^{tc}	%	78 %	78	>	- -	- -	- -
Q UI #	7 t $I_S \leq 78$	c^{tc} φ^{tc}	; %	;				? 7	- -
	78 t $I_S \leq 78$	c^{tc} φ^{tc}	?		>		> ?	;	- -
	78 t $I_S \leq 78;$	c^{tc} φ^{tc}	- -	- -	? ?	7 >	% %		
hl #	7 t $I_S \leq 78$	c^{tc} φ^{tc}	- -	>	%> 7	?	; >	%	%
	78 t $I_S \leq 78$	c^{tc} φ^{tc}	- -	- -	; >	7 ;	%	;	
	78 t $I_S \leq 78;$	c^{tc} φ^{tc}	- -	- -			%	7	? ;

I 9 I B J :D -0 *1 2 *PQ >8 / -3 A= 9 *PQ / Lb En| -0

9 t 9M* 76 k- *PQ / Lb		+H=- / Lb 76 *?* 9-O- 1= :D -0 *1 2 *1K LML[		( 8 / -3 A= 9 E Z 9 70- 1[LM :g 9 e U 9											
				78	78	78	78%	78;	78>	78?	87	8	8	8%	
&} • | &xOv až &v> &~ -! k8 <k # k	Mk #	Q	$7 \leq I_S \leq 78$	-			%	7	;	-	-	-	-	-	
		U5	Q	$7t I_S \leq 78$	-		;	;			-	-	-	-	-
		UI#	Q	$78 t I_S \leq 78$	-			?		>	-	-	-	-	-
	Me # ,	Q UI#	Q	$78 t I_S \leq 78;$	-	-	-	;	>	%		-	-	-	-
			Q	$7t I_S \leq 78$	-	-	>		>		?	-	-	-	-
			Q	$78 t I_S \leq 78$	-	-	-	-	>		?	;	-	-	-
	Me #	Q UI#	Q	$7 \leq I_S \leq 78;$	-			;	;	-	-	-	-	-	-
			Q	$7t I_S \leq 78$	-	7		;		-	-	-	-	-	-
			Q	$78 t I_S \leq 78$	-		>		;		-	-	-	-	-
	&0 # Ÿ 0- , - <J Œ '!@	hl#	Q	$78 t I_S \leq 78$	-	-	-	-	-	-	;			-	-
Q			$7t I_S \leq 78$	-	-	-	-	-	-	-		?		-	
Q			$78 t I_S \leq 78$	-	-	-	-	-	-	-	-	%		7	

<1))*

N& - (F! I

I 1 H? -3 A= 9 *PQ 5

B ?* /D 1 /S i

B B)E 4 , - \$ = U9 k #! 56 < (/ - < ' . k
' #! N2@ %>-II 2 <i 59 E 4 6 #! \$.
I , - \$ & Y- J 0i B 6 \$ 0E !* 5 (L { 9 7 8 E 4
2F 0- . ! R # 3 <i G UB , - R #0 <1 ! #0 \$ 3 . R # 3 3
! #0b 5W , - "#056 (.! 0-8 q 5W \$. I , - \$ # +
2 # @! s o : O

59 E 6 ! I 2 E 4 % D , - 03 0Š . F X 6
. #F #0b ! J #0 \$ #6 F 5: ' E 4 , - &0! F - #05
W 8 R # 3 2 # @! 59 # % V S - #0 # . + #! #! E 4
, - 6 i - #0! # I , - \$

) + #! F 5: , - J 8 !. D R 0- d F 2 R
@! 59 # % V S - , - † F! † # @! s o : O

B B a #! #! E 4 , - 03 0Š <i 59 E 6 3 4 j ' U9 k
<B R # % V #0! "# \$ Š #03 v1 O 8: 3 = (j G U- [

-h . EU *# (+ #Y -! #01 S ! N C # 3 .! !* U- , <6# If

-h' . EU *# (+ #Y -! #01 <\$ *# - 1 # 3 3 f

-p . R # R # #0 <1 56 f

-pd . R -1.42935(6) -0.558694() 1.45913() -1.42935() -0.953-177.82-T#34293(#)-10#0958571(0) -321641

-p

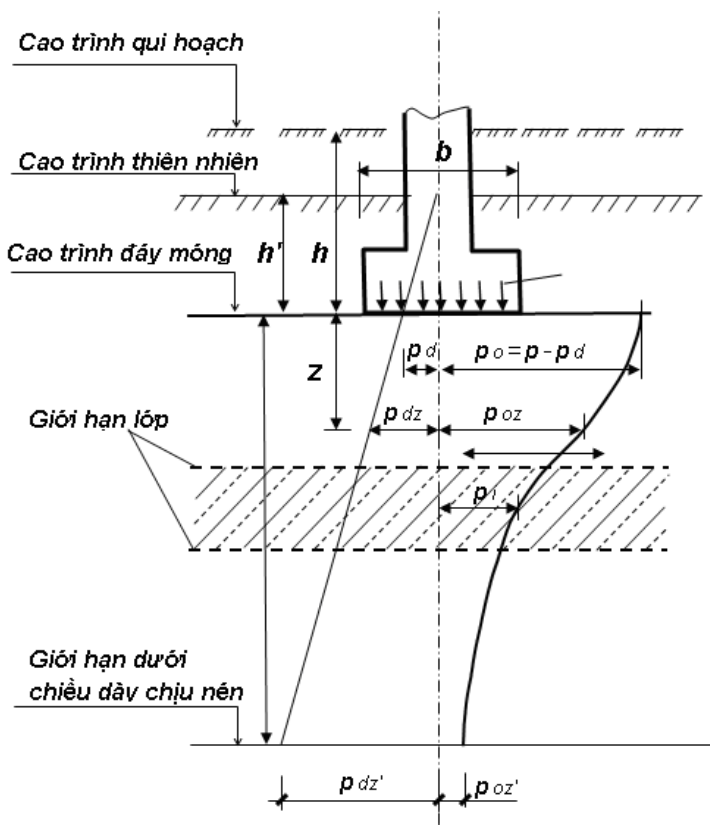
-p

;

α . G UB # ' UR # - X # @! E U , - R # 3 #! "# . " # @! MF O 8

E .! EU #59 B $m = \times \frac{z}{b}$. 1 , - q B 6 D J## 1

E .! #z UB , - $n = \frac{l}{b}$ N \$. l . \$ 0E b I



; 1 B J fe /t /q T 1 i 1RH@1Xe 9@1?@ *S 9 0@

Ovw &vxOv[

I) B 6 #0q N< (l r l #0 α 5W b #= # E .! $m = \frac{z}{r}$

I) B 6 G # ' F . - \$ 8 #0 α 5W b 5 #0q < (l $r = \sqrt{\frac{F}{\pi}}$ f

I Q R #3 K : EU z

I 9 B J [LM α

$m = 2z/b$ $!^*$ $m = z/r$	[LM α /M- 70- *?* > . 9							I V 9] 41- $n \geq 7$
	O D		J#V	6 #z UB		$n = l/b$		
	v1	#0q	8	8>	8	8		
					%	;	>	?
787	8777	8777	8777	8777	8777	8777	8777	8777
78	78? ?	78?%7	78?;	78?;	78?;%	78?;;	78?;;	78?;;
78>	78; %	78>77	78> >	78>%%	78>;	78>;?	78>>	78>>
8	78 ;	78%7%	78%>	78; ;	78; 7	78; ?	78;	78;
8%	78 ?7	78 ?	78	78 ;>	78%	78% 7	78% ?	78%
87	78 >	78 %	78	78 %	78 7	78 ?	78	78 7
8	78	78 ;	78	78 ;	78 ?	78 ?	78 ;7	78 ;;
8>	78 %	78 7	78 %7	78 7	78 7	78 >	78 7	78 7
8	78 7	78 %7	78 7	78	78 ?	78 ?	78 %7	78 ;
8%	78 7%	78 7	78 ;	78 7?	78 7	78 >	78 7	78 ;
87	787>;	78 7>	78	78 ;%	78	78 >	78 >	78 7%
8	787;	787?	78	78 7	78 >	78 >	78 %	78 >7
8>	787%;	787;;	78 7	78 7	78 %	78 ?	78 7	78 >
8	787	787%%	787?	78	78	78 ;7	78 7>	78 ?
8%	787 %	787 >	787;?	787??	78	78	78 >?	78
%87	787 7	787	787;7	787>;	78 7	78 %	78 ;	78 7>
%8	787 %	787	787%	787;;	787?>	78	78 >	78 7%
%8>	787	787 7	787	787%?	787>>	78 7	78	78 >
;8	787 >	787 %	787 ?	787%	787>7	78 77	78	78 ;
;8%	787	787	787	787 %	787;	787?	78	78 %%
>87	787	787 ?	787 7	787	787%%	787>	78	78 >
>8	787	787 %	787 ;	787 %	787%7	787;;	78 7	78 7
>8>	787 ?	787	787	787	787	787;7	787?>	78
?8	787 >	787	787	787 ?	787	787%	787?	78 ;
?8%	787 %	787 7	787 >	787 %	787 ;	787%7	787>	78
787	787	787 ?	787 %	787	787	787 %	787;?	78 %
	787	787 ;	787	787 ?	787 7	787 7	787;	78
	7877?	787	787 7	787 %	787	787	787%7	78 7

Ovw &v1Ov[) B 6 D #0 # - , - m . n8 5W UB α 5W 2 <i E U

B B hR <B # @! E U R # ' # + O .! #! !* !. , -

R # 3 : p_{oz}^c # @! 59 <i = 59 +

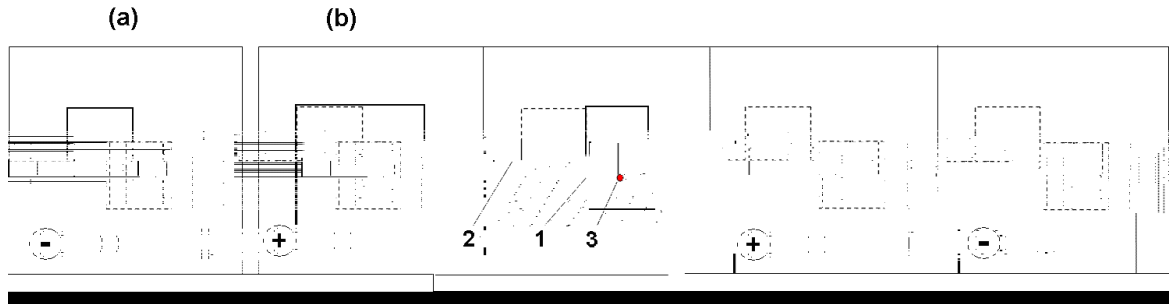
&0! 59 . R p_{oz}^c # @! 59 # % V S - + O 2 <i #X UB

R # + , - <B F! Iv1 O I R <B \$ 8# @! / # V [

$$p_{oz}^c = \sum^+ p_{oz}^g$$

NO I

;



Ovw P] [

-lh9 k <B #l #59 , D- #l #! . F 5:

<lh9 k <B #l † ! † 6 s o " 59 † † . † † + #l #! # @! / # V NO I [

_ | #l #! f _ | F 5: f _) + . # 2 E 4

; 1 B J fe / t M : † • > . 9 H € / q † † 1 1 Xv 9 / 3 / S i 1RH @ 1Xe 9 @ 1 ? @ / - q > 9 . *

B BE Q R V p_{oz} # EU . ! # @! 59 # % V S - #0 # #l #! ((+

' F 5: , - J 2 # @! / # V [

$$p_{oz} = p_{oz} + \sum^k p_{oz}^c$$

n . UB 6 - # @! E U , - # I , - \$

h_i . \$. , - 6 "## V if

E_i . / < ' , - 6 "## V if

p_i . R # 3 #0 <1 #0! 6 "## V i8 <i g- #X UB R # 3 p_{0z} # 6 #03
. 56 , - 6 2 # @! / # V NO I B 6 #05 W (/ # ' F 5: , -
J . # @! / # V NO I ((+ ' F 5:

β . GUB (/ # V 3 <i 78>

B B^ ` G 2 E 4 , - \$ (= U9 k # #! # @! 6 < ' # ' # N . k l
\$. D 5W = #0! #05 W : % >< l O 4 j 0i E 4 #0!
#05 W . . ! R #!. #0 <1 # : ' N(/ #0Y R # 3 3 l
0-

O \$. , - 6 < ' # ' # N . k l " # @! s o : O ?

B Ba) E 4 , - 03 0Š UŠ # @! U9 k # #! \$ 56 6 . k < ' # '
\$. D H 2 # @! / # V [

$$S = b_p \times M \times \sum \frac{k_i - k_{i-}}{E_i} \quad \text{NO \%I}$$

#0! [

b . \$ 0E , - D J# - 5 (L , - #0q f

p . R #0 <1 #03 "# 56 f

M . GUB \$ s 2 # @! MF O 8 # E .! m f

m . #z UB \$. 6 . k H . g- \$ 0E !* < (L , - (\$ 0E , -
<i 7 ' f

n . UB 6 - # @! # I #0! 6 . k Hf

k . GUB 2 # @! MF O B 6 6 i8 # E .! 1 8 #z UB

D J# n=l b . #z UB E U 6 z 6 g- \$ 0E , - m = z b - <

#0! H_o . t B 6 \$ "#UI# 3 " 5W#<i ? . 78 f B 6 \$ "# # " % .
78

Ovw &vxOv[

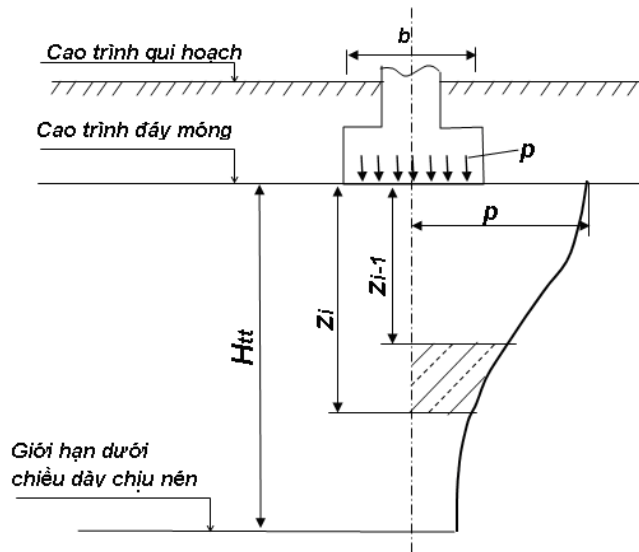
I]' \$ <-! k F "#UI# . "# ##1 # H_{tt} 5W 2 . # # <1
I , # H_{tt}# 5W # @! / # V N;I F E # 3 \$. , - "# / <' Et 7777 (-8 ' 6
i 56 H_{tt} . E . , - (/ 5W#S a \$. , - "# 6 8 d 5 ' 6 "# L- #03
/ <' Et 7777 (- #1 G #! E 4 # R G # @! U9 k < (/ - <' # ' # <i
59 E 6

I 9 B J [L M M

?* 9-0-1= *PQ u LM 5 = × 3 4 5 = × 3 '	[L M M
7t 56 ≤ 78 78 t 56 ≤ t 56 ≤ t 56 ≤ t 56 ≤	87 78? 78?7 78>7 78;

I 9 B J [L M k_l 76 k_b

m=2z/b !* m=z/r	[L M k /M- 70- ** * > . 9							(. 9 V 9 41- n ≥ 10
	; 1 :N ? 4T 1 r	; 1 *1s 1m 70- u LM ** * = 1 n=l/b U 9						
		8	8>	8	8			
787	78777	78777	78777	78777	78777	78777	78777	78777
78	787?7	78 77	78 77	78 77	78 77	78 77	78 77	78 7
78>	78 ; ?	78 77	78 77	78 77	78 77	78 77	78 77	78 7>
8	78 %	78 ??	78 77	78 77	78 77	78 77	78 77	78
8%	78 >	78 >7	78 ?	78 ?;	78 ?;	78 ?;	78 ?;	78
87	78	78 %	78 ;	78 >%	78 >%	78 >%	78 >%	78
8	78 %	78 ??	78 >	78 %	78 %	78 %;	78 %;	78%7
8>	78 7	78	78 ?	78% >	78%	78% 7	78% 7	78%>;
8	78	78 ; ;	78% ;	78%;	78%?%	78; 7;	78; 7?	78; %
8%	78 >	78%7%	78%; %	78; 77	78; %7	78; 77	78; ;	78>
87	78 ; ?	78% 7	78; 7>	78; %	78; ?%	78> 7	78> 7	78>?
8	78 ?%	78% 7	78; ;	78; >?	78> ;	78>%;	78>>>	78? ?
8>	78%	78%>	78; ?	78> ?	78>;	78?7>	78?	877
8	78%	78%>	78; >7	78>>	78?7	78? >	78? ; ;	87 7
8%	78%	78%?;	78; ?>	78>%;	78?	78?>	87 >	87?
%87	78%	78; 7>	78>	78>>;	78? >	87	87 %	8 >
%8	78%	78; ?	78> >	78?7	78?>7	87	87?7	8 ; >
%8>	78%>	78; >	78>	78? 7	8777	87%	8	8
; 8	78%>	78; %	78>	78?	87 ?	87>>	8	8
; 8%	78%;	78;	78>%	78? >	87 %	8 7?	8 >7	8 >
>87	78%; ?	78;	78>;	78?%7	87	8 >	8 7	8 %
>8	78%>	78; ;	78>>;	78?; 7	87%	8 %	8 ?	8 ;
>8>	78%>?	78; %	78>>>	78?>7	87; >	8 %	8	8 ; %
?8	78%?	78; %>	78>?%	78?>?	87?>	8 ; >	8 ;	8 7
?8%	78%?;	78; ;	78?7	78?7>	8 77	8 ?	8 ?	8
787	78; 77	78; ; ;	78?7>	877	8 7	8 7	8 7?	8 %
87	78; 7	78; >%	78?	87	8	8	8 ?	8 7%
87	78; 7	78; ?	78?	87 ;	8	8 ;	8 >	8 7



; 1 B J fe / t / q I 1 / S i U 9 @ 1 X e 9 @ 1 ? @ O @ - 3 A = 9 C 3 I 1

*. *1-5 A6C 1s 1=

B ?* / D 1 / S 91-0 9 *PQ >. 9 41- ?* A) 9 - :W 9 [*1 G >

B B) E 3 , - N(# #F #b G # I # @! U9 k #! #! \$: <
 (/ - . k < ' # ' #! N2@ % > - II 2 5 U- [

- I | D J # # @! 59 6 , - N b # @! # b I # @! / # V [

$$i_e = \frac{-\mu}{E} \times k_l \times \frac{P \times e_l}{(l)^3} \quad \text{NO > I}$$

< I | D J # # @! 59 < I , - N b # @! # - I # @! / # V [

$$i_b = \frac{-\mu}{E} \times k_b \times \frac{P \times e_b}{(b)^3} \quad \text{NO ? I}$$

I | #0q 5 (l r # # @! / # V [

$$i_r = \frac{-\mu}{E} \times \frac{(\times P \times e}{+ \times r^3} \quad \text{NO 7 I}$$

#0! [

P . W R #''# F #F #0b V , - #03 \$ 8 #! < i (/ - N(I f

e_l, e_b, e 5W# . (! F , - + *# W R ' D- # @! 59 #0 b 8

#0 - . # @! < (l 5 #0q 8 #! < i 2@ # I #N I f

E, μ 5W# . / < ' 8 #! < i (/ - U - N(- I 8 . G U B ! - # _ 2 / , - "# "

@! #0 #0 < I #0! # I f

; >

k_1, k_b 5W# . GUB 2 # @! MF O 8 # E .! #z UB , -
 BB)E 3 , - #0q # @! U9 k # #! \$ # E ! 6 < ' # ' # \$
 . D 82 # @! / # V [

$$i_r = \frac{-\mu}{E} \times k_c \times \frac{P \times e}{r^c} \quad \text{NO I}$$

#0! k_c . GUB 2 # @! MF O # E .! #z UB , - \$. 6 . k . < (L
 , - H/r

I 9 BEJ [LM k_1 76 k_b

[LM	[LM k_1 76 k_b Z 9 70- u LM *? * = 1 *PQ > . 9 *1s 1m n=l/b U 9					
	87	8	8>	8	8	87
k_1	78	78;	78>	78?;	8	8
k_b	78 7	78 ?	78	78	78 ?	78
OvW &vOV[) E 3 , - - \$ 5W # #! # @! / # V NO 718 #0! " < (L $r = \sqrt{F} \pi 6 F . G \#$ -						

I 9 BFB [LM k_c

H/r	78	78			~
k_c	78 %	78	78%	78;	78;

B ?* /D 1/S i XO *PQ 5 U 9/ * . I 1 i XO

BB)E 4 56# , - "# \$ S_s ! #F #0b , - 0- (# " 56# #0! = < ' 74)
 2 # @! 8 5W # # @! / # V [

$$S_s = \sum^n \delta_{si} \times h_i \times m \quad \text{NO I}$$

#0! [

δ_{si} . E 4 56# #59 B82 (! 56 ! . #! . 8# @! 8 q (5- ! 56 # @!
 O ! , 6 "# #0! = < ' f h_{bd} : R <1282 235(888) -1. 42935() -1X1. 42935() -105. 505() 6

p . R # <1 56 8 # <i (/ -U - N(-If

p_s . R 4 56#<- 8 # <i (/ -U - N(-If

p_0 . R <i 77 (-f

Ovw &viOv[vG UB B 6 <e 0E 9 . - 0E 9 2 <i E U D-
#0 m # #! # @! / # V NO I . m •

B B)E 4 56# #59 B , - "#((/ ! 56 Nδ'ij 2 # @! / # V [

$$\delta_s = + \frac{W_k - W_s}{W_n - W_s} \times \delta_s - \text{NO I}$$

#0! [

W_k . EK B = , - "#U- (# " 56#f

W_s . EK 4 56#<- , - "#f

W_n . EK ("# !. #!. ! 56 f

δ_s j ... 5 #0! / # V NO I

Ovw &viOv[a EK 4 56#<- W_s { 9 EK #R 3 W#1#0! / # V N I # + # - W_s <i W

B B)E 4 56# , - \$ 8 E G 4 56# . E 3 , - 03 0Š : #0! = 2 "# G
4 56# (/ \$, - \$! UR - #0 \$, - 56 #Y k # " 56#0-2 S - 8 F 2
' UR # " 56# D = 56 , - \$ #0! (!F EU Δh Nv1 O l8<i [

$$\Delta h = h + h_{bd} - h_n \times \frac{x}{m_\beta \times tg\beta} \text{NO I}$$

#0! [

h . EU *# U! 6 -! #01 S ! f

h_{bd} . = <' , - \$ 2 # @! 3 : f

h_n . EU k # " 56#U! 6 <\$ *#S ! f

x . (!F #Y I k # " 56# ' #0 , - - 2l#f

m_β . GUB # ' (F e #e - #0 \$ 56 \$ L- ! # 6 , - "# \$ f

β . - #0 \$ 56 #Y k # " 56#0- L-8 B 6 # 4 56#β • 78 q

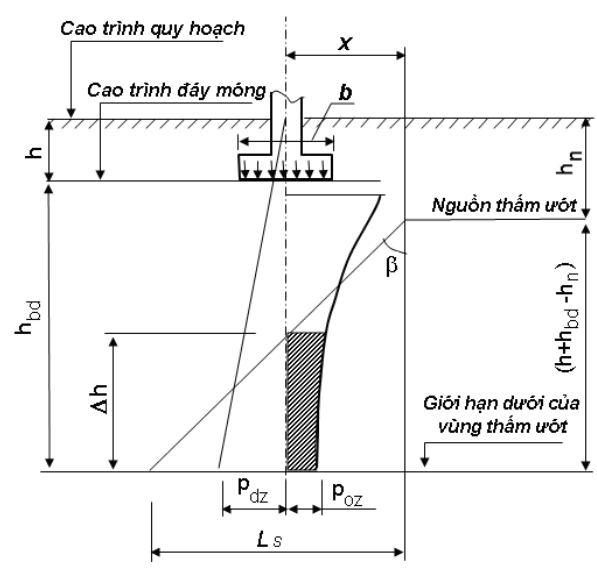
B 6 UI# 4 56#β • 77

O \$. L_s 9 # +2 "# G E 4 56# (/ \$, - "# # +2 # @! / # V [

$$L_s = h + h_{bd} - h_n \times m_\beta \times tg\beta \text{NO \%I}$$

#0! (j G B 5 / # V N I

$B_{BE} \approx R_{E4} S_{sd}^{max} ! \#b \ 5W <F \# \ , - \ " \ 0- (\# \ " \ 56\#$
 $L- \#3 \ 6 \ G \ \# \ <\$ \ 0E \ (/ \ \{ \ 9 \ \$ \ . \ 4 \ 56\# \ !* \ <\$ \ 0E \ (/ \ \{ \ 9$
 $\$ \ . \ 4 \ 56\# \ !* \ (\ R \ 56 \ 82 \ \# \ @! / \ \# \ V \ NO \ 18 \ \#0! \ \#X \ NO \ I$
 $k \ [$
 $-I) E \ 4 \ 56\# \ s \ \#0! \ = \ 4 \ 56\# \ , - \ " \ ! \ \#0b \ 5W <F \ # \ 8 \ (\ (/ \ \#F \ \#0b$
 $! \ . \ d \ 5 \ (\ j \ . \ : \ = \ <' \ ! \ \#F \ \#0b \ 0- \ (/ \ 3 \ W \ 6$
 $= \ 4 \ 56\# \ , - \ " \ ! \ \#0b \ 5W <F \ # \ 0-f$
 $<I) E \ 4 \ 56\# \ s \ \#0! \ .! \ , - \ = \ 4 \ 56\# \ ! \ \#0b \ 5W <F \ # \ " \ . \ # \ " \ EK$
 $< \ -! \ ! \ R \ 56 \ 3 \ !* \ \#e \ EK \ f$
 $I) E \ 4 \ 56\# \ \#0! \ \#Y \ = \ <' \ N \ ! \ \#F \ \#0b \ I \ ' \ , - \ 6 \ " \ (/ \ 4$
 $56\# \ (\ 0E \ . \ \#0! \ E \ = \ <' \ ! \ \#F \ \#0b \ 0- \ 6 \ = \ <' \ 4$
 $56\# \ ! \ \#0b \ 5W <F \ # \ , - \ " \ 0-$
 $O \ \$ \ . \ , - \ = \ 4 \ 56\# \ ! \ \#0b \ 5W <F \ # \ " \ , - \ " \ 5W \ \# \ \#Y \ EU \ . \ : \ V \ U \ "#$
 $\# \ \% \ V \ ! \ \#0b \ 5W <F \ # \ " \ , - \ " \ <i \ R \ 4 \ 56\# \ <- \ ' \ 6 \ 56 \ , - \ 6$
 $4 \ 56\#$
 $) E \ 4 \ 56\# \ \#59 \ B \ \delta'_s \ 2 \ ! \ , \ 6 \ " \ \#0! \ = \ 4 \ 56\# \ : \ R \ <i \ R \ \# \ 3 \ 3$
 $\# \ D- \ 6$



$; \ 1 \ BE \ J \ fe / t / q \ I \ 1 \ H? \ :D \ 1s \ 1= \ \Delta \ 1 \ 1 \ > \ XO \ 1 \ S^* \ 7h \ 9 \ AXO- \ *PQ \ 5 \ AW^* \ 1RH \ :)^*$
 $1 \cdot \ 9 / Z \ 9 \ *PQ \ > . \ 9 \ :H \ 9 \ :X, \ 9 \ 1Y @ \ 3 \ . \ v @ 1TQ \ 9H6- \ 9 \ t \ 1 \ > \ XO \ B$

B BF &0 UB 4 56# (F ... , - "# ! #0b 5W <F # "# 0- #03 = "# ! žž \$ # 4
 56# (. 56# <E # # 6 G # # <\$ 0E { 9 \$. 4 56# /8 UŠ 5W 2
 # @! / # V [

$$S_{sd}^B = S_{sd}^{58} \times \sqrt{\frac{B}{H} \times -\frac{B}{H}} \quad \text{NO \%I}$$

B B &0 UB 4 56# , - "# S_{sd}^{58 B} ! #0b 5W <F # "# 0- # + (- , - G
 # # " 56# . , - G # 2 # @! / # V [

$$S_{sd}^{58 B} = ! \times S_{sd}^{58 B} \times \left(+ \frac{\pi \times x}{r} \right) \quad \text{NO >I}$$

#0! [

S_{sd}^{58 B} . E 4 56# 6 "# !* (F ... , - "# ! #0b 5W <F # # #0 # G #
 # " 56# 2 # @! O !* O f

x . (!F # # <i 2@ # I#N I#Y# G # # " 56# !* + , - "#
 4 56# i - ' + 2 #0 UB 4 56# S_{sd}^{58 B} #0! 7 t x < r f

r . \$. # #! # # <i 2@ # I#N I , - "# 4 56# ! #0b 5W <F # "#
 0-82 # @! / # V [

$$r = H \times ! + m_{\beta} \times tg\beta \quad \text{NO ?I}$$

#0! [(j G 5 #0! / # V NO I . NO ; I

B B^ &0 UB + - U_s N I #03 *# "# (E 4 56# , - ! #0b 5W <F # 0-
 <: UR # " 56# !* <E N2@ I # # @! / # V [

$$U_s = ! \times \varepsilon \times r \times + \frac{\times \pi \times x}{r} \quad \text{NO 7I}$$

#0! [

\varepsilon . + - #59 B 8 # # <i [

$$\varepsilon = \times \frac{U_s}{r} - ! \quad \text{NO I}$$

r . x . D (j G j ... 5 #0! / # V NO >I . NO ?I

BE ?* /D 1 LI :Xe 9 v 76 LI *H 9. *PQ 5 9t> / *. I 1 :Xe 9 v

BEB)E -! \$ S_{tr n} ! UR #059 : , - "# < # " 56# 0- 5W 2 # @!
 / # V [

$$S_{tr n} = \sum_{i=1}^n \delta_{tr n} \times h_i \times m \quad \text{NO I}$$

#0! [

>

δ_{tr_n} . E #59 : #59 B , - 6 "## Vi 2 # @! s o : O f

h_i . \$. 6 "# - 2l #

m . G UB \$ (G . G 8 " $m \cdot 78 >$ (R #X $p_t \cdot 7$ (-f $m \cdot 78 >$ (R #X
 $p_t \cdot 77$ (-f 6 #0 #0 - , - $p_t \cdot 7$ E U " #0 R #X $p_t \cdot 2$ # @! s o :
O

n . UB 6 "# 5W - 0- #! = "# #59 : <3 56 2 # @! s o : O f

BEB)E #59 : #59 B , - "# $\delta_{tr_n} \cdot 2$ 5 U- [

-la # " K 8# @! / # V [

$$\delta_{tr_n} = \frac{h-h}{h}$$

NO I

#! [

h . \$ -! o "# E *# . EK #R 3 5W I (/ : / 56 R #X f

h' . \$ -! o "# U- (# " 56# . 5W I #! = \$ (G #03

<la , <\$ *# . # - X #0 # # , G # @! / # V [

$$\delta_{tr_n} = \frac{k \times W_k - W_o}{+e_o}$$

NO I

#! [

k . G UB 2 <i # R G 8 ((/ UB G # R G 8 " <i f

W_k . EK B = , - "#

W_0 . EK <- , - "#

e_0 . G UB 0, <- , - "#

BEB Q R #X p_t : D- 6 - 2l #Nv1 O I 5W 2 # @! / # V [

$$p_t = p_z + p_{dz} + p_{tz}$$

NO I

#! [

p_z . R ! #F #0b , - 0- # D- 6 - 2l # # <i (/ -U - N(-If

p_{dz} . R ! #0b 5W <F # , - 6 "# (+ #Y ' D- 6 - 2l # #
<i (/ -U - N(-If

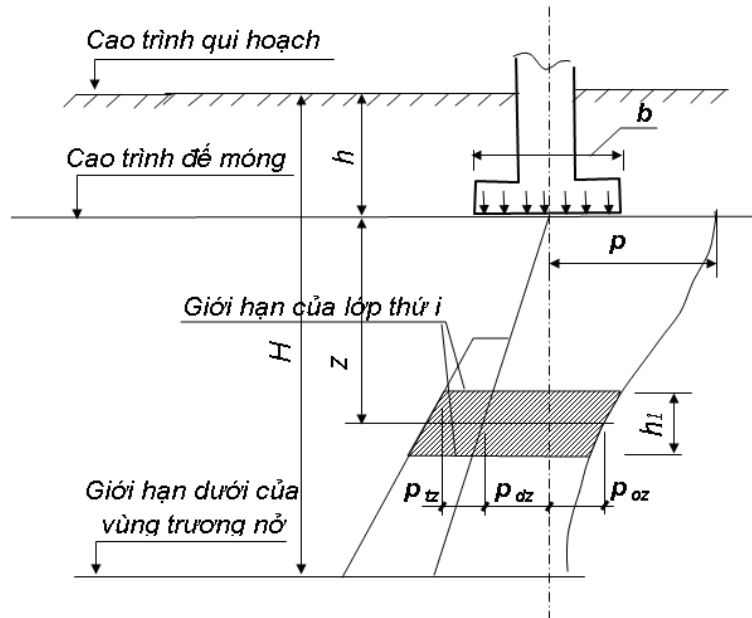
p_{tz} . R # 3 8 # <i (/ -U - N(-18 0- ! F 5: , - #0b 5W "#
(/ <K i !. # " 56# . 2 # @! / # V [

$$p_{tz} = m_n \times \gamma \times Z + h$$

NO %I

$m_n \cdot G_{UB} \cdot \gamma \cdot H_m \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right)$

$\gamma \cdot (B - 5W) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right)$



$\gamma \cdot (B - 5W) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right)$

$H_m \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right)$

$\gamma \cdot (B - 5W) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right)$

$\gamma \cdot (B - 5W) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right)$

$\gamma \cdot (B - 5W) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right)$

$\gamma \cdot (B - 5W) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right) \cdot \left(\frac{1}{2} + \frac{z}{H} \right)$

$(Z+h)/B$	[LM m_n Z 9 70- u LM *1-5 A6- 76 *1-5 :S 9 *PQA-[T*1 1 > XO L/B				
78	7	7	7	7	7
78 >	78 >	78 7	78	78 %	78 ?
78 >	78 >	78; 7	78%	78 7	78 7
78 ?	78 >	78 >	78;	78 ?	78 ;
87	78 > ?	78 > ?	78; ;	78%	78
87 ;	78 ?	78 ?	78 >	78 % ?	78 ;

$S_c = \sum_{i=1}^n \delta_{ci} \cdot h_i \cdot m_c$

$$S_c = \sum_{i=1}^n \delta_{ci} \cdot h_i \cdot m_c$$

NO ; I

#! [

>

δ_{ci} . E ! ## @! \$. #59 B , - 6 # V 2 # @! s o : % 56 #
 , - R <i #X R # 3 3 . R # 3 3 . R # 3 , - # D- 6 "#
 - 2I#(# - X EK , - #Y#0 UB 6 "# ' { "# # + f

h_i . \$. , - 6 - 2I#

m_c . GUB \$ (G . G , - "#(! #8 " <i 8 f

n . UB 6 "# 5W - 0- #0! = "# ! #[6 56 , - = ! #H_c 5W 2
 <i # R G 8 q ((/ UB G # L G # 1 " <i f

a (/ "# ! # G# , - # '# < / G8 6 56 , - = ! #H_c 5W 2
 <i # L G !* <i #L #! #59 V

BF ?* /D 1/Sd. - 9 > *PQ 5 / 1-j > > M-

BFB)E 4 2 , - \$ "# A B S_x 5W 2 # @! / # V [

$$S_x = \sum_{i=1}^n \delta_{xi} \times h_i \quad \text{NO >I}$$

#0! [

n . UB 6 "# 5W - 0- #0! = "# * (F e # ! # . 4 2 f

δ_{xi} . E 4 2 #59 B , - 6 "## V (R ! #F #0b . #0b 5W <F
 # , - 6 "## 82 # @! s o #0! O ' O f

h_i . \$. , - 6 "# A B # V if

BFB &0 UB 4 2 #59 B δ_x , - "# A B 2 <i # L G I #.. G
 #05 !* 59 I # " #0! q # @! #05 W S : 7

^ G # L G F #' . (56 # " . S - "# #0! (!F # - # @! 5 s
 o : 7

BFB &0 UB 4 2 #59 B δ_2 S <i # L G G #05 5W 2 # @! /
 # V [

$$\delta_x = \frac{S_{xn}}{h_n} \quad \text{NO ?I}$$

#0! [

S_{xn} . E 4 2 , - <. I U- (# " 56# 3 # #0! U B# S #01 # L G 56
 R : O f

h_n . \$. I , - \$ 56 <. I

BFB &0 UB E 4 2 #59 B # @! # L G I # " 5W 2 <i / # V [

$$\delta_x = \frac{h-h}{h}$$

NO 71

#0! [

h . E -! , - o "#: EK #R 3 . E *## 3 3 f

h' . E -! , - o "# U- (# " 56#<: 56 . I 56 R 3 : O

<1))* ,

N& - (F!l

{@ I * I 1 H? } CXO* :0 5 /

, B Q R #l #! S 56 #03 "# \$ R_o

$$R = R_o \times \left[+k \times \left(\frac{b-b}{b} \right) \right] \times \left(\frac{h+h}{\times h} \right) \quad \text{NP I}$$

a h ~ 82 R# @! / # V [

$$R = R_o \times \left[+k \times \left(\frac{b-b}{b} \right) \right] + k \times \gamma_{II} \times h - h \quad \text{NP I}$$

#0! [

R₀ . R # #! S 56 MMF P ' MF P 18V 6 \$ 0E b₁ . E
U / h₁ • f

b . h 5W# . \$ 0E . \$ U *# # R #' 8# <i I#N If

γ_{II} . #0 # #! , - #0b 5W # + # " # i L- #03 8# <i (/ #9 #03 I#

(B N[]^ If

k₁ . G UB # ' F 5: , - \$ 0E 8 " k₁ • 78 B 6 \$ "# q 6 . "#
#0Y # < f k₁ • 787 B 6 \$ # < . "# UI

k₂ . G UB # ' F 5: , - E U *# 8 B 6 \$ "# q 6 . "# # "
k₂ • 78 f B 6 \$ # . UI # " k₂ • 78 f B 6 \$ UI # " k₂ • 78 f

I 9 , B J { @ I * T 1 H ? } C X O * : : 0 / L b 4 1 8 9 i X O

N = 2 @ % > I

+H=- / Lb	[LM :g 9 e	R _o Z 9 70- *1KLM L [*PQ /] N(-I	
		I _S • 7	I _S •
Q #	7	77	77
	7	7	77
Q UI #	7	77	7
	7	7	>7
	77	77	77
hl #	7	%77	
	%7	77	
	>7	77 %7	
	7	7	

I 9, B J { @ I * T 1 H ? } C X O * R_0 : 0 5 / i X O

N = 2@ ?I

+H=- /	\ * :i* I 1-0 Xe 9 Z 970-41M- XY 9 1q T*1 1=] \k 8 &^		\ / > *1_ Xe 9 Z 970-41M- XY 9 1q T*1 1=] \k 8 (-	
	8	8	%7	;7
Q #	$\frac{87}{8}$	$\frac{8}{8}$	77	7
Q UI #	$\frac{8}{8>}$	$\frac{87}{87}$	7	77

Ovw &vxOv[
 &0! MF P 8#g UB . # R_0 # E "# 4 56# " #4 #R 3 E ! 56 G ≤ 78 . ((/ (F e
 # " 56# 4 | o UB . # R_0 # E "# 5 #3 5 E ! 56 G ≥ 78 . "# E ! 56 <I ((F
 e # " 56# 4
) B 6 "# 4 U # # \k . G # - # 1 R_0 2 <i E U

I 9, B E J : D T 1 H ? } C X O * R_0 : 0 5 / /p@ /f k /D 1

N = 2@ %I

+H=- / /p@	R_o, (-			
	O ## /8 # #0 8 # 8 2s		O # < 8 "# UI #0 #!	
	> 6 E ! 56			
	G ≤ 78	G ≥ 78>	G ≤ 78	G ≥ 78>
) "# #0! 4 U- \$ *## @! >	7	77	>7	7
O <n # F "# . ' G UF 2 "# U- (*# # @! >	7	77	>7	7
O <n # F "# . ' G UF 2 "# (/ *#	>7	7	7	77
O 9 X "# . ' G UF 2 "# U- (*# # @! >	7	7	7	77
O 9 X "# . ' G UF 2 "# (/ *#	7	77	7	>7

Ovw &vxOv[

I &0 UB R_0 : MF P . , - E U *# h_l • a E U *# h t # R_0 U\$ F <i
 6 G UB k = h + h × h f
 I &0 UB R_0 : + U- = #! MF P . # E \$ "#0

<1))* „

N I

?* 1[LMAh 9/q I 1 H? LZ* *1D - *PQ 5

O GUB = + #L # @! / # V N >I: ; ; \$ UV #F , - \$ "# k "# (/ F
: #0 # X 5 U- [

-I $\lambda_p \lambda_q \cdot \lambda_c \cdot$ GUB UV #F # @! <+ k v1 T T # E .! $tg\phi_b$ #0! ϕ_1
. #0 #L #! - U # #0! 82 # @! 8 . %f

<) $i_p i_q \cdot i_c \cdot$ GUB F 5: E 3 , - #F #0b # @! <+ k v1 T 8 # E .! # ϕ_1
. $tg\delta$ #0! $\delta \cdot$ 3 U! 6 59 # % V , - W R R # 3
If

I $n_p n_q \cdot n_c \cdot$ GUB F 5: #z G , - # @! / # V [

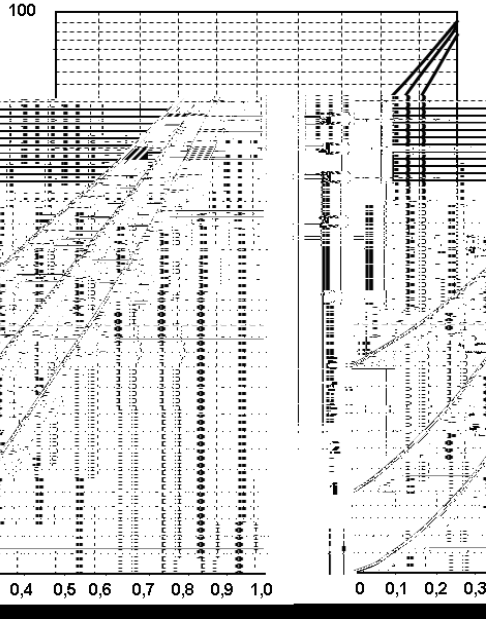
$$n_p = + \frac{!}{n} \quad \text{NT I}$$

$$n_q = + \frac{!}{n} \quad \text{NT I}$$

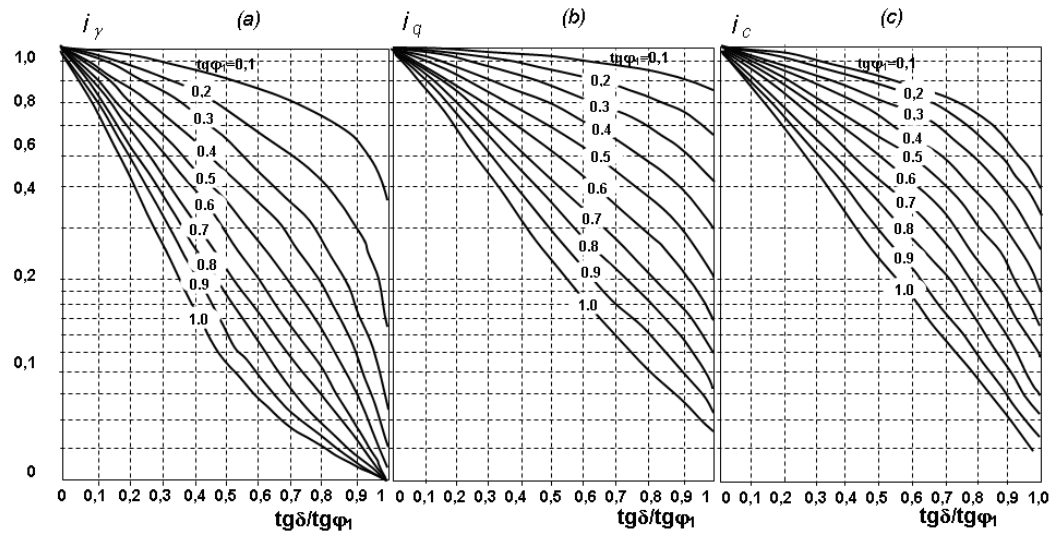
$$n_c = + \frac{(}{n} \quad \text{NT I}$$

#0! [

$n = l b 8 :$ l . b . \$. . \$ 0E , - 8 #0! #05 W R *# G
1 " <i #0 S X $\bar{l} \cdot \bar{b} 2$ # @! s o : ;



; 1 „B JI-q /t /qd?* /D 11[LM LZ* *1D -



; 1 „B JI-q /t /qd?* /D 11[LM/S 91-0 9 - :W 9