

Basic Concepts of Teletraffic Theory

(Solutions to Exercises)

Mr. H. Leijon, ITU

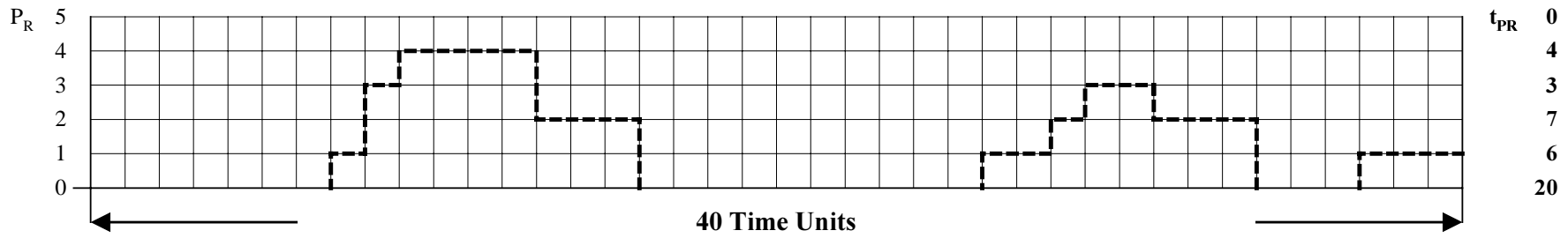
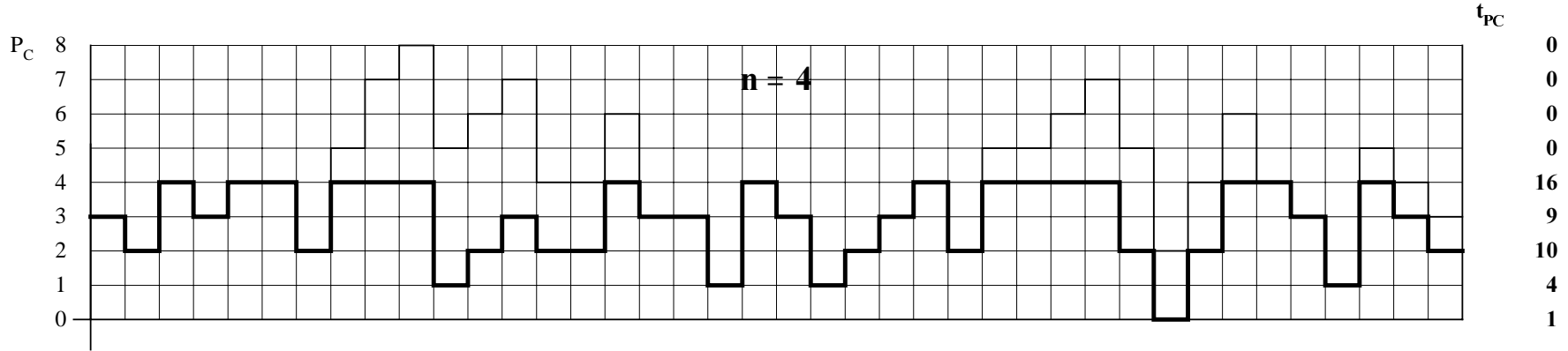
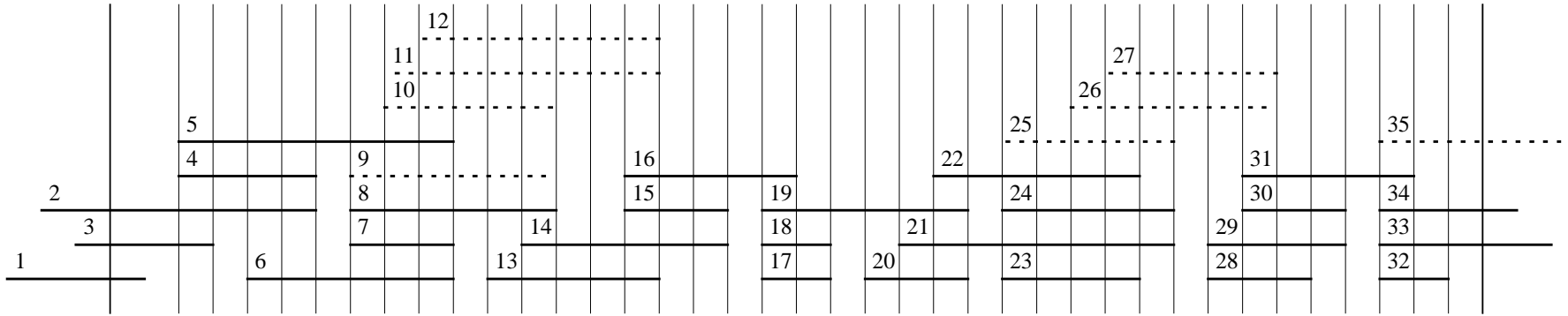


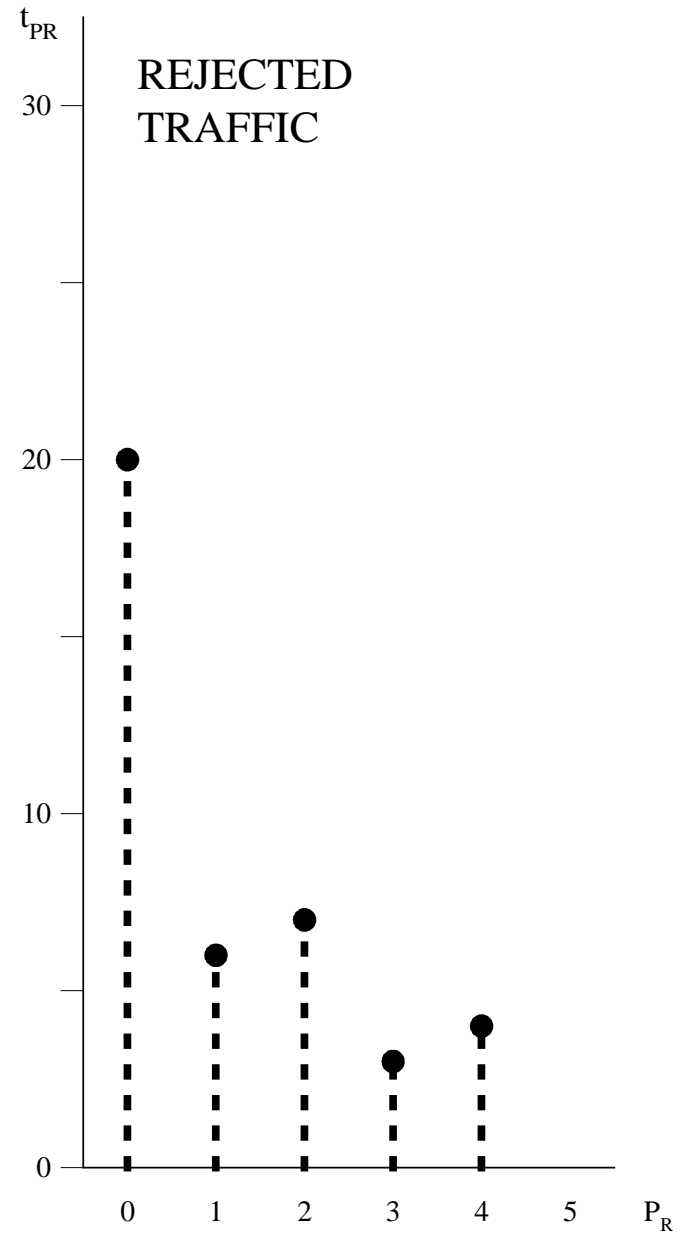
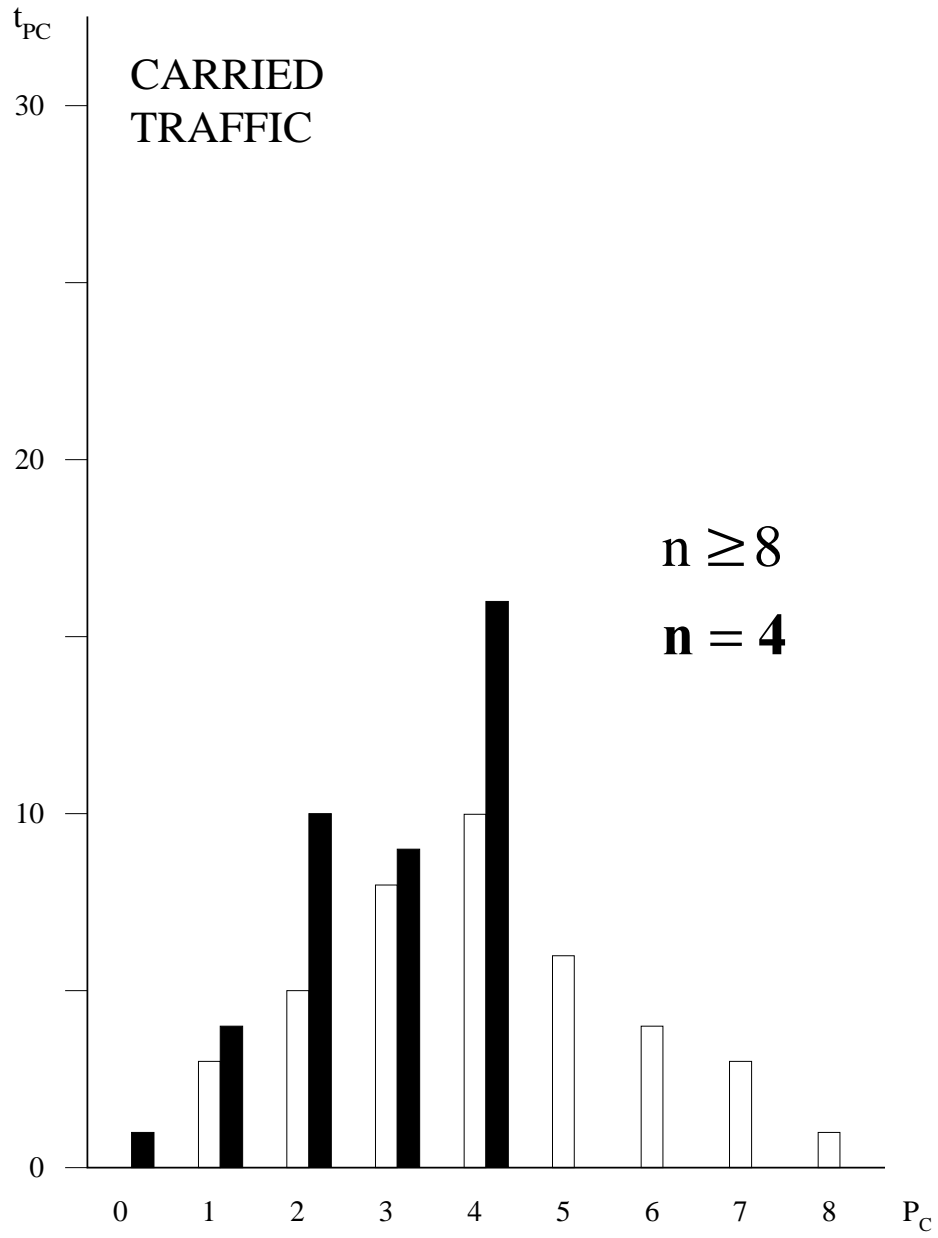
**UNION INTERNATIONALE DES TELECOMMUNICATIONS
INTERNATIONAL TELECOMMUNICATION UNION
UNION INTERNACIONAL DE TELECOMUNICACIONES**



SOLUTION TO EXERCISE p.10

Basic concepts of teletraffic theory





SOLUTION TO EXERCISE p.14

Basic concepts of teletraffic theory

P _x (x = 0, C or R)	Offered Traffic (n ≥ 8)		n = 6				n = 4				n = 3			
	t _{P_O}	P _O · t _{P_O}	Carried Traffic		Rejected Traffic		Carried Traffic		Rejected Traffic		Carried Traffic		Rejected Traffic	
			t _{P_C}	P _C · t _{P_C}	t _{P_R}	P _R · t _{P_R}	t _{P_C}	P _C · t _{P_C}	t _{P_R}	P _R · t _{P_R}	t _{P_C}	P _C · t _{P_C}	t _{P_R}	P _R · t _{P_R}
0					27	0	1	0	20	0	3	0	6	0
1	3	3	4	4	6	6	4	4	6	6	4	4	16	16
2	5	10	6	12	7	14	10	20	7	14	12	24	8	16
3	8	24	10	30			9	27	3	9	21	63	4	12
4	10	40	10	40			16	64	4	16			5	20
5	6	30	6	30									1	5
6	4	24	4	24										
7	3	21												
8	1	8												
Σ	40	160	40	140	40	20	40	115	40	45	40	91	40	69
A _x = = $\frac{\sum p_x \cdot t_{p_x}}{\sum t_{p_x}}$	160/40 = 4.0 A _O		140/40 = 3.5 A _C		20/40 = 0.5 A _R		115/40 = 2.9 A _C		45/40 = 1.1 A _R		91/40 = 2.3 A _C		69/40 = 1.7 A _R	

SOLUTION TO EXERCISE p.15

Basic concepts of teletraffic theory

n	“MEASURED”					The Erlang Table:
	Rejected Calls, Nos.	No. of rejected calls	B	E	A_R/A_O	E(=B)
8	-	0	0	$1/40 = 0.03$	0	0.03
6	11, 12, 27	3	$3/32 = 0.09$	$4/40 = 0.10$	$05/40 = 0.13$	0.12
4	9, 10, 11, 12, 25, 26, 27, 35	12	$8/32 = 0.25$	$16/40 = 0.40$	$1.1/4.0 = 0.28$	0.31
3	5, 9, 10, 11, 12, 16, 22, 25, 26, 27, 31, 35	12	$12/32 = 0.38$	$21/40 = 0.53$	$1.7/4.0 = 0.43$	0.45

SOLUTION TO EXERCISE p.20-21

Basic concepts of teletraffic theory

		GROUP I	GROUP II
RECORDED VALUES	A_c	Same as for group II: <u>2.3 erl.</u>	See p. 14: <u>2.3 erl.</u>
	y_c	All calls connected: <u>$32/10 = 3.2$ calls/min.</u>	See p. 15: $(32-12)/10 =$ <u>2.0 calls/min</u>
	Y_R	All calls connected: <u>0</u>	See p. 15: $12/10 =$ <u>1.2 calls/min</u>
CALC. VALUES	S_c	$2.3/3.2 =$ <u>0.72 min.</u>	$2.3/2.0 =$ <u>1.15 min.</u>
	B	<u>0</u>	$1.2/(1.2 + 2.0) =$ <u>0.38</u>
	A_o	<u>2.3 erl.</u>	$2.3/(1-0.38) =$ <u>3.7 erl.</u>