

Multiplexor Arrangements

Group Work

Mr. H. Leijon, ITU



UNION INTERNATIONALE DES TELECOMMUNICATIONS
INTERNATIONAL TELECOMMUNICATION UNION
UNION INTERNACIONAL DE TELECOMUNICACIONES



Group Work:

MULTIPLEXOR ARRANGEMENTS

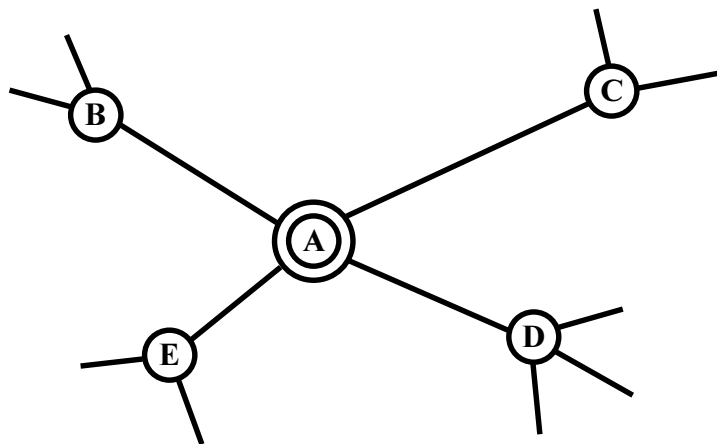
Calculate and draw the appropriate multiplexor arrangement in node A, under the following conditions:

- 1:st to 4:th order PCM is used. 1:st order PCM = 30 channels.
- All systems should be fully utilised.
- Higher order PCM is preferred to lower order.
- None of the systems terminate in node A.
- The other nodes are equipped with the necessary multiplexors.

Use Work Sheets I - III for the planning.

Three different cases should be calculated:

Between	Total no. of 1:st order PCM systems		
	case a)	case b)	case c)
B and C	6	7	70
B and D	3	5	25
B and E	7	7	40
C and D	16	17	37
C and E	4	9	13
D and E	4	4	28



Follow this procedure:

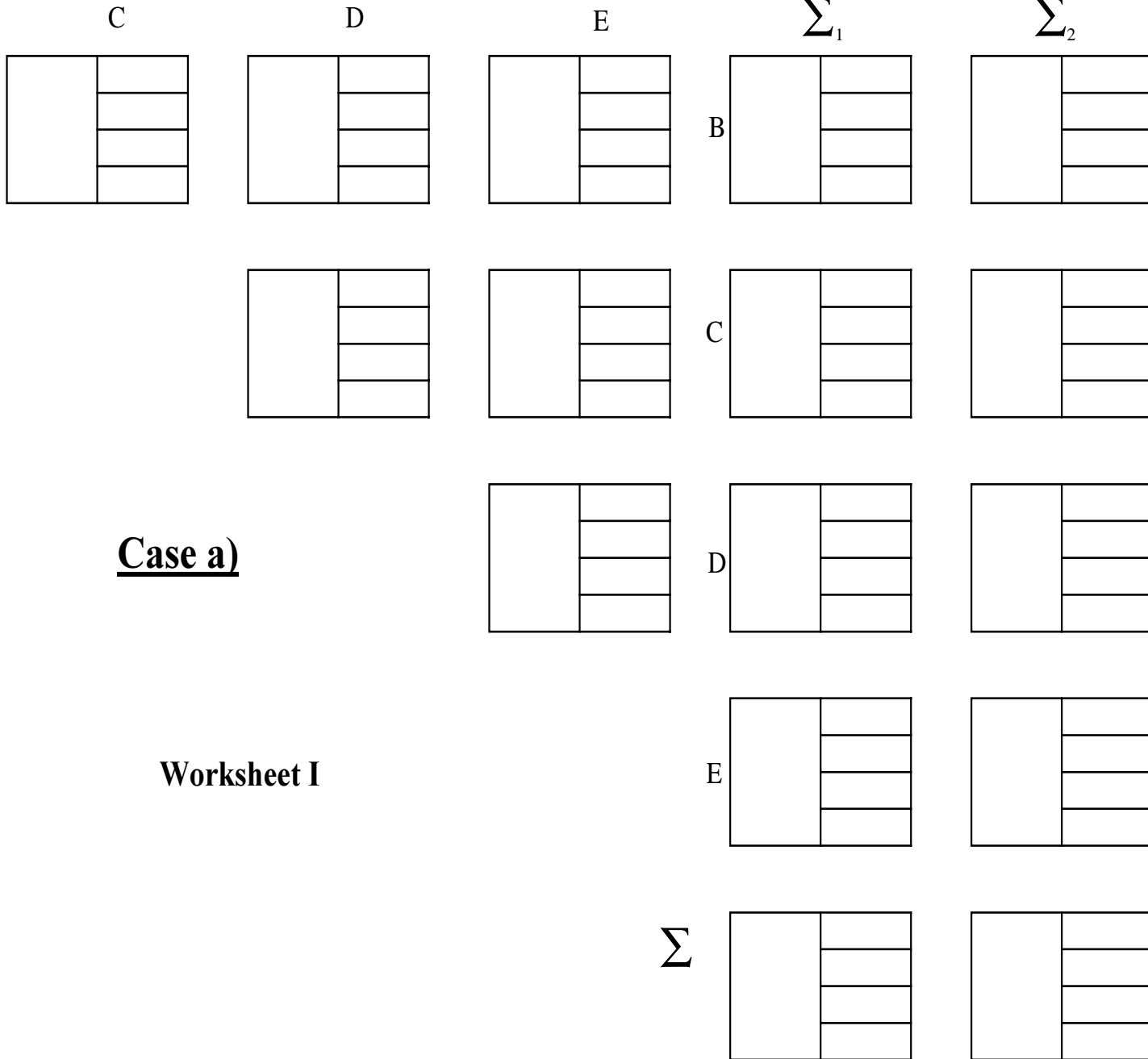
1. Calculate and fill in Work Sheet I.
2. Find out whether any systems of different orders may pass node A without being multiplexed. Note down these systems in the table "Passing Systems" in Work Sheet II, e.g. C/D, B/E, etc., and reduce the numbers in Work Sheet I by encircling the old number and writing the new number besides the circle.
3. Now fill in Work Sheet II, the table "Multiplexors", starting with the obvious cases first: incoming systems of the highest and of the lowest order.

Then continue with the distribution between multiplexors. If a case is dubious, then note it down temporarily in the table "Book keeping", e.g. B/C, D/E, etc. For each system treated, encircle the corresponding numbers in Work Sheet I.

The notations used in the table "Multiplexors" should be, for example, B, C, etc., for systems "switched" between different multiplexor level (e.g. M4), resp. the number of the next multiplexor, e.g. M301, M402, etc. for systems "switched" between different multiplexor levels. For systems coming from the other nodes, use encircled notations, e.g. B, C, etc.

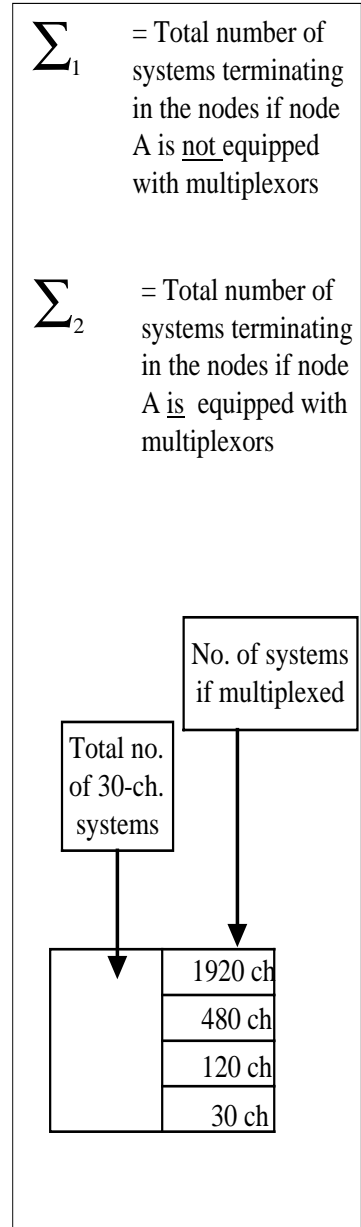
Now and then, some cases "Book kept" become obvious ones and are then moved to the table "Multiplexors", and at the same time the notation in the table "Book keeping" is encircled.

4. When Work Sheet II is completed, it is time to draw the corresponding multiplexor arrangement in Work Sheet III, by connecting the inlets with each other, resp. to mark where the incoming systems are, by writing B, C, etc., on the corresponding empty inlets.



Case a)

Worksheet I



M U L T I P L E X O R S

1920	480	480	120	120	30
------	-----	-----	-----	-----	----

"Book-keeping"

M4	M3	M2	30
			/
			/
			/
			/
M4	M3	M2	120
			/
			/
			/
			/
M4	M3	M2	480
			/
			/
			/
			/

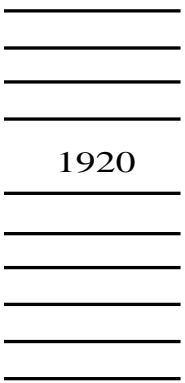
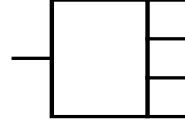
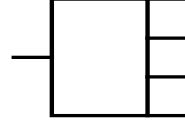
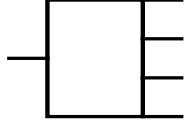
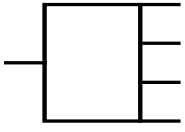
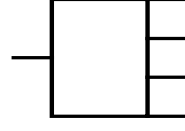
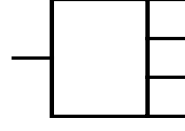
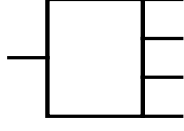
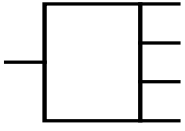
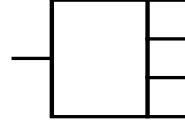
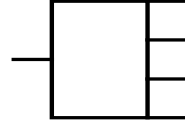
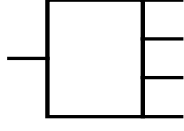
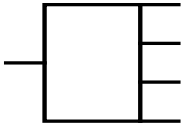
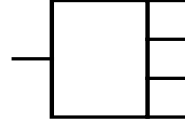
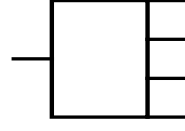
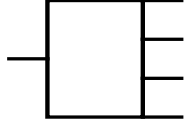
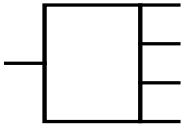
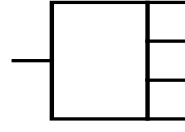
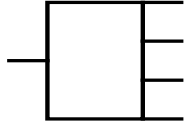
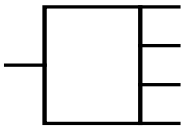
P A S S I N G S Y S T E M S

1920	480	120	30
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

M4
1920 / 480

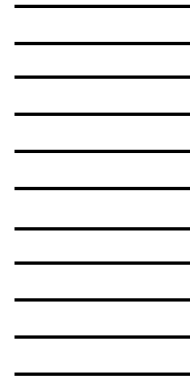
M3
480 / 120

M2
120 / 30

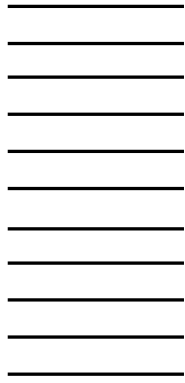


1920

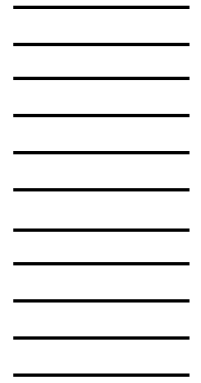
480



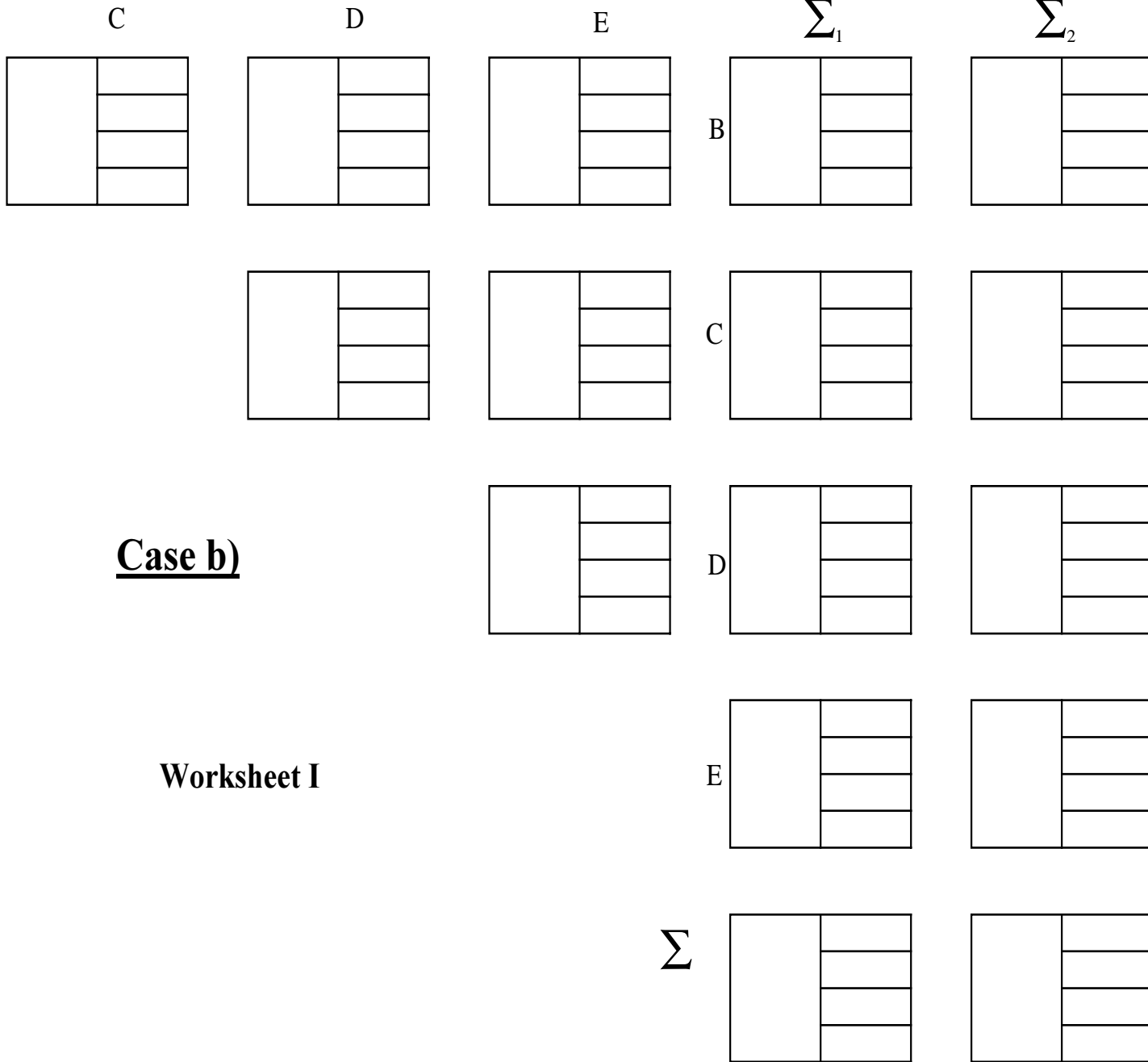
120



30

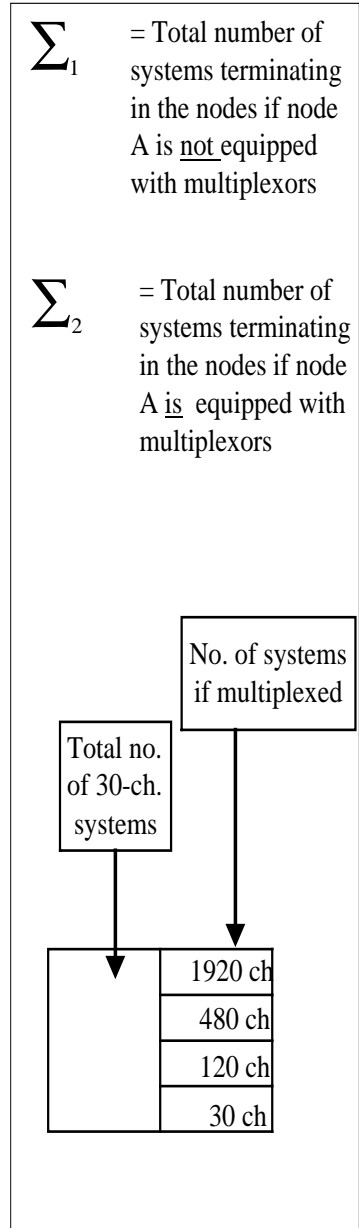


30



Case b)

Worksheet I



M U L T I P L E X O R S

"Book-keeping"

1920	480	480	120	120	30
------	-----	-----	-----	-----	----

M4

M3

M2

30
/
/
/
/

M4

M3

M2

120
/
/
/
/

M4

M3

M2

M4

M3

M2

480
/
/
/
/

M4

M3

M2

M4

M3

M2

P A S S I N G S Y S T E M S

1920
/
/
/
/
/

480
/
/
/
/
/

120
/
/
/
/
/

30
/
/
/
/
/

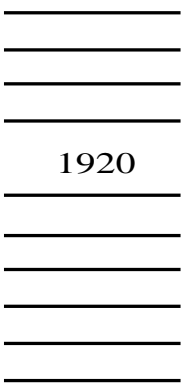
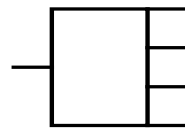
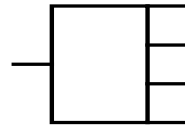
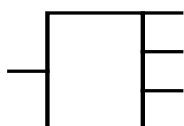
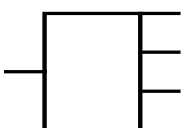
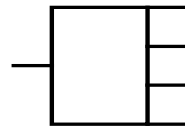
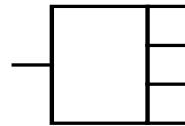
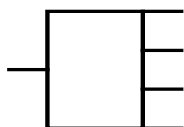
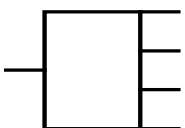
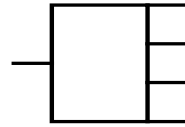
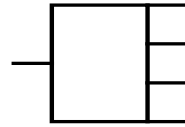
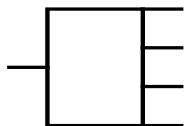
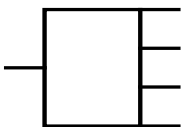
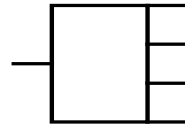
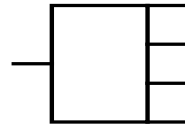
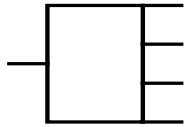
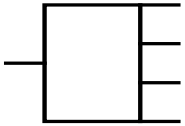
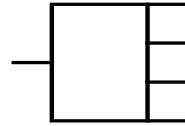
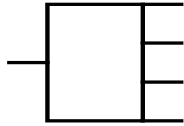
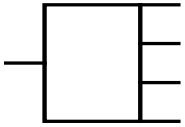
Case b)

Work Sheet II

M4
1920 / 480

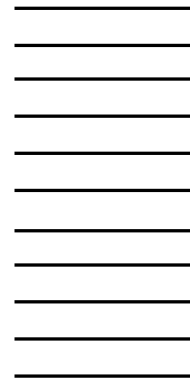
M3
480 / 120

M2
120 / 30

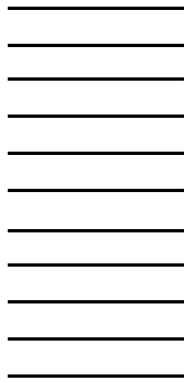


1920

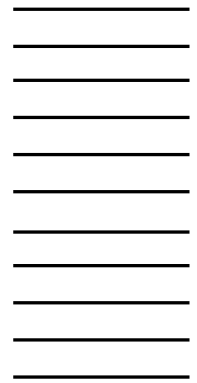
480



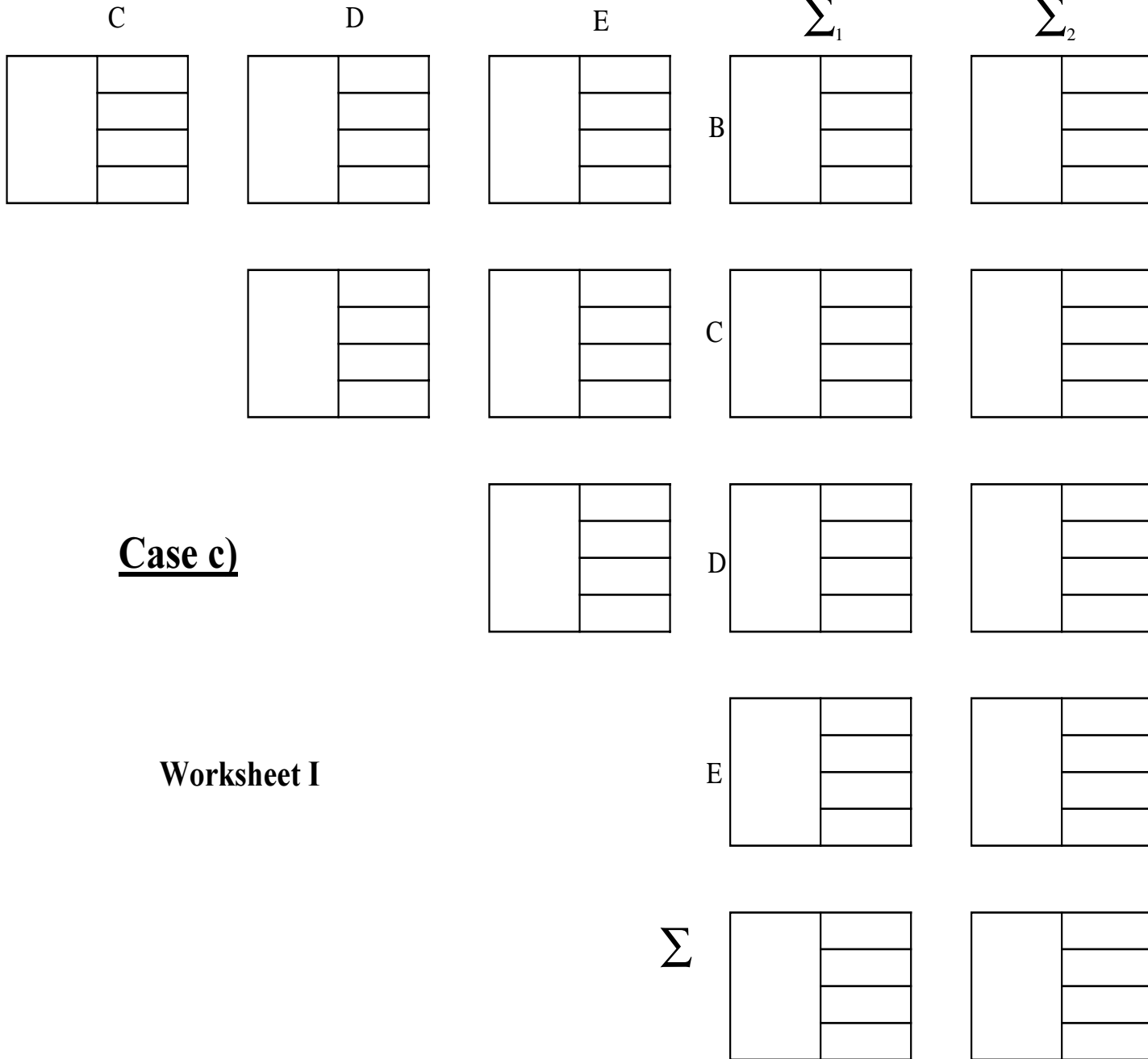
120



30

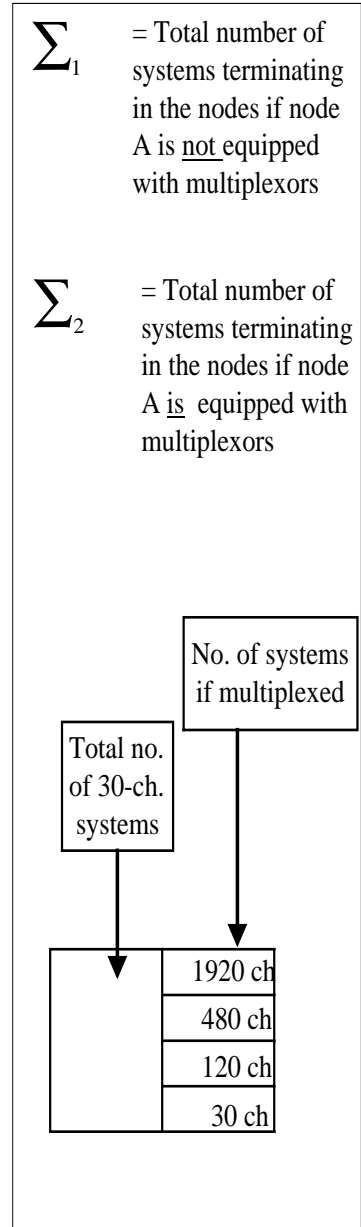


30



Case c)

Worksheet I



MULTIPLEXORS

"Book-keeping"

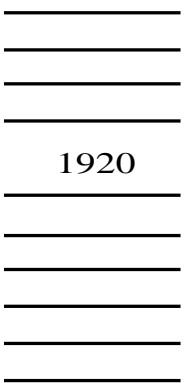
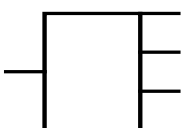
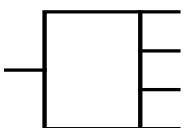
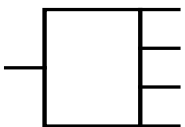
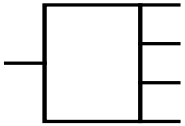
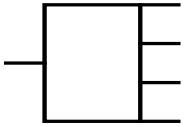
1920	480	480	120	120	30
------	-----	-----	-----	-----	----

M4	M3	M2	30
			/
			/
			/
			/
M4	M3	M2	120
			/
			/
			/
			/
M4	M3	M2	480
			/
			/
			/
			/

PASSING SYSTEMS

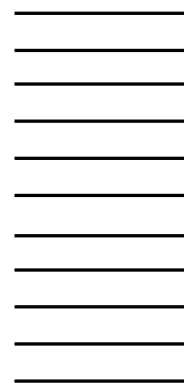
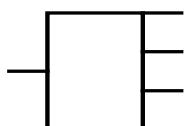
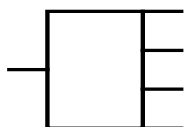
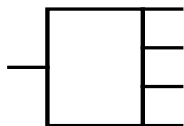
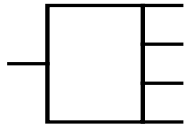
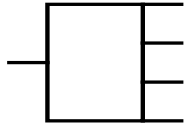
1920	480	120	30
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

M4
1920 / 480



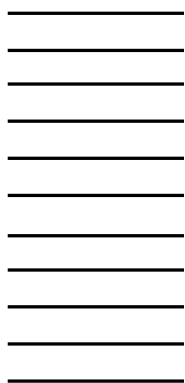
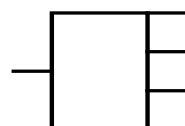
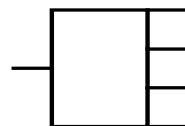
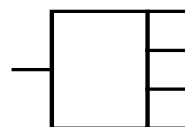
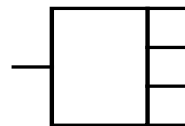
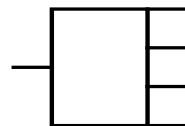
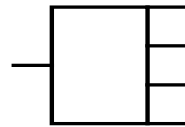
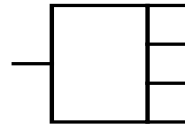
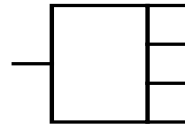
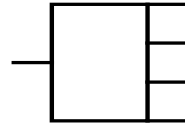
480

M3
480 / 120

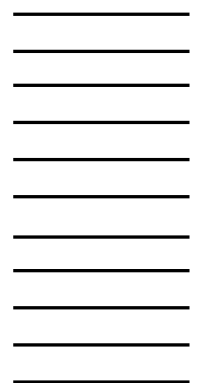


120

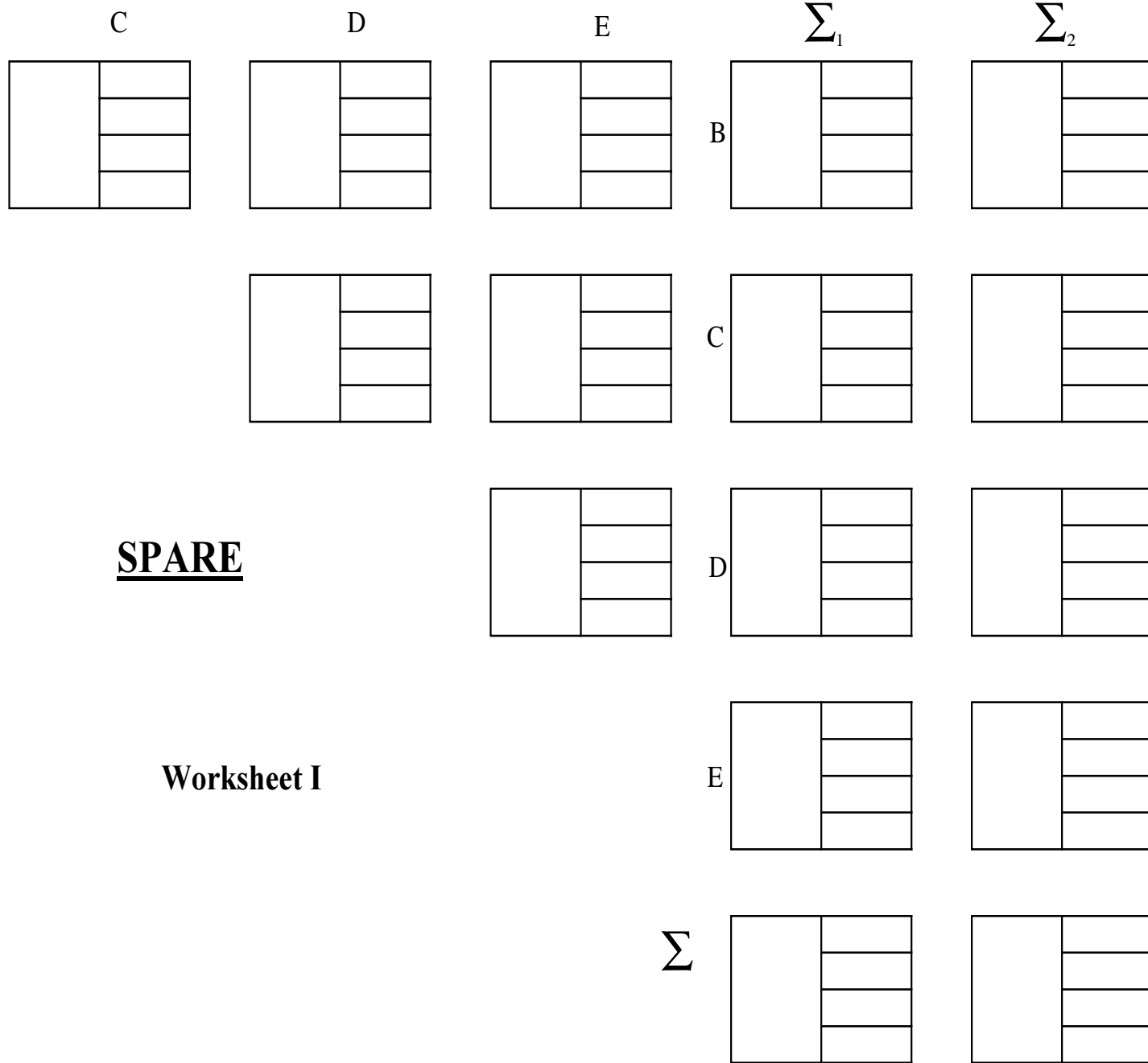
M2
120 / 30



30

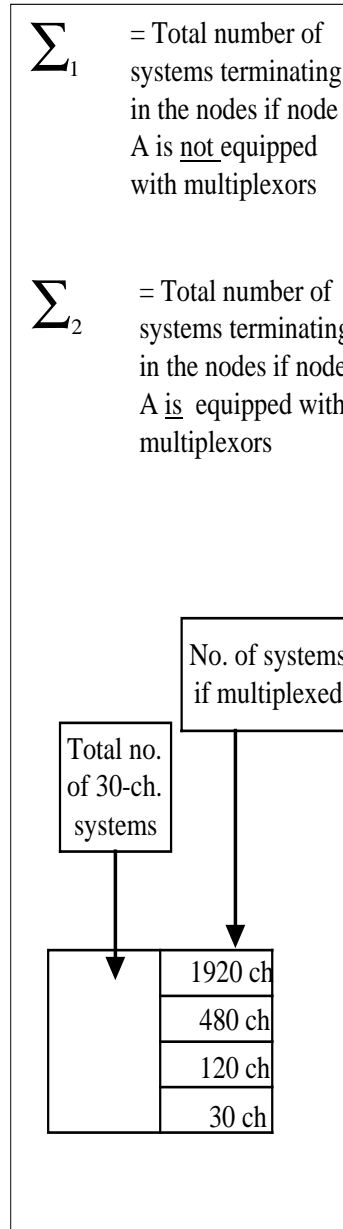


30



SPARE

Worksheet I



MULTIPLEXORS

"Book-keeping"

1920	480	480	120	120	30
------	-----	-----	-----	-----	----

M4	M3	M2	30
			/
			/
			/
			/
M4	M3	M2	120
			/
			/
			/
			/
M4	M3	M2	480
			/
			/
			/
			/

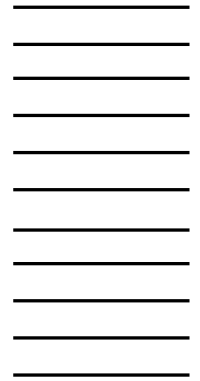
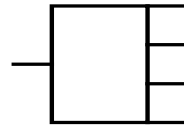
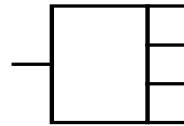
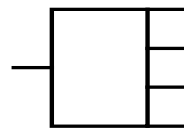
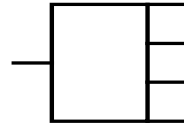
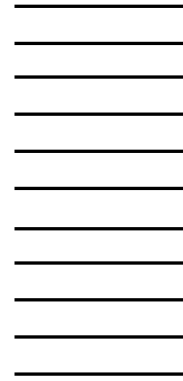
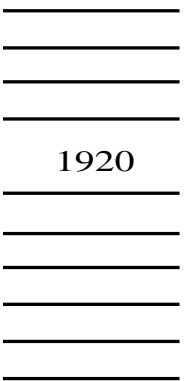
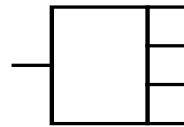
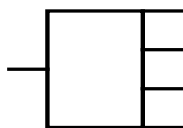
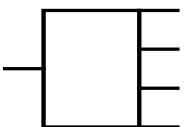
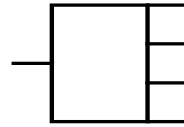
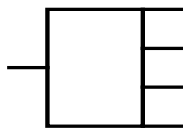
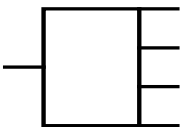
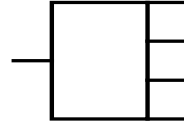
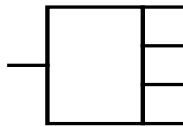
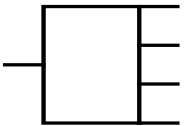
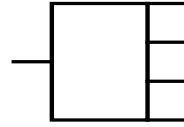
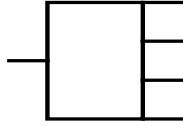
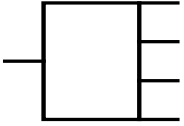
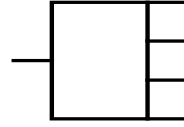
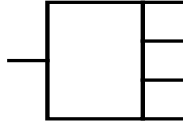
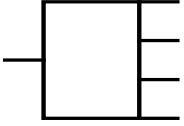
PASSING SYSTEMS

1920	480	120	30
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

M4
1920 / 480

M3
480 / 120

M2
120 / 30



480

120

30

30