

Scrivi i numeri da 0 a 9 nella seguente tabella:

0	1	2	3	4	5	6	7	8	9

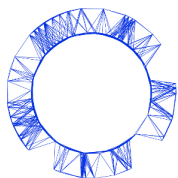
### Parte A: Dimensionamento del circuito (2.5 punti)

**A.1** (0.2 pt)

$V_{\text{out}} =$

**A.2** (0.5 pt)

#	$R_{T1}$	$R_{T2}$	$R_{T3}$
$\overline{R}$			
$\sigma_R$			



**A.3** (0.3 pt)

Dimostrazione:

**A.4** (0.4 pt)

$$R_{\square} = \quad \pm$$

$$\rho_{\text{Carbon film}} = \quad \pm$$

**A.5** (0.5 pt)

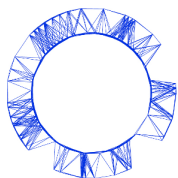
Dimostrazione:

Valori misurati:

$$R_1 =$$

$$R_2 =$$

$$\kappa =$$



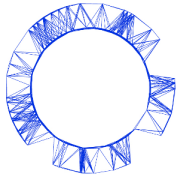
## A.6 (0.3 pt)

Punti $R_1$	$R_x$	$R_y$	Punti $R_2$	$R_x$	$R_y$
Z			Z		
A			H		
B			I		
C			J		
D			K		
E			L		
F			M		
G			N		
V			W		

## A.7 (0.3 pt)

Punti		Punti	
A		H	
B		I	
C		J	
D		K	
E		L	
F		M	
G		N	
V		W	

## Experiment



IPhO 2018  
Lisbon, Portugal

# A1-4

Italian (Italy)

### Parte B: Curve Caratteristiche del transistor JFET (4.5 punti)

**B.1** (0.2 pt)

$I_{DS} =$

**B.2** (0.8 pt)

$I_{DS}$  valori della corrente:

Base/CollettoZe (Ga- te/Drain)		H	I	J	K	L	M	N	W
Z									
A									
B									
C									
D									
E									
F									
G									
V									

**B.3** (0.2 pt)

$f =$

**A1-5**  
Italian (Italy)

$$R_{\text{DS}} =$$
 $R_{DS} =$ [illegible]

**A1-6**  
Italian (Italy)

$$R_{\text{DS}} =$$
[illegible]
$$R_{\text{DS}} =$$
[illegible]

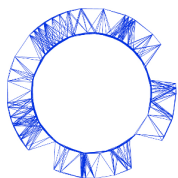
**A1-7**  
Italian (Italy)

Gate E:  $V_{GS} =$

 $R_{\text{DS}} =$ Base/Gate F:  $V_{GS} =$  $R_{DS} =$ [illegible]

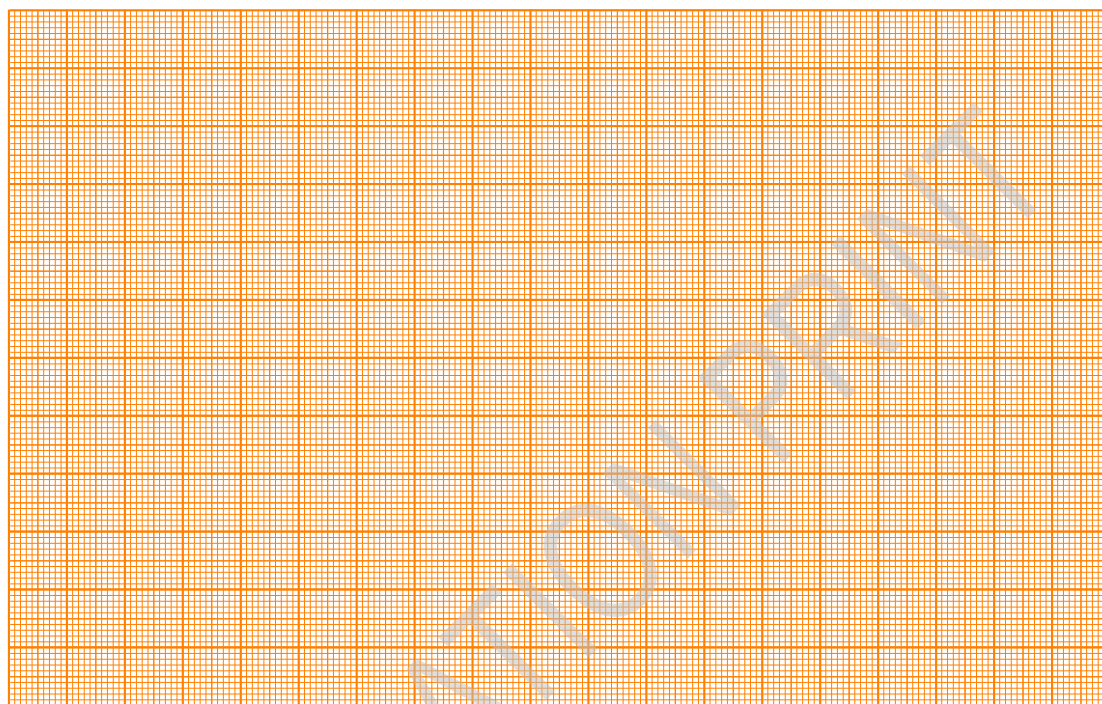
**A1-8**  
Italian (Italy)

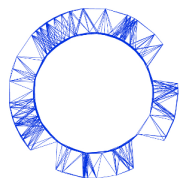
$$R_{\text{DS}} =$$
[illegible] $R_{\text{DS}} =$ [illegible]



**B.5** (0.5 pt)

Curve di output:

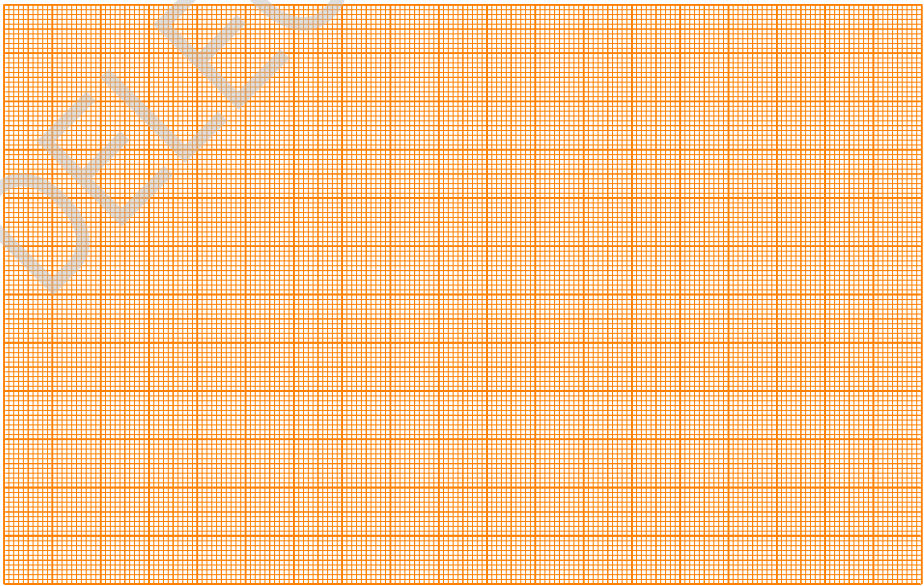


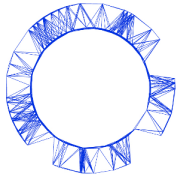


B.6 (0.5 pt)

$V_{GS}$	$R_{DS}$

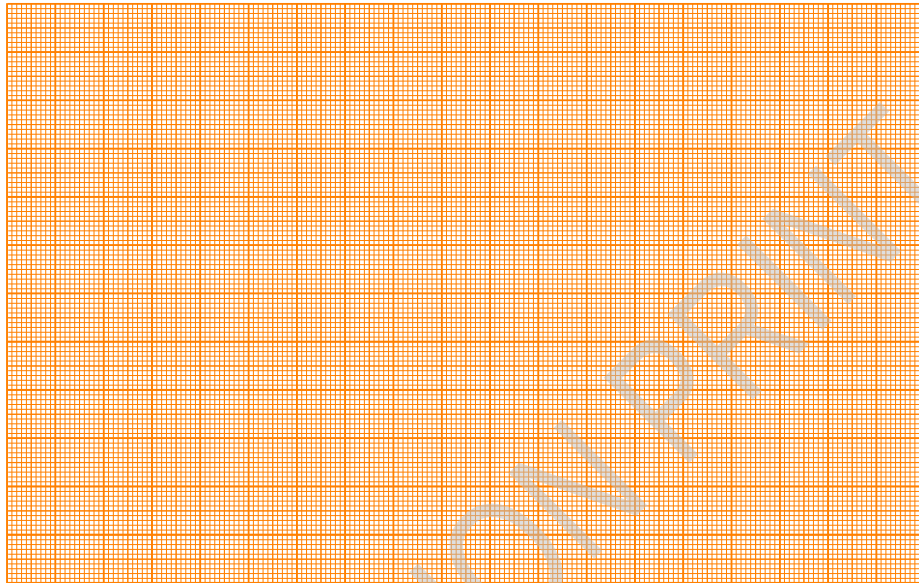
Grafico:  $R_{DS}(V_{GS})$





**B.7** (0.3 pt)

Curva di trasferimento:



**B.8** (0.4 pt)

$I_{DSS} =$

$V_P =$

**B.9** (0.4 pt)

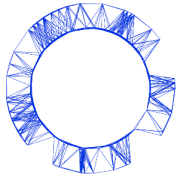
Transconduttanza misurata:  $g =$

Transconduttanza calcolata dal modello JFET:  $g =$

# A1-12

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$$I_{\text{closed}} =$$
[illegible]



**C.2** (1.2 pt)

Grafico:  $I_{DS}(t)$

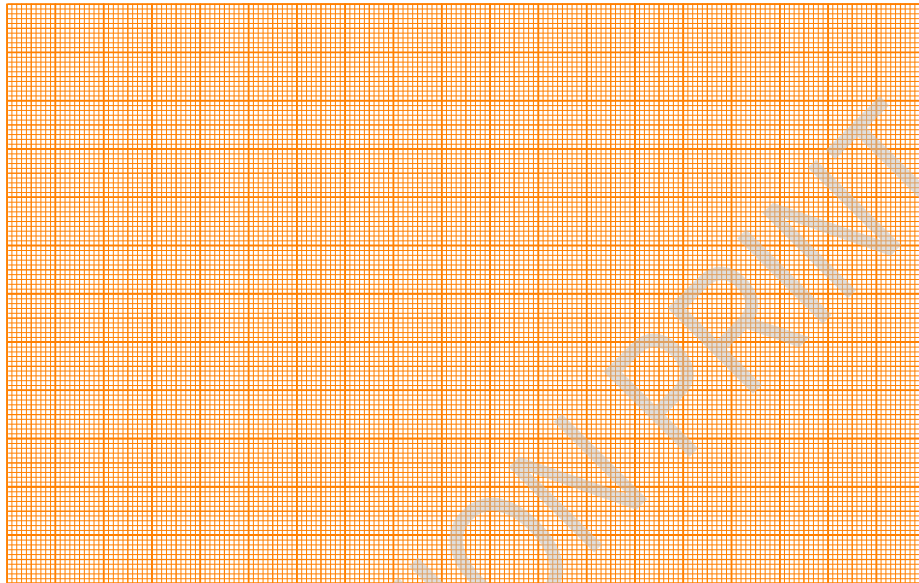
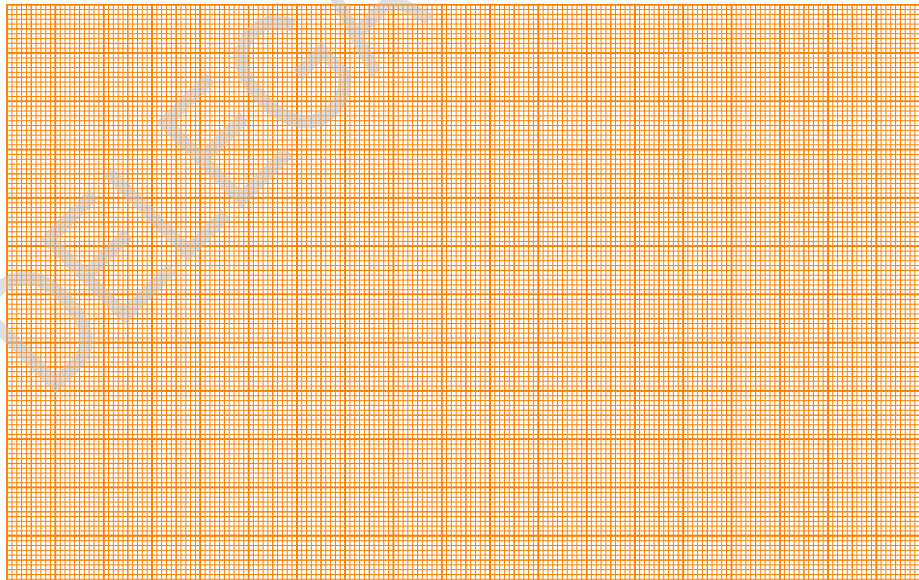


Grafico ulteriore per determinare  $\tau_1$ :

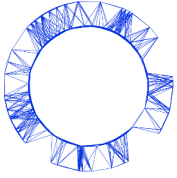


$\tau_1 =$

**A1-14**  
Italian (Italy)

**D.1** (0.5 pt)

$$R_{\mathrm{L}} =$$
[illegible]



**D.2** (0.5 pt)

Grafico:  $V_{\text{out}}(V_{\text{in}})$

