

Datos de Laboratorio de las otras prácticas de las que no se hizo informe (Bomba de Calor y Placa Solar) como prueba de asistencia a laboratorio.

Placa Solar:

Datos tomados en forma de matrices en python de forma directa, los datos crudos tomados son los siguientes.

```
#Datos placa solar (metros)
ancho = 28.8/100
alto = 38.8/100

S = ancho * alto

#Distancia foco-placa solar
d = 0.75 #metros

#Volumen agua depósito auxiliar
V_ac = 7.4 #litros
rho_agua = .997 #g/cm³

m_ac = V_ac * rho_agua
print(f"Superficie (S): {S:1.3f} m²\nMasa agua depósito auxiliar
(m_ac): {m_ac:1.3f} kg")

#Datos constantes
c_p_normal = 4.18
c_p_destilada = 4.186
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```
# [tiempo (min), (T2-T1), T3]
primer_caudal_rpm = 150 #rpm
primer_caudal = 150 #ml/min 148 y 152 la media es 150
primer_set = np.array([[0, 1.6, 17.73], [1, 3.0, 17.77], [2, 3.5,
17.85], [3, 3.1, 17.89], [4, 3.1, 17.94], [5, 3.2, 17.99], [6, 3.4,
18.06], [7, 3.2, 18.13], [8, 3.7, 18.19], [9, 4.1, 18.24], [10, 4.5,
18.29], [11, 4.8, 18.37], [12, 5.1, 18.49], [13, 5.3, 18.55], [14, 5.4,
18.62], [15, 5.5, 18.68], [16, 5.7, 18.76], [17, 5.8, 18.85], [18, 5.9,
18.96], [19, 6.0, 19.05], [20, 6.0, 19.14], [21, 6.1, 19.27], [22, 6.2,
19.33], [23, 6.2, 19.46], [24, 6.2, 19.57], [25, 6.4, 19.66], [26, 6.3,
19.76], [27, 6.4, 19.85], [28, 6.4, 19.96], [29, 6.4, 20.04], [30, 6.4,
20.15], [31, 6.4, 20.26], [32, 6.4, 20.40], [33, 6.4, 20.48], [34, 6.5,
20.59]])
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segundo_caudal_rpm = 120 #rpm
segundo_caudal = 125 #ml/min
segundo_set = np.array([[35, 6.8, 20.71], [36, 7.1, 20.80], [37, 7.2,
20.86], [38, 7.2, 20.98], [39, 7.3, 21.06], [40, 7.5, 21.14], [41, 7.5,
21.24], [42, 7.6, 21.32], [43, 7.6, 21.40], [44, 7.6, 21.52], [45, 7.6,
21.60], [46, 7.7, 21.68], [47, 7.7, 21.80], [48, 7.7, 21.87], [50, 7.7,
22.07], [51, 7.7, 22.15], [52, 7.7, 22.27], [53, 7.7, 22.33], [54, 7.7,
22.45], [55, 7.7, 22.53], [56, 7.7, 22.62]])

tercer_caudal_rpm = 90 #rpm
tercer_caudal = 97 #ml/min
tercer_set = np.array([[58, 8.7, 22.78], [59, 8.9, 22.84], [60, 9.0,
22.92], [61, 9.1, 23.03], [62, 9.2, 23.10], [63, 9.4, 23.18], [64, 9.3,
23.25], [65, 9.4, 23.32], [66, 9.4, 23.39], [67, 9.5, 23.49], [68,
9.4, 23.55], [69, 9.5, 23.63], [70, 9.6, 23.74], [71, 9.5, 23.80], [72,
9.6, 23.89], [73, 9.6, 23.98], [74, 9.6, 24.05], [75, 9.7, 24.12], [76,
9.6, 24.18], [77, 9.6, 24.27], [78, 9.7, 24.35], [79, 9.7, 24.42], [80,
9.6, 24.51], [81, 9.7, 24.58], [82, 9.7, 24.66], [83, 9.6, 24.76], [84,
9.7, 24.82], [85, 9.7, 24.91]])

cuarto_caudal_rpm = 60 #rpm
cuarto_caudal = (58 + 68)/2 #ml/min
cuarto_set = np.array([[86, 9.7, 24.96], [87, 10.9, 25.02], [88, 11.4,
25.08], [89, 11.8, 25.12], [90, 12.0, 25.18], [91, 12.2, 25.24], [92,
12.2, 25.31], [93, 12.4, 25.35], [94, 12.6, 25.40], [95, 12.7, 25.48],
[96, 12.8, 25.52], [97, 12.9, 25.59], [98, 13.0, 25.65], [99, 13.0,
25.72], [100, 13.1, 25.75], [101, 13.1, 25.84], [102, 13.2, 25.88],
[103, 13.2, 25.93], [104, 13.2, 26.00], [105, 13.2, 26.07], [106, 13.3,
26.14], [107, 13.3, 26.18], [108, 13.3, 26.25], [109, 13.3, 26.31],
[110, 13.4, 26.39], [111, 13.3, 26.43], [112, 13.4, 26.49]])

quinto_caudal_rpm = 40 #rpm
quinto_caudal = 42
quinto_set = np.array([[113, 13.2, 26.55], [114, 14.1, 26.60], [115,
14.9, 26.67], [116, 15.3, 26.69], [117, 15.4, 26.74], [118, 15.7,
26.76], [119, 15.9, 26.82], [120, 16.1, 26.83], [121, 16.3, 26.90],
[122, 16.4, 26.93], [123, 16.5, 26.95], [124, 16.7, 27.01], [125, 16.8,
27.05], [126, 16.8, 27.08], [127, 17.0, 27.11], [128, 17.1, 27.15],
[129, 17.2, 27.19], [130, 17.2, 27.23], [131, 17.2, 27.30], [132, 17.4,
27.34], [133, 17.4, 27.40], [134, 17.5, 27.42], [135, 17.5, 27.46],
[136, 17.6, 27.53], [137, 17.6, 27.55], [138, 17.7, 27.59], [139, 17.7,
27.65], [140, 17.7, 27.70], [141, 17.7, 27.73], [142, 17.9, 27.78],
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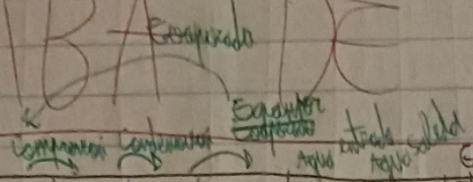
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[143, 17.9, 27.81], [144, 17.8, 27.85], [145, 17.9, 27.90], [146, 17.9, 27.94], [147, 17.9, 27.98], [148, 17.9, 28.06], [149, 17.9, 28.08], [150, 17.9, 28.11], [151, 17.9, 28.16], [152, 17.9, 28.18], [153, 17.9, 28.25], [154, 17.9, 28.28]]
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Bomba de Calor:

LAB TERMO

BOMBA DE CALOR

T (°C)
W (W)
P (Bar)
1 min termometer



±50 ±25

50 g/s

Caudal

Caudal 40 g/s

Caudal 30 g/s

Medida	Minuto	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T _{uno1}	T _{uno2}	W	P _{com}	P _{exp}
1	0:00	14.5	56.3	24.1	4.9	20.1	26.1	17.7	12.7	262	600	250
2	2:00	14.5	56.5	24.6	5.1	20.2	26.0	17.7	12.7	262	600	250
3	4:00	14.5	56.6	24.6	5.0	20.2	26.1	17.5	12.5	261	600	250
4	6:00	14.5	56.7	24.7	5.1	20.3	26.1	17.6	12.4	262	600	250
5	8:00	14.5	56.8	24.8	5.1	20.3	26.3	17.7	12.6	263	600	250
6	10:00	14.6	56.9	24.9	5.2	20.5	26.5	18.0	12.9	264	600	250
7	12:00	14.6	57.0	25.0	5.2	20.5	26.5	18.4	13.0	265	600	250
8	14:00	14.7	57.1	25.0	5.2	20.6	26.5	17.9	12.9	265	600	250
9	16:00	14.7	57.1	25.0	5.2	20.5	26.4	18.0	12.8	265	600	250
1	0:00	14.7	57.3	25.4	5.6	21.5	28.8	18.2	13.0	274	650	250
2	2:00	14.6	57.9	27.2	6.3	21.9	29.7	18.0	12.8	270	700	250
3	4:00	14.6	58.1	27.4	5.7	21.8	29.1	17.6	12.5	267	675	250
4	6:00	14.7	58.2	27.3	5.7	21.9	29.2	18.0	12.6	269	675	250
5	8:00	14.7	58.3	27.4	5.7	22.0	29.3	18.0	12.6	270	675	250
6	10:00	14.7	58.3	27.6	5.8	22.1	29.4	18.0	12.7	271	675	250
7	12:00	14.9	58.5	27.7	5.9	22.3	29.9	18.3	12.7	273	700	250
8	14:00	14.9	58.6	27.9	6.0	22.3	29.7	18.0	12.7	272	700	250
9	16:00	15.0	58.7	27.9	6.1	22.3	29.7	18.5	13.0	273	700	250
10	18:00	15.1	58.7	28.0	6.1	22.5	29.9	18.3	13.0	272	700	250
1	0:00	15.1	58.9	28.3	6.4	23.6	32.8	18.1	13.1	280	750	275
2	2:00	14.9	59.8	30.9	7.2	24.1	34.0	18.4	13.4	285	775	275
3	4:00	15.0	60.2	31.6	7.1	24.2	34.1	18.6	13.5	286	800	275
4	6:00	15.1	60.4	31.9	7.2	24.6	34.6	19.0	13.6	287	800	275
5	8:00	15.4	60.7	32.2	7.4	24.7	34.7	19.0	13.7	287	800	275
6	10:00	15.5	60.8	32.5	7.5	25.0	35.2	19.0	13.6	288	800	275
7	12:00	15.7	61.1	32.7	7.3	25.1	34.9	19.2	13.7	289	800	275
8	14:00	15.7	61.2	32.6	7.3	25.2	35.1	19.0	14.0	288	800	275

Medida	Minuto	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T _{ave1}	T _{ave2}	W	P _{med}	P _{perm}
9	16:00	15.7	61.5	32.9	7.5	25.3	35.2	18.9	14.1	291	800	275
10	18:00	15.8	61.6	33.1	7.6	25.5	35.5	19.0	14.0	288	800	275
11	20:00	15.9	61.8	33.1	7.6	25.5	35.4	19.0	14.1	288	800	275
12	22:00	15.9	61.9	33.2	7.6	25.8	35.8	19.4	14.2	290	800	275

Caudal 20 g/s

1	0:00	15.8	62.2	33.6	8.0	27.0	39.9	18.8	14.3	308	950	275
2	2:00	15.8	64.1	38.1	8.5	28.2	43.1	18.8	14.7	315	1000	275
3	4:00	15.8	65.1	39.5	8.5	28.8	43.6	19.3	14.7	317	1000	275
4	6:00	15.8	65.8	40.0	8.5	29.3	44.1	19.5	14.9	317	1000	275
5	8:00	15.8	66.4	40.6	8.5	29.5	44.6	19.1	14.8	316	1050	275
6	10:00	15.9	66.8	40.8	8.5	29.6	44.6	19.2	14.9	317	1050	275
7	12:00	16.0	67.2	41.1	8.6	29.6	45.0	19.2	15.1	320	1050	300
8	14:00	16.1	67.5	41.3	8.8	29.6	45.0	19.5	15.1	321	1050	300
9	16:00	16.2	67.8	41.3	8.8	29.8	45.2	19.5	15.0	321	1050	300
10	18:00	16.0	68.0	41.5	8.8	29.8	45.1	20.3	15.0	321	1050	300
11	20:00	16.1	68.1	41.3	8.8	29.6	44.8	19.6	15.2	320	1050	300
12	22:00	16.2	68.2	41.4	8.8	29.7	45.0	19.7	15.3	320	1050	300
13	24:00	16.3	68.4	41.3	8.9	29.7	44.9	19.6	15.1	321	1050	300
14	26:00	16.3	68.3	41.1	8.9	29.6	44.8	20.0	15.0	319	1050	300
15	28:00	16.3	68.5	41.2	9.0	29.6	44.9	19.9	15.0	319	1050	300
16	30:00	16.2	68.5	41.3	9.0	29.6	44.9	20.3	15.2	319	1050	300
17	32:00	16.3	68.6	41.1	9.0	29.6	44.8	20.3	15.3	318	1050	300
18	34:00	16.3	68.6	41.2	9.0	29.7	45.0	19.6	15.3	323	1050	300
19	36:00	16.2	68.7	41.2	8.9	29.7	44.9	19.5	15.3	323	1050	300

Caudal 10 g/s

1	0:00	16.2	69.3	41.3	9.3	29.6	53.0	19.3	15.5	356	1350	300
2	2:00	16.0	73.4	49.4	9.7	32.0	60.2	20.0	15.9	372	1500	300
3	4:00	16.4	76.2	53.5	9.8	32.5	61.9	20.0	16.0	377	1500	300
4	6:00	16.5	77.7	54.9	9.9	32.8	62.7	20.0	16.0	379	1550	300
5	8:00	16.5	78.4	54.9	10.0	32.9	62.9	20.3	15.9	378	1550	300
6	10:00	16.6	79.1	55.2	10.1	33.0	63.0	19.6	16.1	378	1550	300
7	12:00	16.6	79.7	55.4	10.0	33.1	63.6	19.8	16.1	381	1550	300
8	14:00	16.6	80.2	55.6	10.1	33.1	63.6	19.4	16.2	378	1550	300
9	16:00	16.6	80.5	55.6	10.1	33.1	63.7	19.6	16.2	381	1550	300
10	18:00	16.5	80.8	55.7	10.0	33.1	63.8	20.1	16.2	380	1550	300
11	20:00	16.7	81.2	55.7	10.2	33.1	64.1	21.0	16.4	382	1550	300

Medida	Minuto	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T _{av1}	T _{av2}	W	Prond	Pesaj
12	22:00	16.7	81.5	56.0	10.3	33.1	64.5	20.2	16.3	382	1600	300
13	24:00	16.9	81.9	56.3	10.4	33.2	64.8	20.1	16.2	381	1600	300
14	26:00	16.6	82.2	56.4	10.2	33.2	64.5	19.7	16.6	380	1550	300
15	28:00	16.5	82.3	56.0	10.1	33.1	64.5	19.7	16.2	380	1550	300
16	30:00	16.7	82.4	56.2	10.2	33.2	65.1	19.8	16.3	382	1600	300
17	32:00	16.5	82.8	56.6	10.1	33.2	65.0	20.2	16.2	379	1550	300
18	34:00	16.7	82.9	56.2	10.2	33.3	64.4	19.8	16.5	380	1550	300

T₂ la cuenta por punto
de comparación inestable