

F Y B Tech SEM I 2021-22  
Engineering Physics Lab Course

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**Experiment No.: 9**  
**Title: Thermocouple - Seebeck Effect**

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**Aim:** To verify the relation between thermo emf of a thermocouple and temperature difference between two hot junctions

**Apparatus:** 2 thermocouple junctions (measurement & resistance), thermocouple wires (according to the type), multimeter/voltmeter, thermometer, water

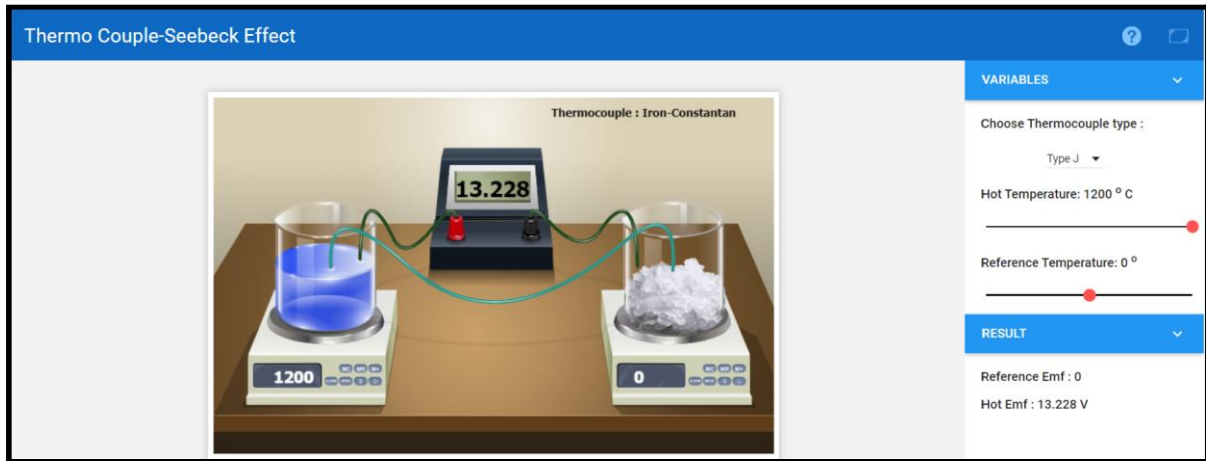
**Observation Table:**

Thermocouple type: Type J (Iron-Constantan)  
Reference Temperature: 273 K  
Reference EMF: 0 V

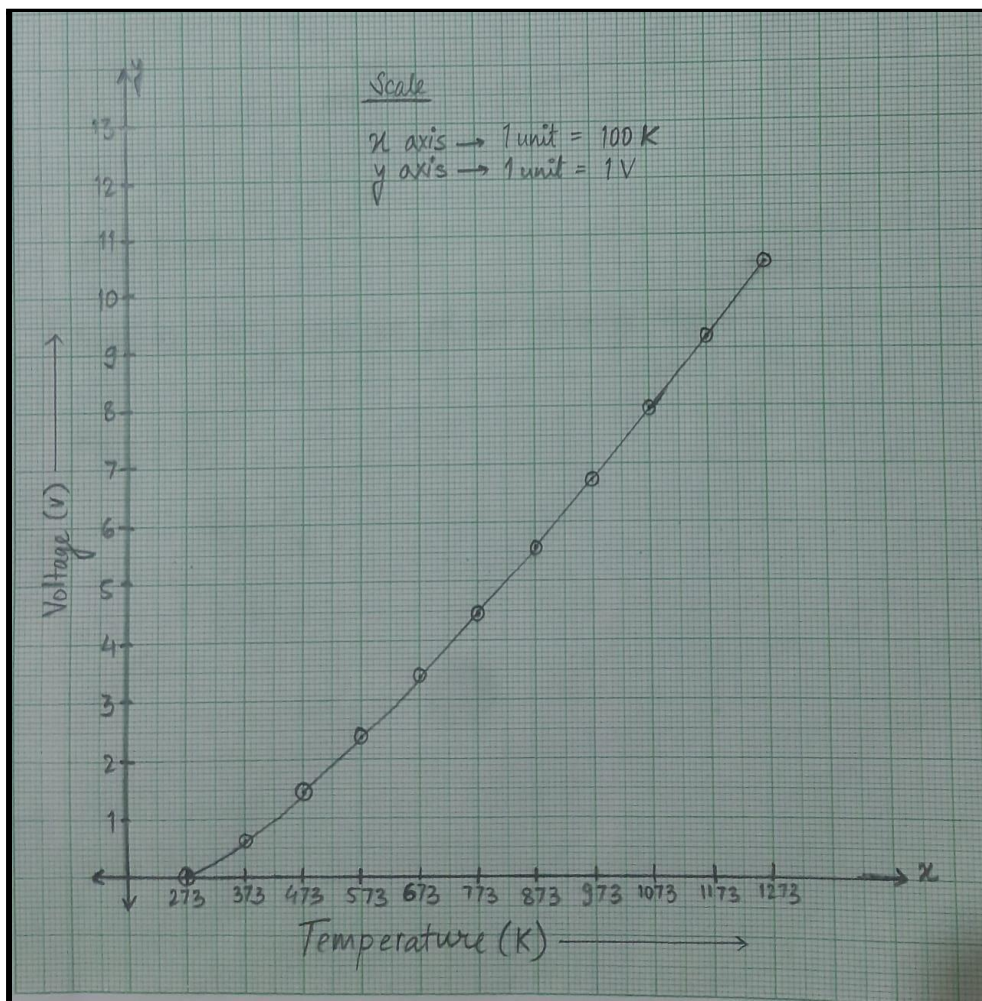
## Observation Table:

Sr. No.	Temperature (C)	Temperature (K)	Voltage (V)
1	0	273	0
2	100	373	0.647
3	200	473	1.469
4	300	573	2.391
5	400	673	3.408
6	500	773	4.471
7	600	873	5.583
8	700	973	6.743
9	800	1073	7.950
10	900	1173	9.205
11	1000	1273	10.506
12	1100	1373	11.850
13	1200	1473	13.228

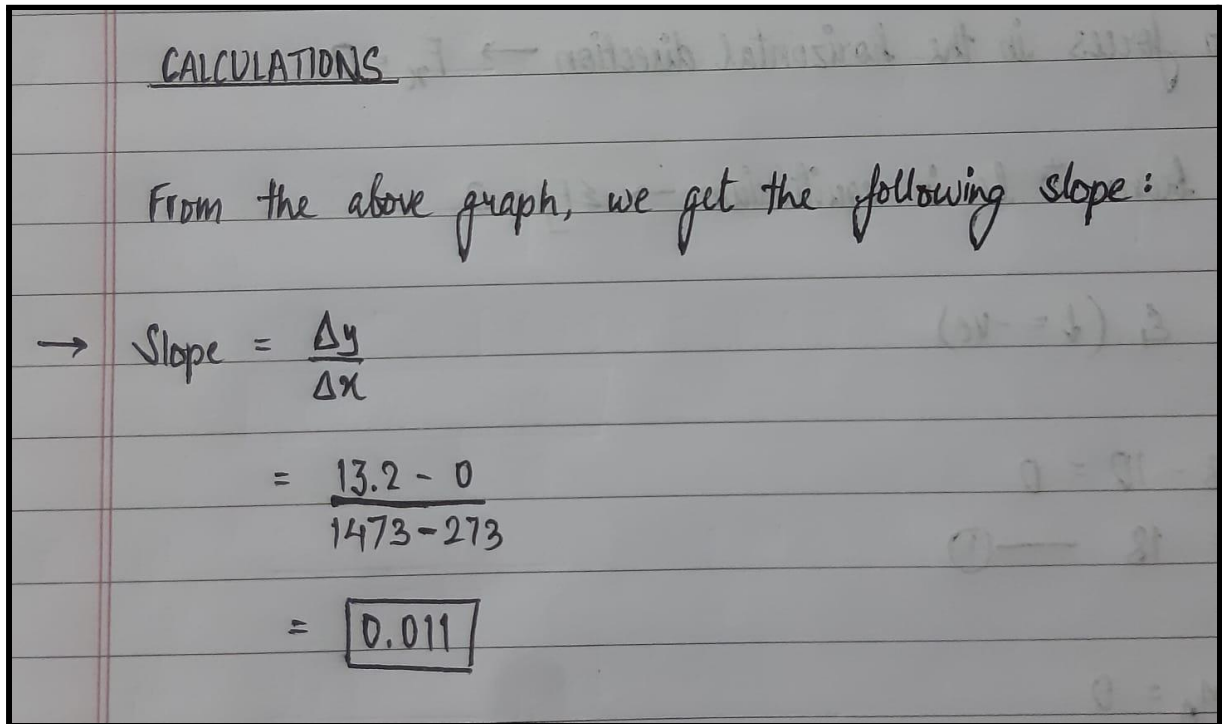
## Screenshot of an experimental set up:



## Graph:



**Calculations:**



A photograph of a piece of lined paper with handwritten calculations. The word 'CALCULATIONS' is underlined at the top. Below it, the text 'From the above graph, we get the following slope:' is written. Then, the formula for slope is given as  $\text{Slope} = \frac{\Delta y}{\Delta x}$ . This is followed by the calculation  $= \frac{13.2 - 0}{1473 - 273}$ . The final result, 0.011, is enclosed in a rectangular box.

CALCULATIONS

From the above graph, we get the following slope:

→  $\text{Slope} = \frac{\Delta y}{\Delta x}$

$= \frac{13.2 - 0}{1473 - 273}$

$= \boxed{0.011}$

**Results and conclusion:**

1. The relation between voltage and temperature is somewhat linear.
  2. The slope obtained from the graph = 0.011
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