EE344
Electronic Design Lab
Lab Report
TUE-JJ-9-1

Mayur Ware, 19D070070
Siddhant Shingade, 19D070057
Rushikesh Metkar, 19D070034

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Selection of Temperature Sensor :

The most important work to do for us in this week was to choose the sensor. The important factors to consider while choosing the sensor were :
- The Dark Current
- Output range (this should be well above the input bias voltage of the Op-amp to avoid the errors)
- Temperature range
- Dimensions of the sensor
- Low noise voltage

So, after looking at various options, we shortlisted two sensors :

1) TS305-11C55

2) ISB-TS45H

We will select and order the sensor after looking at the price and availability. We will inform the same with the WEL TAs and Prof. J. John.

Selection of Amplifying Op-amp :

As discussed before, selection of Op-amp is very important as we have to deal with the very low output voltages of the sensor. Output of sensor typically ranges in few mAmps, so the input offset voltage of the Op-amp should be very low compared to this range. The Op-amp should have low input bias current, low voltage and currents drifts and also low noise voltage. We have shortlisted some Op-amps matching the specifications. Luckily, we got an Op-amp **OP07CP** in the WEL only.

	Opamp	V_{off} (at 25°)	I_{bias}	Price
1)	OP07E	75μV ↳ 1.3 μV/c°	3·8nA	₹20
2)	OP177F	25μV ↳ 0·3μV/°c	2nA	₹107
3)	OP177G	60μV ↳ 1·2μV/°c	2·8nA	
4)	INA126	250μV ↳ 3μV/°c	25nA	₹399
5)	OPAx990	300μV ↳ 0·6μV/°c	20mA	₹1K4

Photodiode based Temperature Sensor :

As instructed by prof. J. John in the previous lab, we built a photodiode based temperature sensor circuit to observe the output and also verified the working of OP07CP Op-amp.
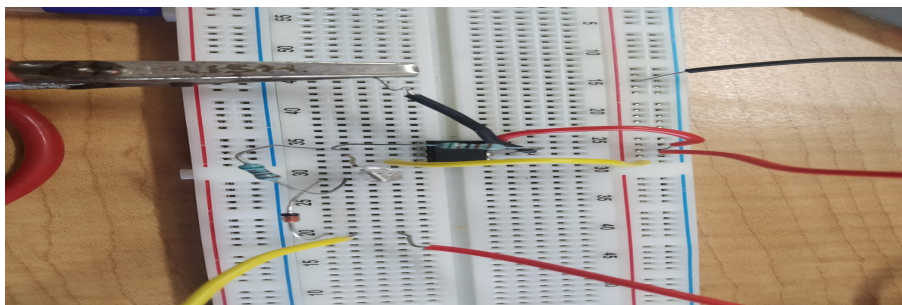
The experiment was successful as we clearly noticed the variation in output by varying the conditions. We plan to replace the Photodiode by the sensor for our project as photodiode has poor working abilities with temperature variations.