

EXPERIMENT NO. 4

TITLE: Study of op-amp as a differential amplifier

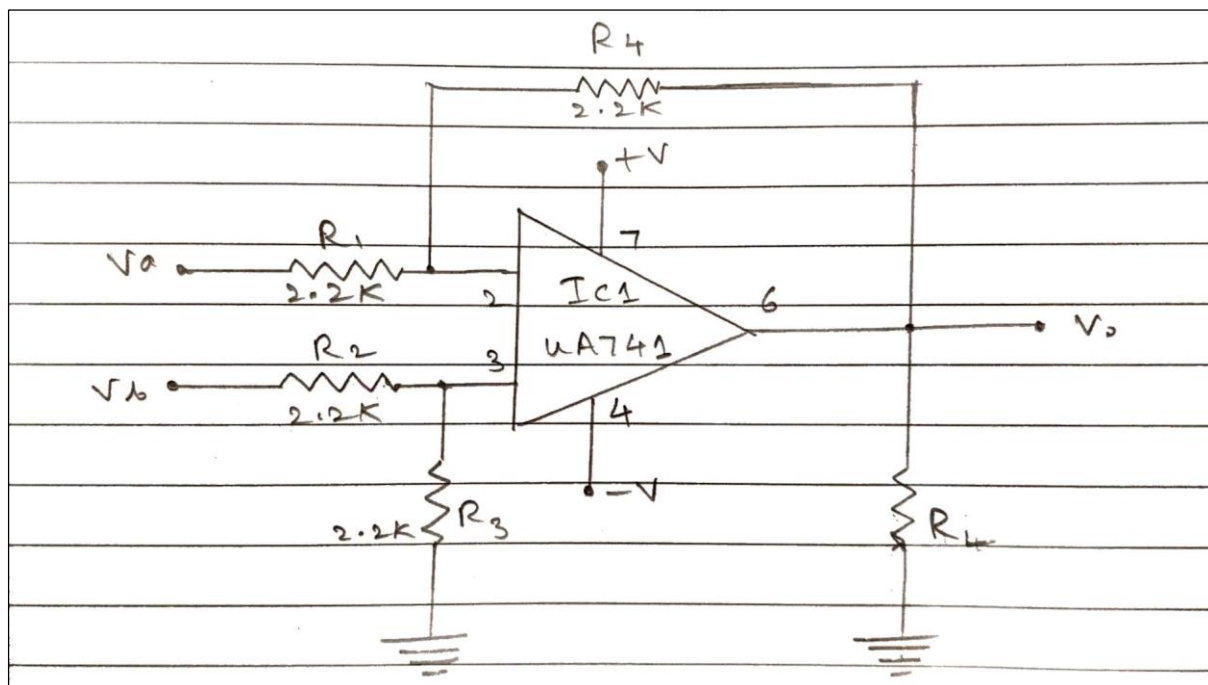
OBJECTIVE: To study op-amp as a differential amplifier and observing its output at noisy signal common to both input terminal.

APPARATUS:

Sl. No.	Instruments/Apparatus	Instrument Serial No.	Range	Quantity
1	Experiment Board, ST2322	OP AMP CH TK – IIT(ISM)/EE/SE/ANG/2012-13/06	110-220 V $\pm 10\%$, 50/60 Hz	1
2	Multi meter	DMM MECO-IIT(ISM)/EE/SE/ANG/2019-20/06	0-5 V	1
3	Patch Cords	-	-	4

SETUP DIAGRAM:

Circuit Diagram of Op-amp as a differential amplifier is shown below:



DATA SHEET:

23JE0145					
Observation Table : .					
S.no.	Input Voltage (+ve) V_1	Input Voltage (-ve) V_2	Output Voltage (V_{out}) (measured)	Output Voltage (V_{out}) (calculated)	Error $V_{out} - V_{calc}$
1	2.075	1.024	1.063	1.051	0.012
2	2.528	1.56 1.543	0.965	0.985	-0.020
3	2.863	2.367	0.494	0.496	-0.002
4	3.207	2.364	0.838	0.843	-0.005
5	3.950	2.900	1.047	1.05	-0.003
6	2.858	2.858	-0.002	0.00	-0.002
$V_{out} = V_1 - V_2$					
2.075 - 1.024 = 1.063 V					
2.528 - 1.543 = 0.965 V					
2.863 - 2.367 = 0.494 V					

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8/8/20

RESULTS & COMMENTS:

The measured and calculated values of V_{out} are approximately equal, with an average error of about 0.003 V over six readings. The value of V_{out} was calculated as $V_{out} = V_1 - V_2$.

The errors are due to noise in the input voltages, imperfect grounding, resistor tolerance error, etc. For one of the readings, the input voltages were made exactly same by giving voltage through a single source. The value of V_{out} was found to be -0.002 V, which is very close but not equal to the calculated value of 0, mainly because of resistance tolerance error.