Complex Engineering Problem (CEP)

EE-215 Electronic Devices and Circuits

Project Statement

Design a two channel dc power supply. The power supply should have two separate independent dc outputs. Output1 is variable dc voltage from 2V to 24V and output2 is fixed dc voltage of 5V, with current capability of 1A at each output.

Rubrics

	Unacceptable	Satisfactory	Good
I – Overall topology of the power supply and transformer selection	Unable to identify relevant details based on the required output specifications	Able to select a topology with difficulty and considerable help	Thought of sensible solution based on given specifications with minimal help
II- Design and simulation of Power Supply	Student does not properly design the power supply. Simulations were not consistent with desired output.	Student develops an adequate design with some errors. The design needs some adjustments during the simulations.	Student designed the power supply using proper calculations. Simulations show good consistency with designed values.
III – Breadboard testing of different parts of the power supply	Different potions of the power supply do not	A few parts of the power supply are not performing	Different portions of the power supply are

	function correctly.	adequately and may need a redesign.	functioning as per expectation.
IV – Testing of complete two channel power supply	Power supply output channels are not providing required output voltages in the desired range.	Power supply is providing output voltage at the two channels in the desired range but current capability is not up to desired value.	Power supply is meeting the desired voltage and current output specifications at both output channels.

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The following attributes of Complex Engineering Problems are involved in the project that was given to DE -44 (EE)- A,B,C for EE-215 Electronic Devices and Circuits.

Depth of Knowledge Required (WP1 >>>WK3 WK5): Requires basic knowledge and understanding of engineering fundamentals relating to diodes, rectifiers, peak rectifiers and voltage regulators. Additionally, it requires engineering design like design of peak rectifier and PCB.

Depth of Analysis Required (WP3): To complete the project mathematical analysis is required to find the peak currents and peak inverse voltages across the rectifier diodes. Also voltage drop across the voltage regulators need to be calculated to determine the power dissipation in the regulators.

Familiarity of Issues (WP4): Involve infrequently encountered issues in fabrication and testing for example thermal management of electronic devices, problems because of cold solder joints etc.

Marks Distribution

Problem Development	**Design and Simulation**	**Breadboard testing of different stages**	**Demonstration of Working Power Supply**	**Total**
5	5	7	8	25