

SEE 4433: Power Electronics and Drives: Dr. Zainal Salam
DESIGN No.1

Posted on website: 28/06/2002 (Friday)

Due Date: 08/07/2002 (Monday)

1.0 The Problem

A design company (CrazyDesigner Sdn. Bhd.-CEO: Dr. Zainal Salam) is offering a contract for UTM PE students to design a DC power supply for telecom application. The specifications of the power supply are as follows:

- i) The input is single-phase AC mains with nominal voltage 240V rms (50Hz).
- ii) Output voltage is +32V DC with isolation. Output power is 500W. Output voltage ripple factor must be less than 1%.
- iii) The AC supply fluctuates $\pm 20\%$. Your output voltage must be stable at +32V under all input variations.
- iv) It has to be as light as possible.

2.0 The Design

You are free to choose any topology you like as long as requirements (i) and (ii) and (iii) are satisfied fully. However, since you are competing for the contract, the design will be graded according to its merit. A good design should consider these factors:

- i) Compliance to the specifications
- ii) Equipment weight

3.0 Design Verification

All designs have to be verified using Pspice simulation. You are free to simulate and choose whatever simulation parameters, but grades will be based on how good you make your judgments on simulation techniques. One requirement is **mandatory** though. You need to approximate the power factor of the circuit. Check Mohan or Hart on the formulas.

4.0 Report.

This is the product of your work. A report is due on Monday (8th July). Late submission will be penalised per day basis (20% downgraded per day). The format of the report is as follows:

- i) Cover Page: Designer Name(s), Date, Title
- ii) Objective
- iii) Design philosophy
- iv) Hand calculation
- v) Pspice simulation
- vi) Discussion
- vii) Conclusion.
- viii) Signature

The report is NO MORE than 15 pages long, inclusive of diagrams, with 1 ½ spacing in-between lines. I'm expecting a solid engineering style and grammatically good report. Grammatical errors and lousy sentence structure will be penalised heavily.