Mid-Term Examination

Subject: Power electronic (EE3410E)

Class number: 131544

Lecture: Dr. Nguyen Kien Trung

Industrial Automation department- School of electrical electronic engineering

Hanoi University of science and technology

Requirement:

- Design the converter by assignment.
  Content:
  - ✓ Find the converter requirements based on the application requirements.
  - ✓ Choose the suitable converter topology
  - ✓ Design the converter: calculate and choose the thyristor, transformer, and output filter (if needed)
  - ✓ Verify by Simulation
- Simulation software: Free (Matlab-simulink, PSIM, PSPICE, LTspice,…).
- Make only one A4 page report by English (following the template)
- Submit via email to ee3410trungnk@gmail.com (email subject: mid-term examination submission QT 131544, please address your name and your student ID in the email content) by 18/06/2022. (The Report do not follow the template or submit after the deadline will be rejected)
- Submit the printed version on the class by 19/06/2022.
- Evaluation:
  - ✓ Good design: 5 point
  - ✓ Good simulation and report : 5 point
  - ✓ The reports with a similarity of over 50% will be rejected.

1. Design a thyristor rectifier for DC motor drive:

No	Output Rated power (KW)	Output Rated Voltage (V)	Input voltage source
1	30	440	3x380V,50Hz
2	7,5	220	3x380V,50Hz
3	150	600	3x380V,50Hz
4	2	120	3x380V,50Hz
5	4	100	3x380V,50Hz
6	300	600	3x660V,50Hz
7	12	220	3x380V,50Hz
8	18	440	3x380V,50Hz
9	5	100	3x380V,50Hz
10	3	100	3x380V,50Hz

2. Design a thyristor rectifier for a battery charger

No	Battery Rated Voltage (V)	Battery capacity (Ah)	Input voltage source
1	360	7	3x380V,50Hz
2	480	100	3x380V,50Hz
3	240	25	3x380V,50Hz
4	120	100	3x380V,50Hz
5	600	110	3x380V,50Hz
6	720	4,5	3x380V,50Hz
7	120	140	3x380V,50Hz
8	360	40	3x380V,50Hz
9	240	50	3x380V,50Hz
10	120	600	3x380V,50Hz

3. Design a thyristor rectifier for a DC arc welder

No	Open output Voltage (V)	Output Rated Current (A)	Input voltage source
1	40	500	3x380V,50Hz
2	50	750	3x380V,50Hz
3	60	800	3x380V,50Hz
4	75	1600	3x380V,50Hz
5	45	1000	3x380V,50Hz
6	65	600	3x380V,50Hz
7	55	1500	3x380V,50Hz
8	70	2000	3x380V,50Hz
9	50	1800	3x380V,50Hz
10	80	2500	3x380V,50Hz

4. Design a thyristor rectifier for electroplating technology

No	Output Rated Voltage (V)	Output Rated Current (A)	Input voltage source
1	24	3600	3x380V,50Hz
2	36	2400	3x380V,50Hz
3	12	5000	3x380V,50Hz
4	120	3000	3x380V,50Hz
5	110	15000	3x380V,50Hz
6	24	10000	3x380V,50Hz
7	24	8000	3x380V,50Hz
8	36	4000	3x380V,50Hz
9	120	6000	3x380V,50Hz
10	24	18000	3x380V,50Hz

5. Design a thyristor rectifier for Electrolysis applications in the Extraction of Metals

No	Output Rated Voltage (V)	Output Rated Current (A)	Input voltage source
1	16	1000	3x380V,50Hz
2	24	1500	3x380V,50Hz
3	12	3000	3x380V,50Hz
4	18	2000	3x380V,50Hz
5	24	10000	3x380V,50Hz
6	16	15000	3x380V,50Hz
7	18	24000	3x380V,50Hz
8	24	8000	3x380V,50Hz
9	24	6000	3x380V,50Hz
10	16	2500	3x380V,50Hz