Unit 9 - Week 8

Course outline

How does an NPTEL online course work?

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Week 2

Week 3

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Week 7

Week 8

- Power factor
- Capacitor commutated converter: Part 1
- Capacitor commutated converter: Part 2
- 12 pulse LCC: Part 1
- 12 pulse LCC: Part 2
- Quiz : Assignment 8
- Week 8 Feedback

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Assignment Solution

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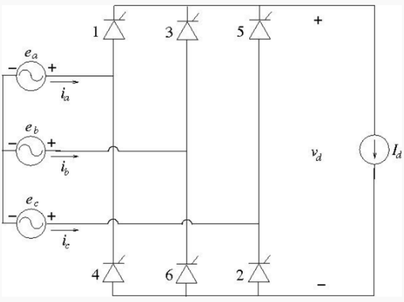
Assignment 8

The due date for submitting this assignment has passed. **Due on 2020-03-25, 23:59 IST.**
As per our records you have not submitted this assignment.

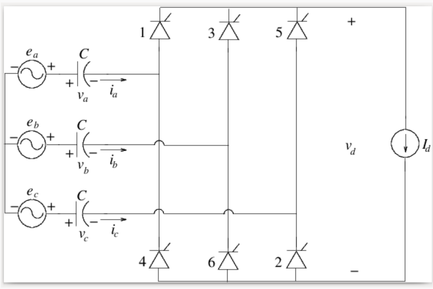
1) What is the power factor at the AC side terminals of line commuted converter shown in the figure below? e_a, e_b, and e_c are balanced sinusoidal voltages, and I_d is constant. Delay angle $\alpha = 30^\circ$. (Give the answer after rounding off to 3 significant figures.)



No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.826,0.828

2 points

Questions 2, 3, and 4 are on the capacitor commutated converter shown in the figure below where $e_a = \sqrt{\frac{2}{3}}V\sin(\omega_s t + 150^\circ)$, $e_b = \sqrt{\frac{2}{3}}V\sin(\omega_s t + 30^\circ)$, and $e_c = \sqrt{\frac{2}{3}}V\sin(\omega_s t - 90^\circ)$, and I_d is constant. The average value of v_a, the average value of v_b, and the average value of v_c are zero.



2) What is the duration, in degree, for which each valve conducts?

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 120

1 point

3) If $V = 400$ kV, $\omega_s = 100\pi$ radian/s, $I_d = 2$ kA, and delay angle $\alpha = 170^\circ$, what is the value of C in mF so that the commutation margin angle $\xi = 20^\circ$? (Give the answer after rounding off to 3 significant figures.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.112,0.114

3 points

4) If $V = 400$ kV and delay angle $\alpha = 40^\circ$, what is the average value of the DC side voltage v_d in kV?
(Give the answer after rounding off to 4 significant figures.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 412.6,415.0

1 point

5) The three phase voltage at the AC side terminals of the 12 pulse line commutated converter is balanced and sinusoidal, and the wye-wye connected **1 point** and wye-delta connected transformers are ideal. Which of the following sentences is/are correct?

- The three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-wye connected transformer and the three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-delta connected transformer have the same magnitude.
- The three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-wye connected transformer and the three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-delta connected transformer do not have the same magnitude.
- The three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-wye connected transformer and the three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-delta connected transformer are in phase.
- The three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-wye connected transformer and the three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-delta connected transformer are not in phase.

No, the answer is incorrect.
Score: 0
Accepted Answers:
The three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-wye connected transformer and the three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-delta connected transformer have the same magnitude.
The three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-wye connected transformer and the three phase voltage at the AC side terminals of the 6 pulse line commutated converter connected to the wye-delta connected transformer are not in phase.

6) The three phase voltage at the AC side terminals of the 12 pulse line commutated converter is balanced and sinusoidal, and the wye-wye connected **1 point** and wye-delta connected transformers are ideal. The current on the DC side is constant. The order h of the harmonic components in the AC side currents is given by _____.

- $h = 3, 5, 7, \ldots$
- $h = 6k, k = 1, 2, 3, \ldots$
- $h = 6k \pm 1, k = 1, 2, 3, \ldots$
- $h = 12k, k = 1, 2, 3, \ldots$
- $h = 12k \pm 1, k = 1, 2, 3, \ldots$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$h = 12k \pm 1, k = 1, 2, 3, \ldots$

7) The three phase voltage at the AC side terminals of the 12 pulse line commutated converter is balanced and sinusoidal, and the wye-wye connected **1 point** and wye-delta connected transformers are ideal. The current on the DC side is constant. The order h of the harmonic components in the DC side voltage is given by _____.

- $h = 3, 5, 7, \ldots$
- $h = 6k, k = 1, 2, 3, \ldots$
- $h = 6k \pm 1, k = 1, 2, 3, \ldots$
- $h = 12k, k = 1, 2, 3, \ldots$
- $h = 12k \pm 1, k = 1, 2, 3, \ldots$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$h = 12k, k = 1, 2, 3, \ldots$