

Unit 6 - Week 5

Course outline

How does an NPTEL online course work?

Week 1

Week 2

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Week 4

Week 5

● Modular Multilevel Converter - Topology and Operation

● Modular Multilevel Converter - Arm and Cell Voltage Ratings

● Modular Multilevel Converter - Arm Currents

● Lecture Slides Week 5

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Week 6

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Assignment 5

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-03-04, 23:59 IST.

1) The primary advantage of Modular Multilevel Converter (MMC) over Cascaded H-Bridge (CHB) is 1 point

- Modularity
- Scalability
- Absence of rectifier fed isolated DC bus
- Low dv/dt

No, the answer is incorrect. Score: 0

Accepted Answers: Absence of rectifier fed isolated DC bus

2) The primary reason for including the arm inductor in MMC is to 1 point

- Improve voltage gain
- Limit the fault current
- Balance capacitor voltages
- Improve current gain

No, the answer is incorrect. Score: 0

Accepted Answers: Limit the fault current

3) An MMC is working as AC-DC rectifier with half bridge cells. The peak of the AC phase voltage is V_m and the DC bus voltage is E . Which of the following is true? 1 point

- $V_m \leq E/2$
- $V_m \geq E/2$
- $V_m = E$
- $V_m = 2E$

No, the answer is incorrect. Score: 0

Accepted Answers: $V_m \leq E/2$

4) The main function of the circulating current in MMC is to 1 point

- Minimize switching losses
- Maintain energy balance between DC and AC side
- Minimize switching frequency harmonics
- Improve output voltage quality

No, the answer is incorrect. Score: 0

Accepted Answers: Maintain energy balance between DC and AC side

5) Which of the following statements about the arm current in an MMC is most appropriate? 1 point

- It has only DC
- It has only fundamental AC component
- It has DC and switching frequency harmonics
- It has DC, fundamental AC and second harmonic component

No, the answer is incorrect. Score: 0

Accepted Answers: It has DC, fundamental AC and second harmonic component

Question (From 6 to 10)

An MMC based 3 phase DC-AC converter has 100 half bridge power cells in each arm and feeds a 50 Hz grid. The DC bus voltage is 500 kV, power output of the converter is 200 MW, power factor is 0.9 and modulation index of each arm voltage is 0.9 when sinusoidal PWM is used. Assume the converter is ideal and there is negligible drop across the arm inductors. Assume safety factor=1.

6) What is the voltage rating of each cell? 1 point

- 4kV
- 2kV
- 1kV
- 5kV

No, the answer is incorrect. Score: 0

Accepted Answers: 5kV

7) What is the number of levels present each arm voltage? 1 point

- 101
- 201
- 100
- 200

No, the answer is incorrect. Score: 0

Accepted Answers: 101

8) The magnitude of output fundamental AC rms current is closest to 1 point

- 400A
- 232A
- 465A
- 133A

No, the answer is incorrect. Score: 0

Accepted Answers: 465A

9) The magnitude of DC current flowing in each upper arm is closest to 1 point

- 113A
- 133A
- 400A
- 121A

No, the answer is incorrect. Score: 0

Accepted Answers: 133A

10) The magnitude of the fundamental AC rms current flowing in each upper arm is closest to 1 point

- 465A
- 232A
- 400A
- 133A

No, the answer is incorrect. Score: 0

Accepted Answers: 232A