

Unit 2 - Week 1

Course outline

How does an NPTEL online course work?

Week 1

- Basic Understanding of Converter (Introduction to Power Converters)
- Basic Understanding of Converter (Half Bridge and Full Bridge Circuit Operation)
- Basic Understanding of Converter (Sinusoidal Pulse width Modulation and Three Phase Circuit)
- Basic Understanding of Converter (Harmonics in Sinusoidal PWM)
- Quiz : Assignment 1
- Lecture Slides Week 1
- Week 1 Feedback Form

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Download Videos

Assignment Solutions

Text Transcripts

Assignment 1

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

Due on 2020-02-12, 23:59 IST.

Q 1. A full bridge converter given in Fig. 1 is used to supply 800 W and 600 VAR to a load at 50 Hz fundamental frequency using SPWM technique. The carrier frequency (f_s) and the modulation index (m) are 5 kHz and 0.9 respectively. The dc link voltage of the full bridge circuit is 400 V.

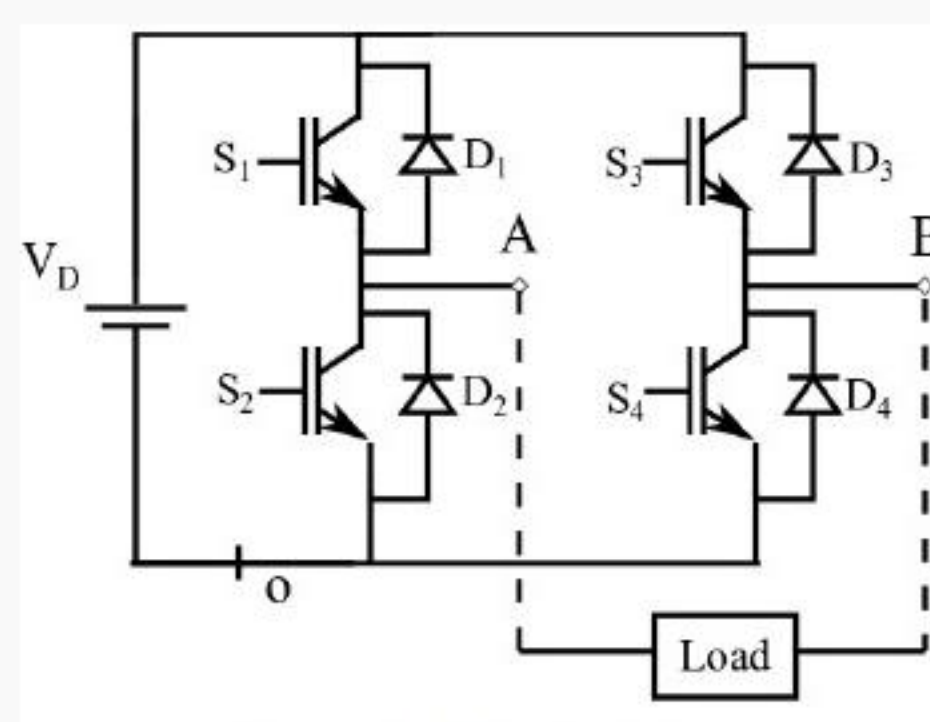


Fig. 1: Full bridge converter

1) The fundamental rms value of V_{AB} is,

- 234.56 V
 244.56 V
 254.56 V
 264.56 V

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 254.56 V

1 point

2) The value of resistor and inductor in the load is,

- 51.82 ohm, 0.124 H
 51.82 ohm, 0.164 H
 58.23 ohm, 0.124 H
 58.23 ohm, 0.164 H

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 51.82 ohm, 0.124 H

1 point

3) Voltage and current rating of S_3 in volt and ampere respectively are,

- 400 V, 3.2 A
 400 V, 3.93 A
 200 V, 3.2 A
 200 V, 3.93 A

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 400 V, 3.93 A

1 point

4) First band of Switching harmonics is at _____ kHz

Hint

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 (Type: Numeric) 10

1 point

5) If the converter is operating using square wave technique with 50 Hz fundamental frequency, then the fundamental rms value of V_{AB} in volts,

- 400 V
 360.13 V
 254 V
 318.5 V

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 360.13 V

1 point

Q 2. A 3-phase voltage source converter as shown in Fig. 2 has input DC-link voltage (V_D) equal to 600 Volts. The converter is operated using sinusoidal PWM (SPWM) technique with 0.85 modulation index (m) and 50 Hz fundamental frequency. The load parameters are as $R_{load}=5$ ohms, $L_{load}=5$ mH per phase.

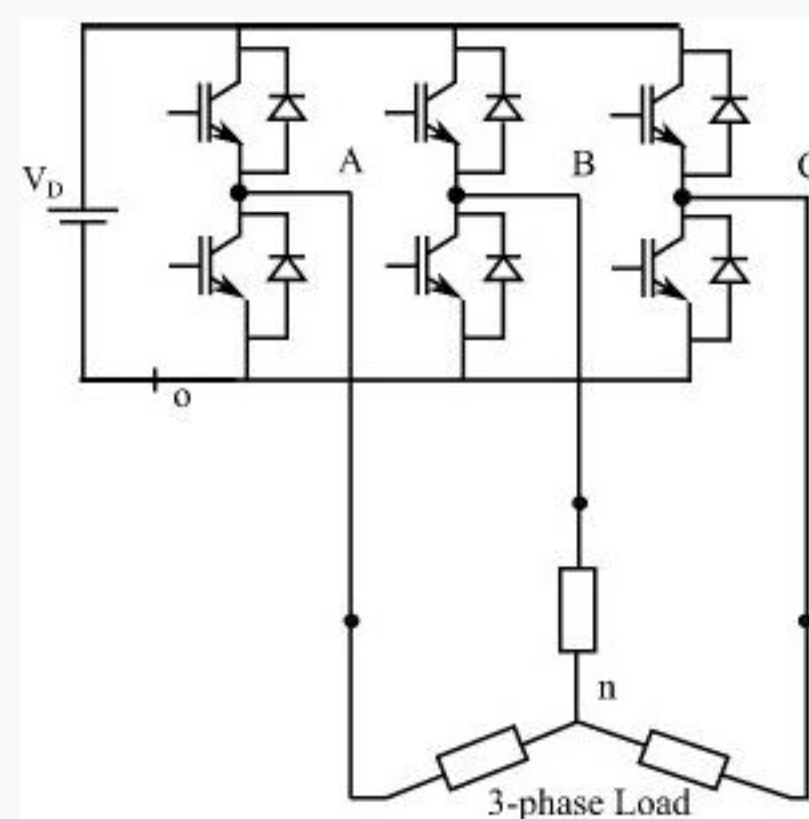


Fig 2. 3-phase voltage source converter.

6) The peak value of fundamental pole voltage ($V_{AO(peak)}$) is,

- 180 V
 255 V
 300 V
 212 V

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 255 V

1 point

7) What is the active (P) and reactive (Q) power consumed by the 3-phase load?

- 17.76 KW, 5.58 KVAR
 5.58 KW, 17.76 KVAR
 5.92 KW, 1.86 KVAR
 1.86 KW, 5.92 KW

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 17.76 KW, 5.58 KVAR

1 point

8) The fundamental rms value of line to line voltage ($V_{AB(rms)}$) is,

- 255 V
 300 V
 180.31 V
 312.31 V

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 312.31 V

1 point

9) What is the value of maximum possible fundamental rms phase voltage that can be applied to the load with the given DC-link voltage (V_D) = 600 Volts?

- 270 V
 300 V
 312 V
 400 V

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 270 V

1 point

10) If the fundamental line to line voltage needed from this converter is 400 V (rms), what is the DC-link voltage required assuming sinusoidal PWM with modulation index (m)=1?

- 600 V
 712 V
 653 V
 515 V

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 653 V

1 point