Assignment 2

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

1. The main purpose of adding a third harmonic component in the reference waveform is to _________.
   - Improve harmonic profile of base voltage
   - Increase the DC link voltage distortion
   - Improve harmonic profile of load current
   - Reduce switched frequency of the inverter
   1 point

   No, this answer is incorrect. Correct Answer: 4.

2. A voltage Source Converter (VSC) device in Fig. 1 with \( V_p = 600 \) V feeds a three-phased load (L1-L2-L3) of three phases. What is the fundamental frequency of the load phase voltage if only the harmonic component of magnitude 1/2 fundamental is added to the reference waveform?
   - 50 Hz
   - 60 Hz
   - 150 Hz
   - 120 Hz
   2 points

   No, this answer is incorrect. Correct Answer: 3.

3. For the condition given in question 2, what is the third phase active and reactive power consumed by the load?
   - 100 kVAR and 15.75 kVAR
   - 25.88 kVAR and 15.78 kVAR
   - 25.88 kVAR and 12.44 kVAR
   - 25.88 kVAR and 15.75 kVAR
   2 points

   No, this answer is incorrect. Correct Answer: 1.

4. In question 2, the magnitude of third harmonic component present in the line voltage is __________ V.
   - 264 V
   - 300 V
   - 240 V
   - 600 V
   No, this answer is incorrect. Correct Answer: 2.

5. The magnitude and phase angle of the space vector for 011 switching combination with \( V_p = 780 \) V DC bus is:
   - 780 V, 180°
   - 600 V, 180°
   - 600 V, 90°
   - 595 V, 120°
   2 points

   No, this answer is incorrect. Correct Answer: 3.

6. To realize the reference vector shown in Fig. 2, the correct switching sequence for realizing space vector PWM is:
   - 011-010-011-111-011-010
   - 010-010-011-111-011-010
   - 010-010-011-111-011-110
   - 010-010-011-111-110-180
   1 point

   No, this answer is incorrect. Correct Answer: 2.

7. For conditions given in question 6, for realizing the reference vector \( V_{r3} \), the firing delays of switching vectors \( V_{y1}, V_{y2} \) and zero vectors are ___________ respectively. (Supplying input voltage, \( T_s = 200 \mu s \) and magnitude of \( V_p = 400 \) V).
   - \( T_{1} = 0.75 \mu s, T_{2} = 0.75 \mu s, T_{y1} = 2.6 \mu s \)
   - \( T_{1} = 0.65 \mu s, T_{2} = 0.65 \mu s, T_{y1} = 0.6 \mu s \)
   - \( T_{1} = 0.95 \mu s, T_{2} = 0.75 \mu s, T_{y1} = 2.6 \mu s \)
   - \( T_{1} = 0.65 \mu s, T_{2} = 0.75 \mu s, T_{y1} = 1.8 \mu s \)
   2 points

   No, this answer is incorrect. Correct Answer: 2.