Assignment 1

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

For Questions 1 and 2:
A 400 Volt peak power factor 0.8 lagging is supplied by a 480-Volt line at effective voltage 480V. 

1. Determine the parallel capacitance in microfarads needed to improve the power factor to 0.8 lagging.

- Answer: 12.47 µF
- Accepted Answer: True
- Type: Range: 12.00-13.00
- Points: 2 points

2. Determine the parallel capacitance in microfarads needed to improve the power factor to 0.8 leading.

- Answer: 12.47 µF
- Accepted Answer: True
- Type: Range: 12.00-13.00
- Points: 2 points

For Questions 3 and 4:
The addition of a 3kVAR capacitor bank improves the power factor at a certain load to 0.90 lagging.

3. Determine active power (in kW) before the addition of the capacitors, if the final apparent power is 18kVA.

- Answer: 16.20 kW
- Accepted Answer: True
- Type: Range: 16.00-16.30
- Points: 1 point

4. Determine reactive power (in kVAR) before the addition of the capacitors, if the final apparent power is 18kVA.

- Answer: 1.80 kVAR
- Accepted Answer: True
- Type: Range: 1.60-2.00
- Points: 1 point

For Questions 5 and 6:
Three identical impedances are connected in delta for a 3-phase supply of 480 Y. The line current is 30.88 A and the total power drawn from the supply is 14.34 kW. 

- Answer: Calculate the resistance.

5. Calculate the resistance.

- Answer: 7.85 Ω
- Accepted Answer: True
- Type: Range: 7.20-8.50
- Points: 1 point

6. Calculate reactance of each impedance.

- Answer: 6.63 Ω
- Accepted Answer: True
- Type: Range: 6.20-7.00
- Points: 1 point

For Questions 7 and 8:
Obtain the rating of transformer's MVA in a three phase three wire system having effective line voltage 240V and balanced A-connected load impedances 33.3 Ohms.

- Answer: Please consider the transformer rating with negative value in question No.7 (Include series sign also in the answer).

7. Obtain the reactance (in p.u. units).

- Answer: 0.29 p.u.
- Accepted Answer: True
- Type: Range: 0.27-0.31
- Points: 1 point

8. Obtain the reactance (in p.u. units).

- Answer: 0.29 p.u.
- Accepted Answer: True
- Type: Range: 0.27-0.31
- Points: 1 point

9. A 3.5 kVA load with power factor 0.8 lagging has a group of reactive heating units added of unity power factor with many kVA's (0kVA on these units). If the line current power factor is 0.8 lagging.

- Answer: Calculate the reactance.

10. A balanced 3-connected (Y-connected) load has an effective line voltage 600V and phase voltage of 208V. Obtain the phase impedances of the transformer required to supply this load.

- Answer: 34.7 Ohms
- Accepted Answer: True
- Type: Range: 34.0-35.0
- Points: 1 point

11. A three phase three wire AC system has a balanced load has an effective line voltage 600V and (peak) line current of 15.8 A with a phase FR angle of 30 degrees. Obtain the line power (olve your answer in kVAR units).

- Answer: 543 kVAR
- Accepted Answer: True
- Type: Range: 530-550
- Points: 1 point

12. A three phase three wire AC system has an effective line voltage 240V. Obtain the line current in phase A and D. Assume 30° and 180° respectively. Find the impedance of the balanced Y-connected load (solve your answer in kVAR units).

- Answer: 14.20 kVAR
- Accepted Answer: True
- Type: Range: 13.0-15.0
- Points: 1 point