Module 19 Units 1-3 Three-Phase Transformers

1. What is the difference between a three-phase transformer and a bank of single-phase transformers?

2. What are the four different connection configurations for a three-phase transformer?

3. What are the advantages of a three-phase transformer?

4. What are the advantages of a bank of single-phase transformers connected for three-phase operation?

5. What are the advantages of a wye-wye connection?

6. Which terminal on a transformer winding is typically connected to the neutral or grounded conductor? (primary and secondary)

7. What is the phase displacement in a transformer?

8. What is the phase displacement angle in wye-wye connected transformers?

9. What is the phase displacement angle in delta-wye connected transformers?

10. When drawing the first phasor on the high side of a transformer, which terminal is located at the bottom? (H₁ or H₂)

11. How many degrees apart are phasors drawn in three-phase transformer diagrams?

12. How are neutral points labeled on a transformer voltage diagram?

13. What is the result of reversing the leads for one winding of a three-phase transformer?

14. Other than incorrect voltages, what other effect will reversing the leads in one phase of a three-phase transformer have on the circuit?
15. What test should be done on a three-phase transformer after it is connected and before the load is applied?

16. Where is a delta-delta connection for transformers typically used?

17. Where is the “A” phase placed when drawing a diagram for grouping individual transformers to form a three-phase bank?

18. Is a transformer bank with mixed polarity windings connected differently from one with all the same polarity?

19. Is the line-to-line voltage ratio for a three-phase bank of transformers the same as the ratio of the individual units?

20. What is a “mesh” or “delta-closure” test?

21. What value will a voltmeter read in a “mesh” test if the transformer connections are correct?

22. What value will a voltmeter read in a “mesh” test if the transformer connections are incorrect?

23. What precaution must be taken when a transformer is connected for with a primary and secondary phase shift of 180 degrees?

24. What requirement does the CEC make for delta-delta three-phase transformer banks?

25. What is a wye-delta connection typically used for?

26. With a proper wye-delta connection, which side leads the other by 30 degrees?

27. In the primary of a wye-delta connected transformer, what is the phase voltage equal to?
28. In the secondary of a wye-delta connected transformer, what is the phase voltage equal to?

29. What is the most common transformer connection for supplying low voltage distribution systems? Why?

30. Why is it important to use the proper voltage diagram for connecting transformers?

31. What is the angle from the horizontal for drawing the first vector in a delta connected transformer?

32. Where is the “A” phase transformer located in a wiring diagram for a three-phase bank?

33. On a standard wiring diagram for a delta connected transformer bank, which terminal of which windings are attached to phase A?

34. On a standard wiring diagram for a delta connected transformer bank, which terminal of which windings are attached to phase “B”?

35. On a standard wiring diagram for a delta connected transformer bank, which terminal of which windings are attached to phase “C”?

36. On a wye connected secondary of a step-up transformer, which terminals are connected to the neutral?

37. On a wye connected secondary of a step-down transformer, which terminals are connected to the neutral?

38. What is a three-phase, four-wire, delta connected transformer?

39. What is the CEC requirement for the “high” leg of a three-phase, four-wire, delta connected transformer?
40. When is an open delta transformer a good option?

41. What percentage of the full load of a three-phase, closed delta transformer will an open delta supply?

42. Where is an open wye-open delta transformer bank used?

Unit 2

1. Why is it possible to make an autotransformer smaller and lighter than other types of transformers?

2. What are the main advantages of the autotransformer? (Other than smaller and lighter)

3. What are the main disadvantages of an autotransformer?

4. What hazard is associated with autotransformers?

5. Why is a wye connected autotransformer not typically used to supply single-phase loads?

6. What are the advantages and disadvantages of a wye-connected autotransformer?

7. What is the maximum ratio for a delta-connected autotransformer?

8. What is one use of an open-delta autotransformer?

9. Which type of delta autotransformer must be used for a ratio of 3:1?

10. What is the main advantage of the zig-zag delta autotransformer?

11. What is a compensator?

12. Which transformer is typically used to control a 240 V three-phase motor from a 208 V three-phase supply?

13. What does “bust” and “buck” mean?
14. What does the meter connected in the secondary of a potential transformer actually measure?

15. What are the two types of connection for a potential transformer?

16. How are the current transformers connected into the lines?

17. What do ammeters, connected to the secondary of current transformers, measure?

18. Can the secondary of a current transformer be opened for work or maintenance?

19. What does a watt element consist of?

20. How many watt elements are required to measure power in a three-phase circuit?

21. What is the “watt multiplier” for calculating power in a circuit?

22. Why are current transformers used on motor circuits?

23. How is the fault current from the neutral of the zig-zag ground-fault alarm limited?