Pretest Module 13 Single-phase Transformers

1. What is the definition of a transformer?
2. What is the principle transformers work on?
3. What is the purpose of coiling the source conductor in a transformer?
4. What is the purpose of coiling the load conductor in a transformer?
5. How efficient is a transformer?
6. What is the primary winding in a transformer? Secondary?
7. What is voltage ratio? Turns ratio?
8. What is the voltage in the secondary of a transformer if the primary is 600 V with 200 turns, and the secondary has 50 turns?
9. Is the transformer in question 8 a step-up or a step-down transformer?
10. What is the current in the secondary of a transformer with 20 turns if the primary has a current of 6 amps and 100 turns?
11. How are transformers classified?
12. What is the turns ratio for a transformer with a primary voltage of 120 V and a secondary voltage of 24 V?
13. What is the turns ratio of a transformer with a primary current of 5 amps and a secondary current of 35 amps?
14. What are the three main parts of a transformer?
15. How is the high-voltage winding physically distinguished from the low-voltage winding in a transformer?
16. What are the characteristics of a good core material?
17. What is the purpose of the silicone in the silicone steel used for cores in transformers?

18. What is the purpose of laminating the core in a transformer?

19. What are the three most common core designs in transformers today?

20. What is the purpose of placing the high-voltage windings between the low-voltage winding in a cross type transformer?

21. How does temperature rise affect insulation aging?

22. What are the two most common mediums for transferring heat away from transformers?

23. What is additive and subtractive polarity in transformers?

24. What is the formula for efficiency of a transformer?

25. What is the kVA rating of a transformer?

26. What does it mean when a transformer has two primary HV winding ratings?

27. What are the two basic types of three-phase transformers?

28. What is the result of operating a transformer at a lower frequency than it is rated for?

29. What are three situations where polarity of transformers is important?

30. What does the temperature rise rating on a transformer indicate?

31. Where is the wiring diagram typically found for a transformer?

32. What is the characteristic that determines if a transformer is a control transformer or not?

33. How are signal transformers different from control transformers?

34. What is the definition of a distribution transformer?
35. What is the purpose of an instrument transformer?

36. What is the unique characteristic of an autotransformer?

**Unit 2**

1. Is a transformer additive or subtractive polarity when X₁ is adjacent to H₁?
2. What do the white dots indicate on instrument transformers?
3. What is the first step in determining the polarity of a transformer with a voltmeter?
4. Where is the voltmeter connected for a DC inductive kick test?
5. When a transformer with a dual primary winding is connected to the higher voltage, which terminals are connected together? (X₁ and H₄ or whatever)
6. How many different turns ratios are available with dual primary and dual secondary windings?
7. What is the most common winding configuration for distribution transformers?
8. Why is it important to keep loads balanced in a dual winding transformer?
9. What are circulating currents in transformers?
10. What is the result of high circulating currents in transformers?
11. What are three values or characteristics of transformers that must be considered when paralleling transformers?
12. When testing closure voltage, what voltage should be measured if proper polarity is maintained paralleling transformers?
13. What should be done if the voltage closure test indicates a significant voltage?
14. Briefly describe “back-feed” in parallel transformers?
15. When a transformer has one primary winding and one secondary winding, what percentage of the kVA rating can be handled by each winding? (50% or 100%)

16. Why is a transformer rated in kVA instead of kW?

17. Does the nameplate on a transformer typically have a current value? Why?

18. Why should the HV winding never be exceeded for a transformer?

19. When two HV winding ratings are given, how should the windings be connected to the supply of the higher value?

20. Where is indication provided if a transformer contains oil with PCBs?

21. What are three types of wiring information?

22. What are the two types of energy losses in transformers? Define each.

23. What is the test for each? (Question above)

24. The magnetizing current for a transformer is typically what percentage of the full load current?

25. How does the source voltage affect the magnetizing current of a transformer?

26. How does the load affect the magnetizing current of a transformer?

27. How does the load affect copper losses?

28. What is the formula for efficiency of a transformer?

29. What is the result of paralleling transformers with unequal impedances?

30. What is the available fault current for a transformer with a FLA of 250 and an impedance of 3 %?

31. What is the available fault current for a transformer with a FLA of 135 and an impedance of 4 %?
32. What is the available fault current for a 600/120 V transformer with a 2 % impedance, rated at 100 kVA?

33. What is the rating of a bank of two paralleled transformers with ratings of 50 kVA, 1 % impedance and 75 kVA, 1 % impedance? (125 kVA, 2 % impedance, etc)

34. How are fault currents calculated for banks of transformers?

Unit 3

1. What is an unloaded transformer?

2. What is the relationship between the applied emf in the primary of a transformer, the counter emf in the primary and the induced emf in the secondary?

3. Why is the counter emf in the primary always slightly less than the applied emf in a transformer?

4. Which value in a transformer is always equal in the primary and secondary windings?

5. What is the formula for percent voltage regulation in a transformer?

6. What is the benefit of a transformer with an adjustable turns ratio?

7. How does adding an extra winding in the primary of a transformer affect the secondary voltage?

8. What are the two types of tap changers?

9. Which type of tap changer is typically used to compensate for power differences throughout the day?

10. Which tap changer is smaller and cheaper to install?

11. What is the purpose of the reactor in an on-load tap changer?

12. How is the reactor size reduced in an on-load tap changer?
13. How is the secondary voltage calculated when you know the primary voltage and the number of primary and secondary turns?

14. What is the turns ratio for a transformer with a primary voltage of 750 V and a secondary voltage of 120 V?

15. What is the secondary voltage of a transformer with a turns ratio of 15:1 and a primary voltage of 1200 V?

16. What is the purpose of removing a section from the center of a transformer winding?

17. What is the main precaution when making jumper connections on a large transformer?

**Unit 4**

1. How is an autotransformer different from other types of transformers?

2. What are the four main uses of autotransformers?

3. What are some advantages of an autotransformer?

4. Which conductor must be grounded in the secondary of a transformer?

5. What does it mean when the low-voltage winding is “bucking” the high-voltage winding in a transformer?

6. Which winding in a “buck/boost” voltage regulator is considered the series winding?

7. How is the buck/boost voltage regulator switched live without shorting out the series winding?
8. What is the secondary voltage on an autotransformer connected across 200 turns if a voltage of 240 volts is connected to 1000 turns at the primary?

9. What is the primary voltage of a transformer with a ratio of 2.5/1 if the secondary voltage is 28 V?

10. What is the one value of a transformer every other value hinges on?

11. What is one major hazard with autotransformers?

**Unit 5**

1. What is the main reason for using current and potential transformers?

2. Where is a current transformer primary winding placed?

3. How are current transformers typically rated?

4. Why is the turns ratio for current transformers not exactly equal to the calculated turns ratio?

5. Why is it important for current transformers to be accurate?

6. What is the danger in opening the secondary circuit of a current transformer?

7. What precaution should always be taken before opening the secondary circuit of a current transformer?

8. Which type of current transformer consists of two separate coils wound over the same coil?

9. What type of current transformer is a clamp-on ammeter?

10. Which type of current transformer is best suited to comparison measurements?

11. Which type of current transformer is strongest and best able to handle overcurrents?
12. How is a potential transformer connected into the primary circuit? (series or parallel)

13. What is the typical secondary voltage for a potential transformer?

14. How are voltages above 100 kV measured using potential transformers?

15. What is the hazard associated with working on the secondary of potential transformers?

16. What is the conventional method of marking polarity for instrument transformers?