1. What is Faraday’s Law? Magnitude of voltage induced in a turn of wire is proportional to the rate of change of flux passing through that turn.

2. What is Lenz’s Law? The direction of induced EMF must be such that any current resulting from it will develop a flux that will oppose any change in the original flux.

3. What is the active length of a conductor? Portion that passes through the lines of force.

4. What is flux density and how is it controlled? Magnetic lines of force controlled by varying the current through a coil.

5. What is velocity and how is it controlled? Speed of conductor rotating at right angles to the lines of flux. Controlled by the speed of prime mover.

6. With Fleming’s left hand rule, what is indicated by the first finger? Flux direction

7. With Fleming’s left hand rule, what is indicated by the middle finger? Current

8. What is the unit of inductance? Henry

9. What is an inductor? Choke, coil, or reactor that displays the characteristics of inductance.

10. How is the inductance of a variable inductor varied? Increase flux-per-ampere

11. Inductors have no resistance. T or F? F

12. What is the definition of inductance? That property of a circuit that opposes any change in current.

13. How many time constants are required for an inductor to reach 99.33% of the steady state value? 5
14. Does an inductor dissipate any energy? No. It takes some energy to set up the magnetic field but gives it back when it collapses.

15. What precautions should be taken when opening a switch on a highly inductive circuit? Stand to the side when opening or closing it.

16. What is a field-discharge resistor? A resistor connected in parallel with a coil to provide a low resistance path for the discharge of the coil.

17. What is a diode? An electronic component that only allows current to flow in one direction blocking the other direction.

18. What is a freewheeling diode? Diode that is normally inactive or reverse bias.

19. What is mutual induction? A current is induced in a coil by changing the current in another coil with no mechanical connection.

20. How is the voltage increased in a second coil through mutual induction? Bring the coils closer together.

21. What is the most efficient of all machines? Transformer

22. What is the most common application of mutual induction in a DC circuit? Auto ignition coil.

23. Where does an inductor store energy? In the magnetic field

24. What is the formula for combining inductors in series? $L_T = L_1 + L_2 + L_3$

25. What is the formula for combining inductors in parallel? $\frac{1}{L_T} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3}$

26. What is the total inductance of a 50 H and a 100 H inductor connected in series? 150 H

27. What is the total inductance of a 50 H and a 100 H inductor connected in parallel? 33.3 H
28. What is the total inductance of a 70 mH and a 30 mH inductor connected in series? 100 H
29. What is the total inductance of a 70 mH and a 30 mH inductor connected in parallel? 21 H
30. What is the total inductance of three 10 H inductors connected in series? 30 H
31. What is the total inductance of three 10 H inductors connected in parallel? 3.33 H
32. Do all inductors have some resistance? Yes
33. How much does the current increase in one time constant? 63.2% of difference between the value at the beginning of time constant and steady state value.
34. How does an inductor store energy and how does it release it? Stores in the magnetic field and releases it back when the field collapses.
35. What is Coulomb’s Law of electrostatic force? Electric force between two point electric charge is directly proportional to the product of the two charges and inversely proportional to the square of the distance between them.
36. What are two methods to increase the electric field intensity between two parallel plates? Increase voltage at plates or decrease distance between them.
37. What is electrostatic induction? Charges that are induced in a conductor or other material without electrical contact.
38. What is a dielectric? Insulating material exposed to an electric field.
39. What is dielectric breakdown? When the atoms become so distorted they conduct electricity.
40. What is the definition of a capacitor? Parallel plates separated by a dielectric (insulating material)
41. What is the term used to describe the ratio of the voltage between the plates to the voltage of the charge on the plates? Capacitance of the capacitor.

42. What is the unit of capacitance? Farad.

43. What does mfd mean in relation to capacitors? Microfarad (.000001 Farads)

44. Name three factors that affect the capacitance of a capacitor? Area of plates, distance between plates, type of dielectric.

45. What are the two main types of capacitors? Fixed or variable.

46. What is a “self-healing” capacitor? One which will repair itself when the plate area that caused the fault evaporates clearing the fault.

47. Why are electrolytic capacitors not for use on AC circuits? Puncturing will occur.

48. What are two ways of changing the capacitance of a variable capacitor? Vary plate area and vary distance between plates.

49. What are some common problems with capacitors? Shorting, leaking, opens, strays, and dielectric absorption.

50. How should large power factor capacitors be discharged? Through a resistor.

51. Why should the leads of a capacitor remain shorted after it is discharged? Prevent a recharge through absorption from the dielectric.

52. What is the formula for time constant in a capacitive circuit? \( t = RC \)

53. How is energy stored in a capacitor? In the distortion of the field between the plates.

54. What happens to the charges on the plates over time in a capacitor if the supply voltage is removed? There is a small leakage through the dielectric but the charge can remain on the plates indefinitely.
55. What is the definition of capacitance? The property of an electric circuit that opposes any change in the voltage.

56. What is the total capacitance of a 30 mfd and a 50 mfd capacitor connected in series? 18.75 mfd

57. What is the total capacitance of a 30 mfd and a 50 mfd capacitor connected in parallel? 80 mfd

58. What is the total capacitance of a 25 mfd and a 40 mfd capacitor connected in series? 15.38 mfd

59. What is the total capacitance of a 25 mfd and a 40 mfd capacitor connected in parallel? 65 mfd

60. What is the total capacitance of three 10 mfd capacitors connected in series? 3.33 mfd

61. What is the total capacitance of three 10 mfd capacitors connected in parallel? 30 mfd

**Unit 3**


2. How does the applied voltage affect the inductive reactance in a circuit? Applied voltage does not affect inductive reactance in a circuit.

3. How does frequency affect the inductive reactance in a circuit? It increases as the frequency increases. Directly proportional

5. What is the result of multiplying a negative current and a negative voltage? Positive power.

6. What is the unit of reactive power? Vars

7. What is the unit of true power? Watts

8. What is the unit of apparent power? Volt Amps

9. What is the “Q” factor of a circuit? Ratio of XL to R

10. How is a coil wound for a non-inductive resistor? Start from middle and wind together so equal current flows in each direction canceling out the inductance.

11. What is the purpose of a saturable reactor? Current regulator for motors, welders, etc.