PART – I

1. What is the impedance of each branch of an equivalent Wye circuit when each branch of a Delta circuit has an impedance of $\sqrt{3}Z$?
   a. $\sqrt{3}Z$ b. $Z/\sqrt{3}$ c. Z d. None of these

2. Which of the following functions represents the impulse response of a R-L circuit?
   a. Decaying exponential function b. Increasing Cubic function
   c. Decreasing reciprocal function d. None of these

3. Which of the following is true with respect to a Furrier series expansion of a periodic function with half wave symmetry?
   a. It contains only even harmonics b. It contains only odd harmonics
   c. Both a and b d. None of these

4. Consider a two-port reciprocal network. The output open circuit voltage divided by the input current is equal to which of the following?
   a. Z_{12} b. $1/Z_{12}$ c. $Z_{12}*Z_{21}$ d. None of these

5. Consider a two port resistive network with A = (3/2)B = D = (4/3) C. What is the value of Z_{11} of the network?
   a. 1/3 b. 4/3 c. ¾ d. None of these

6. Which of the following is a two-terminal variable resistor?
   a. Rheostat b. Potentiometer c. Thermodynamizor d. None of these

7. What is the induced voltage across a stationery conductor inserted inside a stationery magnetic field?
   a. Zero b. 220 V if the cycles are 50 Hz
   c. 110 V if the cycles are 60 Hz d. None of these

8. What is the resistance of the heating element in an electric oven if it draws 2.2 A from a 110 V source?
   a. 50 Ω b. 50 mΩ c. 50 kΩ d. None of these

9. What is the frequency of an alternator, if A = number of poles and B = revolution made per second?
   a. ABHz b. AB/π c. AB/2Hz d. None of these

10. Which of the following statements is true?
    a. A stator is a rotating part of a generator.
    b. A stator is a stationary part of a generator.
    c. A stator is a rotating part of a transformer.
    d. None of these.

11. How many coulombs of charge move through a filament of a light bulb in 1.3 s If there is 8 A of current through the filament?
    a. 9.3 b. 10.4 c. 6.15 d. None of these

12. What is a neutral atom?
    a. An atom in which the number of electrons is equal to the number of protons so that there is no net electric charge.
    b. An atom in which the number of neutrons is twice the number of protons and electrons put together.
    c. An atom in which the number of electrons is twice the number of protons.
    d. None of these.

13. What is the unit of measurement of electrical conductance?
    a. Ohm b. 1/Ohm c. Henry d. Siemens

14. Which of the following can be used as a rheostat for low power applications?
    a. A two-terminal variable resistor.
    b. A three-terminal potentiometer with one terminal unconnected.
    c. A three-terminal potentiometer with one terminal connected to the wiper.
    d. All the above.

15. What is the current, in amperes, when 0.95 coulombs pass a point in 5 s?
    a. 1.00 b. 0.19 c. 4.75 d. None of these

16. Which of the following can be measured by a millimeter?
    a. Voltage b. Resistance c. Current d. All the above

17. It was found that the current was 60 mA when a circuit with a particular resistance is connected to a 20 V battery. The current has dropped to 30 mA after sometime. How much has the voltage changed?
    a. 10 V b. 20 V c. 0 V d. None of these

18. What is the power consumed by the circuit when a bulb of 60 watts and another of 120 watts are joined in a series?
    a. 180 W b. 40 W c. 120 W d. None of these

19. What is the resistance of a 440 cm long wire of 0.28 cm diameter, with specific resistance 0.56 ohm-cm?
    a. 900 Ω b. 90 Ω c. 9 Ω d. None of these

20. Three resistors of equal resistance connected in series across a power source together dissipate 15 watts of power. What would be the power dissipated when the same resistors are connected in parallel?
    a. 150 W b. 100 W c. 135 W d. None of these

21. Which of the following is the unit for measuring specific resistance of a material?
a. Ohm-meter b. Ohm c. Siemens d. Ohm/meter

22. It is desired to have a total resistance of 7 Ω. There are 3 resistances of values 3 Ω, 12 Ω and 6 Ω available. What will be the combination of these three resistances in order to achieve the required objective of 4 Ω?
a. All the three in series
b. 3 Ω in series with the parallel combination of 12 Ω and 6 Ω
c. 6 Ω in series with the parallel combination of 12 Ω and 3 Ω
d. None of these

23. There are 3 resisters in parallel in a circuit. What happens to the total resistance if one of them is removed?
a. Total resistance decreases b. Total resistance increases
c. Total resistance will not change d. Total resistance will decrease by one-third

24. There are five parallel resistors and a total of 600 mA of current into these resistors. The currents through four of the resistors are 30 mA, 60 mA, 70 mA and 100 mA. What is the current through the fifth resistor?
a. 260 mA b. 340 mA c. 600 mA d. None of these

25. There are five parallel resistors and a total of 600 mA of current into these resistors. What happens to the total resistance when an additional resistor is connected across this parallel circuit?
a. Total resistance decreases b. Total resistance increases
c. Total resistance will not change d. Total resistance will increase by one-sixth

26. Consider a circuit having four parallel branches with a power dissipation of 1.6 W in each. What is the total power dissipation?
a. 1.6 W b. 6.4 W c. 0.4 W d. None of these

27. The law which states that "At any node or junction in an electrical circuit, the sum of currents flowing into that node is equal to the sum of currents flowing out of that node" is known as _____.
a. Kirchhoff's current law b. The principle of conservation of electric charge
c. Both a and b d. None of these

28. If two light bulbs that are parallel-connected dissipate 60 watts and 100 watts of power, then what is the total power loss?
a. 160 W b. 80 W c. 40 W d. None of these

29. The total resistance of circuit with two resisters connected parallel is 6 ohms. What are the individual values of these two parallel resistors when one has 50% more resistanoe than the resistance of the other?
a. 10 ohms and 15 ohms b. 16 ohms and 24 ohms
c. 6 ohms and 9 ohms d. None of these

30. Which of the following can be a use of a parallel circuit?
a. Voltage b. Current c. Magnetic flux d. None of these

31. Which of the following can be used to measure the strength of a battery?
a. Henry b. Tesla c. Volt d. None of these

32. What is the main reason for a circuit breaker to shut off when a large number of appliances on run on one single circuit?
a. Voltage becomes so high that it cannot be handled anymore.
b. The total amount of current increases because the total resistance decreases.
c. Both a and b.
d. None of these.

33. Which of the following is a device capable of supplying electrical energy?
a. Microwave b. Radio transmitter c. Solar cell d. None of these

34. Which of the following can be used to increase the capacitance of a capacitor?
a. Decrease the plate area. b. Increase the plate area.
c. Increase the magnetic field. d. None of these.

35. Which of the following is an example of polarized capacitor?
a. Electrolytic capacitor b. Ceramic capacitor
c. Paper capacitor d. None of these

36. What is Electrical impedance?
a. It is the measure of the opposition that a circuit presents to a current when a resistance is added or removed.
b. It is the measure of the opposition that a circuit presents to a current when there is a change in the cycles.
c. It is the measure of the opposition that a circuit presents to a current when a voltage is applied.
d. None of these.

37. What happens to the reactance as the frequency applied to the capacitor increases?
a. Decreases b. Increases
c. Remains the same d. Depends on the material used in the capacitor

38. Which of the following types best describes rate of charge of a capacitor?
a. Linear b. Quadratic c. Exponential d. None of these

39. When does the current flow occur in a capacitive circuit?
a. Never b. When it is charging
c. When it is discharging d. Both b and c

40. The polarizability of a *dielectric* is called _____
a. Dielectric constant b. Relative permittivity
c. Both a and b d. None of these

41. Which of the following type of material is used between the plates of a capacitor?
    a. Insulation material b. Conductive material
    c. Dielectric material d. All the above

42. Consider a circuit consisting of a capacitor and a resistor in series with a voltage source. When the capacitor is fully charged, the voltage across the resistor is _____ zero, then the capacitor is:
    a. Zero b. Maximum c. Half the capacity of the source d. None of these

43. Among the following materials, which one has the highest dielectric strength?
    a. Air b. Alumina c. Mica d. Polystyrene

44. What is the SI unit for capacitance?
    a. Volt b. Watt c. Farad d. None of these

45. Which of the following is a unit of reluctance?
    a. Tesla b. Henry/Wb c. At/Wb d. Wb

46. An electro-magnetic field can exist only when _____.
    a. there is voltage b. there is no voltage
    c. there is current d. there is no current

47. Which of the following results in an increase in the induced voltage?
    a. When we decrease the speed at which a conductor is moved through a magnetic field.
    b. When we increase the speed at which a conductor is moved through a magnetic field.
    c. When we first increase and then decrease the speed at which a conductor is moved through a magnetic field.
    d. None of these.

48. What happens to the flux density when flux remains the same, but the cross-sectional area of a magnetic field increases?
    a. The flux density increases. b. The flux density decreases.
    c. The flux density remains the same. d. The flux density doubles.

49. The direction of the magnetic field reverses when _____.
    a. the current through the coil of an electromagnet increases beyond certain limit
    b. the current through the coil of an electromagnet reverses
    c. the voltage through the coil of an electromagnet halves
    d. none of these

50. What is the induced voltage across a coil with 220 turns located in a magnetic field that is changing at a rate of 10 Wb/s?
    a. 22 V b. 220 V c. 2200 V d. None of these

51. The flux density in a wire wound core can be increased by _____.
a. decreasing the current through the coil b. increasing the current through the coil
c. increasing the ambient pressure d. none of these

52. The voltage induced across the coil wire placed in a changing magnetic field is _____
a. Positively correlated to the number of turns in the coil
b. Negatively correlated to the number of turns in the coil
c. Uncorrelated to the number of turns in the coil
d. Positively correlated to the atmospheric pressure

53. Consider a 100-turn coil of wire with 0.5 A of current through it. What is the magnetomotive force?
a. 50 At b. 500 At c. 5 At d. None of these

54. Which of the following describes the magnetization left behind in a ferromagnetic material (such as iron) after an external magnetic field is removed?
a. Retentivity b. Remanence c. Both a and b d. None of these

55. What happens to the induced voltage if a rotor in a generator starts moving at faster speed?
a. It decreases b. It increases
c. It remains the same d. It becomes zero

56. What is the flux density of a magnetic field whose flux is 1000 μWb and cross-sectional area is 0.5 m^2?
a. 500 μt b. 5000 μt c. 2000 μt d. None of these

57. What is the peak-to-peak value when the peak of a sine wave is 13 V?
a. 26 V b. 13 V c. 260 V d. None of these

58. Which of the following is determined by the turns ratio?
a. Ratio of primary and secondary voltages b. Ratio of primary and secondary currents
c. Both a and b d. None of these

59. The turns ratio of a step down transformer is _____.
a. equal to one b. less than 1
c. more than 1 d. more than that of the step-up transformer

60. Consider two coils with an inductance of 64 mH and 81 mH respectively. What is the mutual inductance between the coils if the coefficient of coupling between two coils is 0.45?
a. 32.4 mH b. 64.8 mH c. 72.5 mH d. None of these

61. What is a balun transformer?
    a. It is an electrical device that converts high resistivity to low resistivity
    b. It is an electrical device that converts between a balanced signal and an unbalanced signal
    c. It is an electrical device that converts between resistivity and permeability
    d. None of these

62. Which of the following is true with a transformer?
    a. The same transformer can be used as a step up or step down.
    b. The primary winding and he secondary winding are connected through a central tap.
    c. Both a and b.
    d. None of these.

63. Which of the following true with an autotransformer?
    a. The two windings are wound such that the two form a single layer where each turn is touching each of the adjacent turns of the other winding.
    b. The two wires are twisted together before being wound into the coil.
    c. Both a and b.
    d. None of these.

64. Which of the following describes the type of transformer which has two windings with an inductance of 3 H each and a mutual inductance of 3 H between them?
    a. Perfect transformer b. Ideal transformer
    c. Common value transformer d. None of these

65. Consider two 2 H inductance coils that are connected in series and also magnetically coupled to each other. What is the total inductance of the combination if the coefficient of coupling is 0.15?
    a. 4.6 H b. 3.4 H c. Either a or b d. None of these

66. Consider a network linear transistors and ideal voltage sources. What will happen to the voltage across each resistor, if the values of all the transistors are doubled?
    a. They will be doubled. b. They will be halved.
    c. They will increase four times. d. They will remain the same.

67. Consider a light bulb which has a resistance of 10 ohms is connected to a 120 volt source. If we want to vary the current to the light bulb from 3 to 5 amperes by using a rheostat, what should be its resistance and current rating?
    a. 30 ohms and 5 A b. 30 Ohms and 10 A
    c. 10 ohms and 30 A d. None of these

68. Consider a series resonance with values R = 25 ohms, L = 0.04 H and C = 0.01 μH. What is the frequency at which the voltage across L is maximum?
    a. 7.96 kHz b. 8.3 kHz c. 10.5 kHz d. None of these

69. When a capacitor is used for power factor correction in a single phase circuit, it decreases _____.

a. Line current b. Power factor c. Both a and b d. None of these

70. To which of the following is Superposition theorem is applicable?

a. Dependent voltage sources b. Dependent current sources
c. Transformers d. All the above

PART II

Section – A: Electrical

71. What is a squirrel cage?

a. It is a type of 3-phase AC generator.
b. It is a cage to protect the generator from squirrels.
c. It is a squirrel shaped transformer.
d. None of these.

72. What happens to the impedance of a parallel RC circuit when the frequency of source voltage is decreased?

a. It decreases b. It increases c. It becomes zero d. It becomes erratic

73. What is the equivalent negative angle of 30^0 positive angle?

a. -30^0 b. -330^0 c. -300^0 d. None of these

74. What happens to the impedance in a series RC circuit when the frequency and resistance are halved?

a. It is also halved b. It becomes one-fourth
c. It becomes zero d. None of these

75. What does a phasor represent?

a. Phase angle b. Phase volume c. Phase ratio d. None of these

76. What is the duty cycle of a pulse waveform that has a high time of 8 ms and a pulse width of 32 ms?

a. 25% b. 256% c. 25.6% d. None of these

77. Which of the following factors determine the inductance?

a. Number of turns b. Permeability c. Coil length d. All the above

78. Which of the following does Faraday's law deal with?

a. A magnetic field and a conductor
b. A conductor in an extremely low temperature
c. A magnetic field of the planets
d. None of these

79. Which of the following statements is true?
    a. A magnetic field develops within the conductor when current travels within it.
    b. A magnetic field develops around the conductor when current travels within it
    c. A magnetic field develops within the conductor when it becomes super cold.
    d. None of these

80. Which of the following can generate electricity?
    a. A wire which is exposed to centrifugal force.
    b. A wire which is passing through a magnetic flux field.
    c. A wire which is wound tightly around a conductor.
    d. None of these.

81. Which of the following is true with transformers?
    a. They work on the principle of induction.
    b. The voltage can be either stepped-up or stepped down.
    c. Both a and b.
    d. None of these.

82. What is the secondary power of a transformer having a 2:1 voltage ratio, if the primary power is 200 W?
    a. 400 W b. 100 W c. 200 W d. None of these

83. An autotransformer can be used as _____.
    a. Step-up or step-down transformer b. Balun transformer
    c. Both a and b d. None of these

84. A transformer with 1:1 turns ratio is called _____.
    a. Isolation transformer b. Equitable transformer
    c. Isotopic transformer d. None of these

85. What is the equivalent inductance of a combination of two coils which have self-inductance of 2 mH and 4 mH respectively and a mutual inductance of 0.15 mH?
    a. 7.5 mH b. 5.7 mH c. 6.15 mH d. None of these

86. It was known that a balanced Wheatstone bridge will remain balanced even when the positions of director and source are interchanged. This observation is based on which of the following theorems?
    a. Pythagoras theorem b. Duality theorem
    c. Reciprocity theorem d. None of these

87. Which of the following is resettable protective devise?
    a. Fuse b. Circuit breaker c. Both a and b d. None of these

88. Which of the following is equal to 0.8 W?
    a. 8 mW b. 800 mW c. 800 MW d. None of these

89. What is the rating of a particular source if it is capable of supplying 8 A for 6 hours?
a. 1.33 Ah b. 48 Ah c. 0.75 Ah d. None of these

90. If you had consumed 27 kWh in 15 days, what is the average daily consumption of power?
a. 0.5556 kWh b. 0.9 kWh c. 1.8 kWh d. None of these

91. If an oven consumes 500 watts for 25 hours, then the total power used is
a. 12.5 kWa b. 12500 kWa c. 12500 mW d. None of these

92. What is the percentage efficiency of an equipment which produces 8 W output with an input of 9W?
a. 1.125% b. 112.25% c. 88.89% d. 8%

93. What is 480,000 μW equal to?
a. 0.480 W b. 0.480kW c. 0.480 mW d. None of these

94. A server uses 350 W and is allowed to run continuously for 30 days. What is the amount of kilowatt hours of energy is consumed?
a. 252,000kWh b. 252kWh c. 0.252 kWh d. None of these

95. What is the determinant of a 2x2 matrix which has 2 and 8 in the first row and 8 and 2 in the second row?
a. 12 b. 60 c. -60 d. None of these

96. Which of the following is used by the branch current method?
a. Kirchhoff's laws b. Thevenin's laws c. Ohms law d. None of these

97. Which of the following is true in a Y-Y configuration?
a. The phase current, line current and load current are equal in each phase.
b. The phase current and line current are equal and load current is double of line current.
c. The phase current double of line current but, load current and line current are equal.
d. None of these.

98. How much is the neutral current when loads are perfectly balanced in a three-phase system?
a. Half of the total current b. Zero
c. Half of the line current d. None of these

99. Which of the following is true when there is a constant load power?
a. Uniform conversion of electrical energy to mechanical energy.
b. Uniform conversion of mechanical energy to electrical energy.
c. Non-uniform conversion of mechanical energy to electrical energy.
d. None of these.

100. What is the angle of separation of voltages in a 3-phase system?
a. 150^0 b. 180^0 c. 90^0 d. None of these

Section – B: Electronics & Communication

71. Which of the following is the interface chip for 8086 and ADC?
    a. 8255 b. 8256 c. 8251 d. None of these

72. Which of the following is a computer language?
    a. Photoshop b. PL/1 c. Microsoft Project d. All the above

73. Which of the following are of noise sources in a BJT?
    a. Shot noise b. Partition noise c. Thermal noise d. All the above

74. What is the output of an OR gate with 4 inputs where one input is high and the other three are low?
    a. High
    b. Low
    c. Can be high or low depending on the application
    d. First low, followed by high

75. How many inputs can "AND" and "OR" gates have?
    a. Only one b. exactly 2 c. Not more than 2 d. More than 2

76. What is the equivalent of 47 in hexadecimal system?
    a. 2F b. 30 c. 2E d. None of these

77. Which of the following is used to store data in memory?
    a. Flip-Flop b. LED c. Both a and b d. None of these

78. Which of the following is true with respect ACSII?
    a. It is an eight bit code. b. It is a seven bit code.
    c. It is a four bit code. d. None of these.

79. How many cell does a Karnaugh map with 5 variables has?
    a. 5 b. 15
    c. 25 d. Can be any number between 5 and 20

80. What is the current gain of a transistor in the CC mode, given that it has a current gain of 0.98 in the CB mode?
    a. 100 b. 50 c. 98 d. None of these

81. Which of the following produces heat in a diode?
    a. Atmospheric temperature b. Current passing through the diode
    c. The clash between the holes and electrons d. None of these

82. What is a varistor?
   a. It is a voltage dependent resistor.
   b. It is a variable resistance enabled resistor.
   c. It is can withstand high variance of pressure.
   d. None of these.

83. What are valance electrons?
   a. Electrons captured and retained in the nucleus of the atom.
   b. Electrons that are attached to the neutrons inside the atom.
   c. Electrons in the outermost orbit of the atom.
   d. None of these.

84. What is a veractor diode?
   a. It is a diode where the emitter can be changed into base.
   b. It is a diode where all the holes can be replaced by electrons.
   c. It is a diode where the reverse bias can be changed thereby varying the capacitance.
   d. None of these.

85. What is $8.2x10^6$ Ω equal to?
   a. 8.2 MΩ b. 8.2 kΩ c. 8.2 mΩ d. None of these

86. $8x10^4$ multiplied with $5x10^6$ is equal to
   a. $40x10^{10}$ b. $4x10^{11}$ c. Both a and b d. None of these

87. Which of the following is equal to 186 milliwatts?
   a. $1.86x10^{-4}$ kW b. $1.86x10^{-5}$ kW c. $1.86x10^{-6}$ kW d. None of these

88. What is the SI unit for inductance?
   a. Volt b. Ohm c. Henry d. Columb

89. What is a JFET?
   a. It is a voltage controlled device.
   b. It is a Joint Frequency Enabling device.
   c. It is James Faraday Electronic Testing device.
   d. None of these.

90. What is the type of gate in "n" channel JFET?
   a. n type b. p type c. can be either n type or p type d. n-p type

91. What is the unit of measurement for magnetic permeability?
   a. Henry b. Henry/m c. Henry/kg d. None of these

92. Which of the following reduces the number of electron-hole pairs?
   a. Recombination b. Re-energization c. Recastination d. None of these

93. Which of the following will generate piezo-electric effect?
a. Heating the crystal b. Pressure on the crystal
c. Soaking the crystal in iodine d. None of these

94. Which of the following statements is true?
a. Resistivity of silicon is more than that of germanium.
b. Resistivity of silicon is less than that of germanium.
c. Resistivity of silicon is same as that of germanium.
d. Resistivity of silicon is half of that of germanium.

95. Which of the following contribute to flow of current in semiconductors?
a. Holes b. Electrons c. Both a and b d. None of these

96. What is the resistivity of a material becomes a superconducting material?
a. Zero b. 50% of its normal value
c. Between 50% and 100% of the normal value d. None of these

97. What is the name the pattern exhibited by Silicon and Germanium atoms when they combine into repetitive geometric pattern?
a. Bonded molecules b. Crystals c. Catacombs d. None of these

98. Which of the following statements is true?
a. An exponential amplifier has a diode in feedback path.
b. An exponential amplifier has a resistance in feedback path.
c. An exponential amplifier has both a diode and a resistance in feedback path.
d. None of these.

99. How many times do you have to use RAL instruction to multiply a number by 16 in 8085?
a. 2 times b. 3 times c. 4 times d. More than 4 times

100. Which of the following is not allowed as a variable name in C?
a. Varname5 b. Varval2 c. 5var d. All the above