


1,000 QUESTIONS AND ANSWERS

ELECTRICITY AND ELECTRIC CIRCUITS

1. A substance has electrons which are free to drift freely from atom to atom. Such a substance is likely to be:
a. copper. b. a vacuum. c. air. d. glass.
2. Which of the following is meant by the abbreviation EMF?
a. electrical mains frequency b. electric measuring force
c. electro magnetic force d. electro motive force
3. The best conductor listed below is:
a. copper. b. carbon. c. glass. d. a vacuum.
4. An important use of insulators in electronics is:
a. electrodes in radio valves. b. electrolytes in lead-acid cells.
c. dielectric material in capacitors. d. wire leads on transistors.
5. An electrical component marked as "6.8 kilohms" would be a:
a. capacitor. b. transistor. c. dry cell. d. resistor.
6. The opposition to electron flow in a circuit would be called:
a. current. b. voltage. c. resistance. d. power.
7. Between two points in a circuit the potential difference would be measured in:
a. amperes. b. volts. c. ohms. d. coulombs.
8. Which of the following instruments is used for measuring electrical current flow?
a. wattmeter b. voltmeter c. ammeter d. faradmeter
9. The substance listed which will most readily allow an electric current to flow is called:
a. an insulator. b. a conductor. c. a resistor. d. a dielectric.
10. The ohm is the unit of:
a. supply voltage. b. electrical pressure.
c. current flow. d. electrical resistance.
11. Which of the following devices depends on electromagnetism for its operation?
a. lead-acid cell b. solenoid relay
c. electrolytic capacitor d. field effect transistor
12. A length of metal is connected in a circuit and is found to conduct electricity very well. It would be best described as having a:
a. high resistance. b. low resistance. c. high wattage. d. low wattage.
13. The plastic coating formed around wires is used as:
a. an insulator. b. a conductor. c. an inductor. d. a magnet.
14. The most common material used as a resistor is:
a. lead. b. gold. c. mica. d. carbon. ;
15. The unit of current flow is the:
a. volt. b. ohm. c. ampere. d. farad.

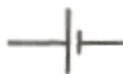
16. The space in which substances experience a magnetic force is called:
- magnetic field.
 - an electric field.
 - an electronic field.
 - a gravitational field.
17. A kilohm refers to:
- 10 ohms.
 - 0.1 ohms.
 - 0.001 ohms.
 - 1 000 ohms.
18. 6.6 kilovolts is equal to:
- 66 volts.
 - 660 volts.
 - 6 600 volts.
 - 66 000 volts.
19. A current of one quarter of an ampere may be written as:
- 250 microamperes.
 - 0.5 amperes.
 - 0.25 milliamperes.
 - 250 milliamperes.
20. How many millivolts are equivalent to two volts?
- 0.002
 - 2 000
 - 0.000 002
 - 2 000 000
21. This circuit symbol represents:
- 
- a capacitor.
 - a resistor.
 - an inductor.
 - an aerial.
22. In the resistor colour code the third colour band indicates:
- tolerance range.
 - power value.
 - the multiplier.
 - resistor material.
23. In the resistor colour code the colour yellow refers to the number:
- 2.
 - 3.
 - 4.
 - 5.
24. A resistor is marked with the colours red-violet-yellow. This resistor has a value in ohms of:
- 274.
 - 270 k.
 - 72 k.
 - 27 M.
25. A device which is magnetic only when the current is flowing is called:
- a magnetic field.
 - an electromagnet.
 - a bar magnet.
 - a permanent magnet.

Electricity and electric currents

1-a	2-d	3-a	4-c	5-d	6-c	7-b	8-c	9-b	10-d
11-b	12-b	13-a	14-d	15-c	16-a	17-d	18-c	19-d	20-b
21-b	22-c	23-c	24-b	25-b					

DIRECT CURRENT

1. This symbol represents a:



- a. cell.
- b. resistor.
- c. transistor.
- d. coil.

2. A cell that can be repeatedly recharged by supplying it with electrical energy is known as a:

- a. primary cell.
- b. secondary cell.
- c. yagi cell.
- d. low leakage cell.

3. Which of the following is a source of EMF?

- a. lead acid battery
- b. carbon resistor
- c. germanium diode
- d. P channel FET

4. An important difference between a normal torch cell and a lead acid car battery is that only the lead acid battery:

- a. has two terminals.
- b. contains an electrolyte.
- c. can be repeatedly recharged.
- d. can be effectively discharged.

5. When an electric cell is connected to an electric circuit:

- a. electrons flow from the positive electrode into the circuit.
- b. electrons flow from the negative electrode into the circuit.
- c. atoms flow from the positive electrode into the circuit.
- d. atoms flow from the negative electrode into the circuit.

6. All Leclanche cells have a nominal voltage of $1\frac{1}{2}$ volts. Compared with a small cell of this type, a large cell would have:

- a. different chemicals inside the case.
- b. a longer life supplying the same current.
- c. the ability to be recharged.
- d. a greater open circuit voltage.

7. A dry cell has an open circuit voltage of 1.5 volts. When supplying a great deal of current the voltage may drop to 1.2 volts. This is due to the cell's:

- a. internal resistance.
- b. self capacitance.
- c. electrolyte leaking.
- d. SWR effect.

8. This is a circuit symbol for:



- a. a battery.
- b. an inductor.
- c. a resistor.
- d. a cell.

9. The basic torch cell has an EMF of 1.5 volts. Which of the following is likely to be a battery formed from these cells?

- a. 1 volt battery.
- b. 2 volt battery.
- c. 3 volt battery.
- d. 4 volt battery.

10. What is the smallest number of $1\frac{1}{2}$ volt cells you need to produce a 9 volt battery?

- a. 3
- b. 6
- c. 9
- d. 12

11. To make a long lasting $1\frac{1}{2}$ volt battery from three $1\frac{1}{2}$ volt cells, the cells should be connected in:

- a. series resonant.
- b. series.
- c. parallel resonant.
- d. parallel.

12. Six dry cells are connected to provide a battery for a 9 volt transistor radio. The cells are connected in:

- a. parallel resonant.
- b. parallel.
- c. series resonant.
- d. series.

13. The diagram shows a battery formed from:



- a. 1 cell.
- b. 2 cells.
- c. 4 cells.
- d. 8 cells.

14. A lead-acid battery should have its top casing and terminals kept clean to prevent:
- excess battery voltage developing.
 - corrosion of terminals and leads.
 - overcharging occurring.
 - excessive capacitance effects.
15. A battery is made of six lead-acid cells in parallel. It will have an effective voltage of:
- 2 volts.
 - 6 volts.
 - 9 volts.
 - 12 volts.
16. The nominal output voltage of a single lead-acid cell is:
- 1.2 volts.
 - 1.5 volts.
 - 2.0 volts.
 - 6.0 volts.
17. A battery is made of six lead-acid cells in series. It will have an effective voltage of:
- 2 volts.
 - 6 volts.
 - 9 volts.
 - 12 volts.
18. No flames should be brought near a lead-acid cell being charged because of the:
- corrosive sulphuric acid.
 - high charging currents.
 - hydrogen gas produced.
 - inflammable plastic case.
19. The state of charge of a storage cell can be conveniently found by examining the:
- acid content of electrolyte.
 - lead content of the electrode.
 - corrosion on the terminals.
 - leakage current of the cell.
20. A lead-acid battery will begin to charge when the:
- terminal voltage of charger exceeds battery voltage.
 - terminal voltage of battery exceeds charging voltage.
 - internal resistance of the battery is high.
 - internal resistance of the battery is low.
21. Regular maintenance of lead-acid cells should involve:
- adding lead to electrolyte.
 - completely discharging each cell.
 - depolarising the cells.
 - maintaining electrolyte levels.
22. To limit the current drawn when charging a lead-acid cell you would:
- connect a resistor in series.
 - connect a resistor in parallel.
 - connect a capacitor in series.
 - connect a capacitor in parallel.
23. The liquid from lead-acid cells should not be allowed to come in contact with clothing or sensitive skin because this liquid is:
- expensive to replace.
 - charged with electricity.
 - highly inflammable.
 - corrosive and poisonous.
24. The voltage of a new Leclanche type torch cell is:
- 0.5 volts.
 - 1.2 volts.
 - 1.5 volts.
 - 2.0 volts.
25. A Nicad cell is really a shortened name for the:
- nichrome cell.
 - Leclanche cell.
 - lead-acid cell.
 - nickel-cadmium cell.

26. Sealed Nicad cells should not be charged at high current rates because they:
- might explode due to sudden gas pressure.
 - may reverse polarity because of high current.
 - convert their electrolyte to water.
 - may convert to a Leclanche cell.
27. A Nicad cell has a typical no load output voltage of:
- 1 volt,
 - 1.2 volts,
 - 1.5 volts,
 - 2 volts.
28. The voltage across a resistor carrying current is:
- $I + R$,
 - $I - R$,
 - $I \times R$,
 - $\frac{I}{R}$.
29. A current of 2 amperes flows through a resistance of 16 ohms. The applied voltage is:
- 8 volts,
 - 14 volts,
 - 18 volts,
 - 32 volts.
30. What voltage causes a current of 5 ampere to flow in a resistance of 50 ohms?
- 20 volts,
 - 45 volts,
 - 55 volts,
 - 250 volts.
31. What voltage would be needed to supply a current of 200 mA to operate an electric lamp which has a resistance of 25 ohms?
- 5 volts,
 - 8 volts,
 - 175 volts,
 - 225 volts.
32. An EMF of 6 volts causes a current of 0.5 ampere to flow through a resistance. To change the current to 0.25 ampere the voltage must:
- increase to 12 volts.
 - drop to 3 volts.
 - not change.
 - drop to zero.
33. The current flowing through a resistor is:
- $E \times R$,
 - $\frac{E}{R}$,
 - $E + R$,
 - $E - R$.
34. When an 8 ohm resistor is connected to a 12 volt supply the current flow in amperes is:
- $\frac{12}{8}$.
 - $\frac{8}{12}$.
 - $12 - 8$.
 - $12 + 8$.
35. A circuit has a total resistance of 100 ohms. When a voltage of 50 volts is applied to the circuit the current which will flow will be:
- 50 mA.
 - 500 mA.
 - 2 amperes.
 - 20 amperes.
36. Which of the following resistors has the greatest opposition to current flow?
- 230 ohm
 - 1.2 kilohm
 - 1 600 ohm
 - 0.5 megohm
37. The resistance of a circuit can be found by:
- $E + I$.
 - $E - I$.
 - $\frac{E}{I}$.
 - $E \times I$.
38. A resistor in a circuit has a voltage across its ends of 10 volts. While carrying a current of 1 mA the resistance must be:
- 10 ohms.
 - 100 ohms.
 - 1 kilohm.
 - 10 kilohm.

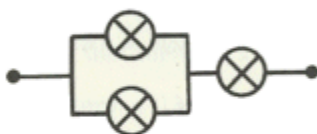
39. A torch bulb is connected to a 3 volt battery. If 300 mA flows the resistance of the bulb is:
 a. 10 ohms. b. 9 ohms. c. 6 volts. d. 3 volts.
40. An EMF of 12 volts causes a current of 0.5 ampere to flow through a resistor. The value of its resistance is:
 a. 6 ohms, b. 12,5 ohms, c. 17 ohms. d. 24 ohms,
41. This circuit would be best described as a:



- a. series circuit.
 b. parallel circuit.
 c. series-parallel circuit.
 d. series resonant circuit.

42. Which of the following formulae would be correct for finding the total series resistance
 a. $R_t = R_1 \times R_2 \times R_3$ b. $R_t = R_1 + R_2 + R_3$
 c. $R_t = \frac{R_1 + R_2 + R_3}{3}$ d. $R_t = \frac{R_1 \times R_2 \times R_3}{3}$

43. The diagram shows three light bulbs in a circuit. The bulbs are wired in:



- a. series.
 b. parallel.
 c. series-parallel.
 d. shunt form.

44. A pair of stereo headphones has separately connected earpieces each of 8 ohms. When connected in series they should present a load of:
 a. 2 ohms. b. 4 ohms. c. 8 ohms. d. 16 ohms.

45. When resistors are arranged in series it is true to say that their total resistance is:
 a. less than the resistance of any one resistor.
 b. greater than the resistance of any one resistor.
 c. equal to the highest resistance present.
 d. equal to the lowest resistance present.

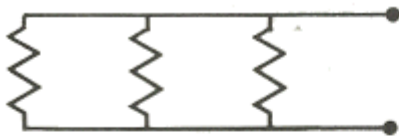
46. What is the combined resistance of five 10 ohm resistors in series?
 a. 1 ohm b. 5 ohms c. 10 ohms d. 50 ohms

47. If the resistors 10, 270, 3 900, and 100 ohms are connected in series the total resistance would be:
 a. 9 ohms. b. 3 900 ohms. c. 4 280 ohms. d. 10 ohms.

48. Which series combination of resistors would most nearly replace a single 120 ohm resistor?
 a. five 33 ohm b. six 22 ohm c. two 68 ohm d. five 100 ohm

49. If two resistors of 0.22 Megohm and 330 kilohm are arranged in series the total resistance is:
 a. 55 000 ohms. b. 550 Megohms.
 c. 55 000 kilohms. d. 550 kilohms.

50. This circuit shows three resistors arranged in:



- a. series.
- b. parallel.
- c. series-parallel.
- d. potential divider.

51. If ten resistors all "R" ohms were wired in parallel then the total resistance would be:

- a. $10 \times R$.
- b. $10 + R$.
- c. $\frac{10}{R}$.
- d. $\frac{R}{10}$.

52. What is the total resistance of four 68 ohm resistors wired in parallel?

- a. 12 ohms
- b. 17 ohms
- c. 34 ohms
- d. 272 ohms

53. The resistors 68 ohm, 47 kilohms, 560 ohms and 10 ohms are connected in parallel. The total resistance is:

- a. less than 10 ohms.
- b. between 68 and 560 ohms.
- c. between 560 ohms and 47 kilohms.
- d. greater than 47 kilohms.

54. Which of the following resistor combinations would most nearly replace a single 150 ohm resistor?

- a. four 47 ohm resistors in parallel
- b. five 33 ohm resistors in parallel
- c. four 47 ohm resistors in series
- d. five 33 ohm resistors in series

55. Two 120 ohm resistors are arranged in parallel to replace a faulty resistor. The faulty resistor originally had a value of:

- a. 15 ohms.
- b. 30 ohms.
- c. 60 ohms.
- d. 120 ohms.

56. Two resistors are in parallel. If resistor A carries twice the current that resistor B does then it means that:

- a. A has half the resistance of B.
- b. B has half the resistance of A.
- c. the voltage across A is twice that across B.
- d. the voltage across B is twice that across A.

57. Given five 1 kilohm resistors the least resistance that can be made would be:

- a. 50 ohms by arranging them in series.
- b. 50 ohms by arranging them in parallel.
- c. 200 ohms by arranging them in series.
- d. 200 ohms by arranging them in parallel.

58. Which of the following combinations of 28 ohm resistors would have a total resistance of 42 ohms?

- a. three resistors in series
- b. three resistors in parallel
- c. two resistors in parallel in series with another
- d. two resistors in parallel in series with another two in parallel

59. Two 100 ohm resistors arranged in parallel are wired in series with a 10 ohm resistor. The total resistance is:

- a. 60 ohms.
- b. 180 ohms.
- c. 190 ohms.
- d. 210 ohms.

60. Four 15 kilohm resistors are wired as shown. The total resistance is:



- a. 15 kilohms.
- b. 30 kilohms.
- c. 20 kilohms.
- d. 60 kilohms.

61. A 5 ohm and a 10 ohm resistor are wired in series and connected to a 30 volt power supply. The current flow from the power supply is:

- a. 0.5 ampere.
- b. 1 ampere.
- c. 2 ampere.
- d. 15 ampere.

62. Three 12 ohm resistors are wired in parallel and connected to an 8 volt supply. The total current flowing from the 8 volt supply is:

- a. 1 ampere.
- b. 2 ampere.
- c. 3 ampere.
- d. 4.5 ampere.

63. Two 33 ohm resistors are connected in series with a power supply. If the current flow is 100 mA then the voltage across one resistor is:

- a. 66 volts.
- b. 33 volts.
- c. 3.3 volts.
- d. 1 volt.

64. Three resistors of 3.3, 4.7 and 10 ohms are connected in series across a 36 volt battery. The current flowing through the 10 ohm resistor is:

- a. 0.5 ampere.
- b. 1.0 ampere.
- c. 2.0 ampere.
- d. 3.6 ampere.

65. One way of operating a 3 volt bulb from a 9 volt supply would be to:

- a. operate it in series with the supply.
- b. operate it in parallel with the supply.
- c. operate it in series with a resistor.
- d. operate it in parallel with a resistor.

66. How many identical lamps each rated at 250 mA could be operated full current from a 5A supply?

- a. 50 lamps
- b. 30 lamps
- c. 20 lamps
- d. 5 lamps

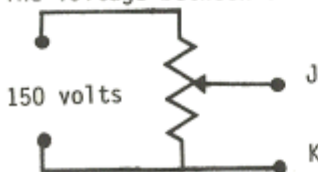
67. A set of three resistors each of 33 ohms wired in parallel is connected to a power supply. If each resistor is carrying 1 ampere the voltage of the power source is:

- a. 99 volts.
- b. 33 volts.
- c. 11 volts.
- d. 1 volt.

68. If two resistors of 180 and 820 ohms are connected in series across a 15 volt DC supply the current flow in the circuit is:

- a. 15 milliamperes.
- b. 30 milliamperes.
- c. 15 amperes.
- d. 30 amperes.

69. The resistor has a resistance of 66 ohms while the resistance between J & K is 22 ohms. The voltage between J & K would be:



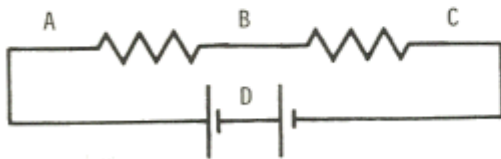
- a. 450 volts.
- b. 150 volts.
- c. 100 volts.
- d. 50 volts.

70. If six identical bulbs each rated at 2 volts were connected in series the supply voltage needed to cause the bulbs to light normally would be:

- a. 3 V.
- b. 12 V.
- c. 6 V.
- d. 2 V.

71. How many 12 volt bulbs should be arranged in series to form a string of lights to operate from a 240 volt power supply?
 a. 12×240 b. $240 + 12$ c. $240 - 12$ d. $240 \div 12$
72. Often in the small decorative lights used on Xmas trees, if one bulb is removed the rest will fail to light. This would indicate that:
 a. removing one bulb causes the others to blow.
 b. only that bulb was satisfactory.
 c. the bulbs are arranged in parallel.
 d. the bulbs are arranged in series.
73. Three 10 000 ohm resistors are connected in series across a 90 volt DC power supply. The voltage drop across one of the resistors is:
 a. 30 volts. b. 60 volts. c. 90 volts. d. 15.8 volts.

74. The current in this circuit will be the same at:



- a. A and B.
 b. B and C.
 c. A, B and C.
 d. A, B, C and D.

75. Two resistors of the same value, are arranged in a series circuit with a battery. It is true to say that:

	Voltage across each resistor	Current in each resistor
a.	same	same
b.	same	different
c.	different	same
d.	different	different

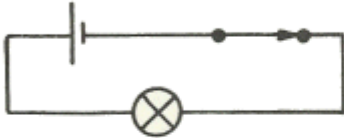
76. A 100 ohm resistor is connected across the terminals of a 3 volt battery. To double the current flowing in the circuit it is necessary to add a:
 a. 100 ohm resistor in series.
 b. 50 ohm resistor in series.
 c. 100 ohm resistor in parallel.
 d. 50 ohm resistor in parallel.
77. Power is expressed in:
 a. ohms. b. watts. c. amperes. d. volts.
78. Which of the following two quantities should be multiplied together to find power:
 a. resistance and capacitance. b. voltage and current.
 c. voltage and inductance. c. inductance and capacitance.
79. Which two electrical units multiply together to give the unit "watts"?
 a. volts and amperes. b. volts and farads.
 c. farads and henrys. d. amperes and henrys.
80. A resistor is rated at 2 watts. This means the resistor:
 a. needs 2 watts to operate correctly. b. can safely dissipate 2 watts of power.
 c. will limit the power to 2 watts. d. has a resistance of 2 watts.

81. A resistor in a circuit becomes very hot and starts to burn. This is because the resistor is dissipating too much:
- current.
 - voltage.
 - resistance.
 - electrical power.
82. High power resistors are usually large with heavy leads. The size aids the operation of the resistor by:
- allowing higher voltage to be handled.
 - making it shock proof.
 - increasing the effective resistance of the resistor.
 - allowing heat to dissipate more readily.

83. The resistor that would dissipate most heat would be marked:

- 20 watts.
- 0.5 watts.
- 2 ohms.
- 10 ohms.

84. In this circuit most electrical energy would be converted to heat and light energy in:



- connecting wires.
- electric cell.
- electrical switch.
- light bulb.

85. A 12 volt light bulb is rated at a power of 30 watts. The current drawn would be:

- 360 amperes.
- 18 amperes.
- $\frac{30}{12}$ amperes.
- $\frac{12}{30}$ amperes.

86. The minimum power rating of a resistor passing 10 mA at 10 volts PD would need to be:

- 0.01 watt.
- 0.1 watt.
- 1 watt.
- 10 watt.

87. If two resistors each of 10 ohms are connected in series with a battery of 10 volts then the power consumption would be:

- 5 watts.
- 10 watts.
- 20 watts.
- 100 watts.

88. Each of 9 resistors in a circuit is dissipating 4 watts. If the circuit operates from a 12 volt supply the total current flowing in the circuit is:

- 48 amperes.
- 36 amperes.
- 9 amperes.
- 3 amperes.

89. A power supply of 25 volts DC is supplying five 10 ohms resistors in series. The power rating of each resistor needs to be at least:

- 1 watt.
- 2 watts.
- 3 watts.
- 4 watts.

90. Three 18 ohm resistors are connected in parallel across a 12 volt DC supply. The total power dissipation of the resistors is:

- 3 watts.
- 18 watts.
- 24 watts.
- 36 watts.

91. One advantage in replacing a 50 ohm resistor with a parallel combination of two similarly sized 100 ohm resistors is that the parallel combination will have:

- greater resistance and similar power rating.
- lesser resistance and similar power rating.
- the same resistance but greater power rating.
- the same resistance but lesser power rating.

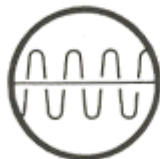
92. Voltage and current readings are given for various resistors in a circuit. Which resistor will dissipate the most power?
- a. 2 volts and 40 mA
b. 1 volt and 1 ampere
c. 250 mA and 250 mV
d. 500 mA and 3 volts
93. A resistor of 10 kilohms has a current of 20 mA flowing through it. The power dissipated in the resistor is:
- a. 2 watts.
b. 4 watts.
c. 20 watts.
d. 40 watts.

Direct current

1-a	2-b	3-a	4-c	5-b	6-b	7-a	8-a	9-c	10-b
11-d	12-d	13-c	14-b	15-a	16-c	17-d	18-c	19-a	20-a
21-d	22-a	23-d	24-c	25-d	26-a	27-b	28-c	29-d	30-d
31-a	32-b	33-b	34-a	35-b	36-d	37-c	38-d	39-a	40-d
41-a	42-b	43-c	44-d	45-b	46-d	47-c	48-b	49-d	50-b
51-d	52-b	53-a	54-d	55-c	56-a	57-d	58-c	59-a	60-c
61-c	62-b	63-c	64-c	65-c	66-c	67-b	68-a	69-d	70-b
71-d	72-d	73-a	74-d	75-a	76-c	77-b	78-b	79-a	80-b
81-d	82-d	83-a	84-d	85-c	86-b	87-a	88-d	89-c	90-c
91-c	92-d	93-b							

AC CIRCUIT

1. The frequency of a current is 50 hertz. This means:
- a. a potential difference of 50 volts exists.
b. the current flow is 50 ampere.
c. the power dissipated is 50 watts.
d. the current oscillates 50 times per second.
2. Current in an AC circuit goes through a complete cycle in 0.1 second. This means the AC has a frequency of:
- a. 1 Hz.
b. 10 Hz.
c. 100 Hz.
d. 1 000 Hz.
3. A signal formed when a 4 kHz sine wave is mixed with signals of 8, 12 and 16 kHz is called a:
- a. pure sine wave.
b. single harmonic wave.
c. frequency response curve.
d. complex wave.
4. A signal is found to be made of a fundamental frequency of 2 kHz and another signal of 4 kHz. This 4 kHz signal is referred to as:
- a. a fundamental of the 2 kHz signal.
b. a harmonic of the 2 kHz signal.
c. the DC component of the main signal.
d. a dielectric signal of the main signal.
5. A mixture of many different AC waveforms is termed:
- a. a fundamental wave.
b. a harmonic wave.
c. a complex wave.
d. an induced wave.
6. The diagram shows a voltage trace on a cathode ray screen. It represents:



- a. direct current.
b. alternating voltage.
c. output of dry cell.
d. output of lead acid cell.

7. The shape shown is often described as a:



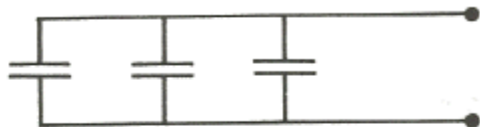
- a. RMS wave.
b. harmonic wave.
c. sine wave.
d. coupling wave.

8. To generate an AC sine wave two basic components are needed. These are:

- a. primary cell and wire.
b. wire coil and magnet.
c. magnet and primary cell.
d. wire coil and a resistor.

9. A useful value which indicates the effective voltage in an AC circuit is the:
- RMS value.
 - peak value.
 - surge value.
 - clipping value.
10. RMS voltage refers to effective voltage. A correct formula about RMS voltage is:
- $\text{RMS} = .707 \times \text{peak}$.
 - $\text{RMS} = .707 \times \text{average}$.
 - $\text{RMS} = 1.414 \times \text{peak}$.
 - $\text{RMS} = 1.414 \times \text{average}$.
11. An AC supply and DC supply are connected to identical bulbs and adjusted until each bulb is equally bright. The DC supply is found to be 6 volts. Thus the AC supply is 6 volts:
- peak.
 - RMS.
 - surge.
 - peak to peak.
12. An equivalent of "one cycle per second" is one:
- henry.
 - volt.
 - hertz.
 - coulomb.
13. One megahertz is equal to:
- 0.001 Hz.
 - 100 kHz.
 - 1 000 kHz.
 - 10 Hz.
14. A radio component would be identified as a capacitor if its value was measured in:
- microvolts.
 - millihenrys.
 - megohms.
 - picofarads.
15. A $0.01 \mu\text{F}$ capacitor is formed from two metal plates separated by air. The capacitor could be changed to $0.02 \mu\text{F}$ by:
- bringing the metal plates closer together.
 - making the plates smaller in size.
 - charging the capacitor to a high voltage.
 - touching the two plates together.

16. The circuit shows:



- three capacitors in series.
 - three capacitors in parallel.
 - three chokes in series.
 - three chokes in parallel.
17. Which of the following is most likely to be a capacitor of $200 \mu\text{F}$?
- a plastic capacitor
 - ceramic capacitor
 - silver mica capacitor
 - electrolytic capacitor
18. The material which separates the plates of a capacitor is the:
- dielectric.
 - nicad.
 - resistor.
 - lamination.
19. Which of the following factors affects capacitance?
- thickness of dielectric
 - surrounding magnetic field
 - capacitor working voltage
 - resistance between the plates
20. Compared to an RF by-pass capacitor an AF by-pass capacitor will have a:
- larger capacitance.
 - smaller capacitance.
 - larger inductance.
 - smaller inductance.
21. One thousand picofarads means the same as:
- 0.1 microfarads.
 - 0.01 microfarads.
 - 0.001 microfarads.
 - 0.0001 microfarads.

22. This symbol represents:



- a. an aerial.
- b. a capacitor.
- c. an inductor.
- d. a diode.

23. Substances like iron or ferrite are used in inductors since they have high:

- a. resistance.
- b. conductivity.
- c. permeability.
- d. capacitance.

24. The inductance of a coil would be increased by:

- a. inserting a ferrite rod.
- b. removing some turns.
- c. inserting a brass core.
- d. winding on a thinner former.

25. Another name for an inductor is a:

- a. carbon resistor.
- b. dielectric.
- c. choke.
- d. diode.

26. The unit to indicate the value of inductance in a radio component is called the:

- a. ohm.
- b. farad.
- c. volt.
- d. henry.

27. A changing magnetic field around a wire coil will cause:

- a. A.F. by-passing.
- b. R.F. by-passing.
- c. an induced emf.
- d. an induced capacitance.

28. In some components a changing current causes a changing magnetic field which opposes this change in current. These components would be called:

- a. resistors.
- b. capacitors.
- c. inductors.
- d. transistors.

29. An inductance of 10 000 microhenries may be stated correctly as:

- a. 10 henrys.
- b. 100 millihenrys.
- c. 10 millihenrys.
- d. 1 000 henrys.

30. A moving coil meter can be easily protected from mechanical damage while being transported by:

- a. shorting its terminals.
- b. leaving its terminals open circuit.
- c. applying a constant voltage.
- d. applying a constant current.

31. Four radio chokes each of 12 microhenry are wired in series. The total inductance will be closest to:

- a. 3 microhenry
- b. 4 microhenry
- c. 12 microhenry
- d. 48 microhenry

32. The effective inductance of this combination is:



- a. more than 100 μH .
- b. less than 2 μH .
- c. between 2 and 10 μH .
- d. between 10 and 100 μH .

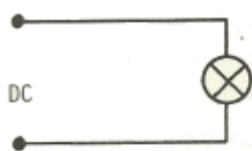
33. Two 12 millihenry chokes are wired in parallel. The effective inductance is:

- a. 3 millihenry.
- b. 6 millihenry.
- c. 12 millihenry.
- d. 24 millihenry.

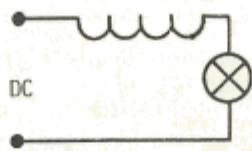
34. To replace a faulty 10 millihenry choke you could use two:

- a. 5 millihenry chokes in series.
- b. 5 millihenry chokes in parallel.
- c. 10 millihenry chokes in series.
- d. 10 millihenry chokes in parallel.

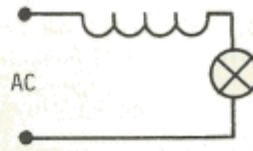
35. Three inductances $1\mu\text{H}$, $10\mu\text{H}$ and $100\mu\text{H}$ are wired in parallel. The effective inductance of this combination is:
- more than $100\mu\text{H}$.
 - less than $1\mu\text{H}$.
 - between 1 and $10\mu\text{H}$.
 - between 10 and $100\mu\text{H}$.
36. Three 15 picofarad capacitors are wired in parallel. The capacitance of the combination is:
- 45 picofarad.
 - 18 picofarad.
 - 12 picofarad.
 - 5 picofarad.
37. Three 15 microfarad capacitors are wired in series. The capacitance of the combination is:
- 45 microfarad.
 - 18 microfarad.
 - 12 microfarad.
 - 5 microfarad.
38. Which series combinations of capacitors would best replace a faulty 10 microfarad capacitor?
- two 10 microfarad capacitors.
 - ten 2 microfarad capacitors.
 - two 20 microfarad capacitors.
 - twenty 2 microfarad capacitors.
39. A parallel combination of 20 , 15 and $10\mu\text{F}$ capacitors will have a total capacitance of
- less than $10\mu\text{F}$.
 - between 10 and $15\mu\text{F}$.
 - between 15 and $20\mu\text{F}$.
 - greater than $20\mu\text{F}$.
40. Both capacitors and inductances can oppose AC. This opposition to AC is referred to as:
- resistance.
 - resonance.
 - SWR.
 - reactance.
41. In general the reactance of capacitors increases as:
- AC frequency increases.
 - AC frequency decreases.
 - applied voltage increases.
 - applied voltage decreases.
42. A capacitor acts as an open circuit to 10 Hz AC yet readily passes 10 KHz AC. This indicates that the:
- dielectric is breaking down.
 - electrostatic shielding is changing.
 - copper losses are occurring.
 - reactance depends on frequency.
43. An air spaced capacitor has a high reactance to an AC signal. This means that the:
- capacitor will tend to pass the AC.
 - capacitor will tend to block the AC.
 - air will become conductive to the AC.
 - air will act as an insulator to the AC.
44. An audio frequency choke is different from a radio frequency choke in that the audio frequency choke has:
- few iron laminations or cores.
 - many iron laminations or cores.
 - a great thickness of dielectric.
 - a thin layer of dielectric.
45. A component which tends to pass low frequency AC better than higher frequency AC is:
- an inductance.
 - a capacitor.
 - a resistor.
 - a transistor.
46. In general the reactance of inductors increases with:
- decreasing AC frequency.
 - increasing AC frequency.
 - decreasing applied voltage.
 - increasing applied voltage.



bulb lights



bulb lights



bulb does not light

The effect shown in these circuits illustrates that the inductor has a high:

- a. AC reactance. b. DC reactance.
 c. AC rectification. d. DC rectification.
48. A coiled length of wire may readily pass DC yet may oppose AC. This is due to the wire acting as a:
 a. capacitor. b. inductor. c. resistor. d. transistor.
49. In inductances AC may be opposed by both resistance of winding wire and reactance due to inductive effect. The term which includes resistance and reactance is:
 a. resonance. b. capacitance. c. inductance. d. impedance.
50. A set of audio headphones is labelled "impedance 8 ohms". This impedance is:
 a. greater than the resistance. b. less than the reactance.
 c. equal to the resistance. d. equal to the reactance.
51. This is the symbol for:



- a. a capacitor.
 b. a microphone.
 c. a loudspeaker.
 d. an iron cored transformer.

52. Which of the following is a type of loss that usually occurs in power transformers?
 a. resonance loss b. copper loss c. frequency loss d. diode loss
53. The fact that energy transfer from primary to secondary winding in a power transformer is not perfect is indicated by:
 a. large secondary currents. b. high primary voltages.
 c. warm iron laminations. d. electrostatic shielding.
54. A transformer when used to power a transistor radio from the mains is being used to:
 a. match impedance. b. reduce the voltage.
 c. produce less power. d. match reactances.
55. An electrostatic screen between windings on a transformer acts to:
 a. increase magnetic coupling. b. increase capacitive coupling.
 c. decrease magnetic coupling. d. decrease capacitive coupling.
56. In a circuit a transformer is shown connecting an amplifier stage to a speaker. This transformer is being used to match:
 a. voltages. b. SWR. c. impedances. d. frequencies.
57. The core of a power transformer is usually laminated to:
 a. reduce manufacturing cost. b. reduce transformer weight.
 c. reduce heat in transformer. d. increase the turns ratio.

58. The insulated laminations in a transformer act to reduce currents in the:

- a. primary winding.
- b. secondary winding.
- c. iron transformer core.
- d. wiring around the transformer.

59. Power transformers operate by the principle of:

- a. mutual inductance.
- b. magnetic attraction.
- c. piezo electric effect.
- d. copper losses.

60. The primary winding of a 240 V mains operated transformer has 720 turns. The secondary number of turns needed for a 20 volt output is:

- a. 20.
- b. 60.
- c. 240.
- d. 720.

61. A transformer operates a 6.3 volt 2 ampere light bulb from its secondary winding. The power consumed by the primary is approximately:

- a. 3 watts.
- b. 6 watts.
- c. 8 watts.
- d. 13 watts.

62. A transformer has a 240 volt primary that draws a current of 250 mA from the mains supply. Assuming no losses, what current would be available from a 12 volt secondary?

- a. 215 amperes
- b. 5 amperes
- c. 25 amperes
- d. 50 amperes

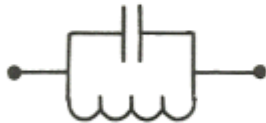
63. On a mains power transformer the primary winding has 250 turns and the secondary has 500. If the input voltage is 240 volts the likely secondary voltage is:

- a. 24
- b. 120
- c. 480
- d. 500

64. A tuned circuit is formed from two basic components. These are:

- a. diodes and transistors.
- b. resistors and valves.
- c. directors and reflectors.
- d. inductors and capacitors.

65. The resonant frequency of this circuit depends on:



- a. frequency of applied signal.
- b. capacitor value only.
- c. inductor value only.
- d. capacitor and inductor value.

66. This is a:



- a. series rectifier circuit.
- b. series resonant circuit.
- c. parallel rectifier circuit.
- d. parallel resonant circuit.

67. This is a:



- a. series rectifier circuit.
- b. series resonant circuit.
- c. parallel rectifier circuit.
- d. parallel resonant circuit.

68. When a parallel coil-capacitor combination is supplied with AC of different frequencies there will be one frequency where the impedance is highest. This is termed the:
- reactive frequency.
 - impedance frequency.
 - inductive frequency.
 - resonant frequency.
69. In a parallel resonant circuit at resonance the circuit has a:
- low impedance..
 - high impedance.
 - low mutual inductance.
 - high mutual inductance.
70. In a series resonant circuit at resonance the circuit has a:
- low impedance.
 - high impedance.
 - low mutual inductance.
 - high mutual inductance.
71. A coil and air-spaced capacitor are arranged to form a resonant circuit. The resonant frequency will remain the same if we:
- wind more turns on the coil.
 - increase the area of plates in capacitor.
 - replace the air with oil in the capacitor.
 - add a resistor to the circuit
72. Resonant circuits are frequently used in receivers since they form a circuit which changes impedance with changes in applied:
- current direction.
 - voltage level.
 - signal frequency.
 - standing wave ratio.
73. Piezo electric effects are used in:
- magnetic earphones.
 - crystal microphones.
 - series resistance circuits.
 - parallel resistance circuits.
74. Piezo electricity is generated by:
- touching crystals with magnets.
 - moving a magnet near a wire coil.
 - inserting metal rods into acid.
 - deforming certain crystals.
75. The operation of crystal microphones depends on the:
- mutual induction effect.
 - piezo electric effect.
 - parallel resonance effect.
 - decibel effect.
76. The unit "decibel" is used to indicate:
- certain radio waves.
 - single side band signal.
 - cathode ray wave forms.
 - mathematical ratios.
77. The power output from a transmitter increases from 1 watt to 2 watt. This is a db increase of:
- 1 db.
 - 3 db.
 - 10 db.
 - 30 db.

ANSWERS

AC circuits

1-d	2-b	3-d	4-b	5-c	6-b	7-c	8-b	9-a	10-d
11-b	12-c	13-c	14-d	15-a	16-b	17-d	18-a	19-a	20-a
21-c	22-c	23-c	24-a	25-c	26-d	27-c	28-c	29-c	30-a
31-d	32-a	33-b	34-a	35-b	36-a	37-d	38-c	39-d	40-d
41-b	42-d	43-b	44-b	45-a	46-b	47-a	48-b	49-d	50-a
51-d	52-b	53-c	54-b	55-d	56-c	57-c	58-c	59-a	60-b
61-d	62-b	63-c	64-d	65-d	66-b	67-d	68-d	69-b	70-a
71-d	72-c	73-b	74-d	75-b	76-d	77-b			