Unit 16: Current Electricity

63 MCQs. Correct option in bold. 1 mark each.

1. The formula for electric current is
A. $I = Q/\Delta t$ B. $I = \Delta t/Q$
C. $I = Q + \Delta t$ D. $I = Q\Delta t$

2. The SI unit of electric current is the
A. coulomb **B. ampere** C. ohm D. volt

3. One ampere is the current when _____ of charge flows through a cross-section in one second.
A. one volt B. one ohm
C. one joule **D. one coulomb**

4. The assumed direction of flow of positive charges from the positive to the negative terminal of a battery is called
A. actual current B. induced current
C. conventional current D. alternating current

5. The directions of actual current and conventional current are
A. the same **B. opposite to each other**
C. unrelated D. perpendicular to each other

6. A battery charged at 10 A for 2 hours receives a charge of
A. 72,000 C B. 1,200 C C. 20 C D. 7,200 C

7. 1 Ah is equal to
A. 1 C B. 1000 C C. 60 C **D. 3600 C**

8. A 200 Ah battery is charged with a current of 25 A. The time required is
A. 0.125 hours B. 5000 hours
C. 8 hours D. 225 hours

9. If 3 A of current flows for 2 minutes, the charge crossing a cross-section is
A. 6 C B. 1.5 C C. 180 C **D. 360 C**

10. A current of 1 mA passes through a wire. The number of electrons passing a point in 10 s is
A. 6.25×10^{-16} B. 6.25×10^{13}
C. 6.25×10^{16} D. 6.25×10^{19}

11. Direct current (DC) flows
A. in circles **B. in one fixed direction**
C. only in AC mains D. in alternating directions

12. Alternating current (AC) changes its direction
A. continuously B. only when the battery is replaced
C. never D. once

13. The difference of electric potential between two points is called
A. resistance B. current
C. electromotive force **D. potential difference**

14. The formula for potential difference is
A. $V = q/W$ B. $V = Wq$ **C. $V = W/q$** D. $V = W + q$

15. The SI unit of potential difference is the
A. ampere **B. volt** C. watt D. ohm

16. One volt is equal to
A. one joule per coulomb B. one ampere per ohm
C. one coulomb per joule D. one watt per second

17. The energy supplied by a battery per unit positive charge is called
A. potential difference **B. electromotive force (emf)**
C. current D. resistance

18. The SI unit of emf is the
A. volt B. ampere C. joule D. ohm

19. An emf source is a device which converts
A. heat into light
B. electrical energy into heat
C. non-electrical energy into electrical energy
D. light into sound

20. The mathematical form of Ohm's law is
A. $V = R/I$ B. $V = I/R$ C. $I = VR$ **D. $V = IR$**

21. Devices that obey Ohm's law are called
A. insulators **B. ohmic devices**
C. semiconductors D. non-ohmic devices

22. Which of the following is a non-ohmic device?
A. Carbon resistor B. Copper wire
C. Diode D. Silver wire

23. Which of the following is an ohmic device?
A. Copper wire B. Filament bulb
C. Thermistor D. Semiconductor diode

24. A torch bulb uses two 1.5 V cells in series and has a resistance of 20 Ω. The current is
A. 1.5 A B. 30 A C. 6.7 A **D. 0.15 A**

25. A device connected to a 12 V battery allows a current of 200 mA. Its resistance is
A. 60 Ω B. 0.6 Ω C. 6 Ω D. 2400 Ω

26. A 12.0 V emf source is connected to a bulb through which 2.0 A flows. The resistance of the bulb is
A. 24 Ω B. 0.17 Ω C. 10 Ω **D. 6 Ω**

27. A voltage of 5000 V is needed to pass 50 A through a resistance of
A. 0.01 Ω **B. 100 Ω** C. 10 Ω D. 250 Ω

28. The current through a resistor is 0.5 A at 6.0 V. At 9.0 V, the current is
A. 0.33 A B. 1.5 A **C. 0.75 A** D. 0.25 A

29. Resistance is the
A. opposition to the flow of charges B. force on charges
C. energy of charges D. flow of charges

30. The SI unit of resistance is the
A. volt B. siemens C. ampere **D. ohm**

31. The resistance of a wire is directly proportional to its
A. cross-sectional area **B. length**
C. voltage D. current

32. The resistance of a wire is inversely proportional to its
A. resistivity B. length
C. cross-sectional area D. temperature

33. If a wire's length is doubled (same area), its resistance becomes
A. four times B. half
C. one fourth **D. double**

34. The resistance of a conductor as the temperature rises
A. increases B. becomes zero
C. stays constant D. decreases

35. The resistance of semiconductors as the temperature rises
A. increases **B. decreases**
C. becomes infinite D. stays constant

36. A tungsten bulb burns out the moment it is switched on mainly because
A. the filament is thick
B. the filament has high resistance when cold
C. the cold filament has low resistance so a large current flows
D. the voltage drops

37. The resistance of a material always decreases when
A. temperature increases B. area decreases
C. length increases **D. the number of free electrons increases**

38. Conductance is the reciprocal of
A. resistance B. resistivity
C. voltage D. current

39. The resistance offered by a wire of length 1 m and cross-sectional area 1 m^2 is called
A. conductivity **B. resistivity**
C. capacitance D. conductance

40. The formula for resistance in terms of resistivity is
A. $R = L/\rho A$ B. $R = A/\rho L$ **C. $R = \rho L/A$** D. $R = \rho A/L$

41. The formula for resistivity is
A. $\rho = L/RA$ **B. $\rho = RA/L$** C. $\rho = RL/A$ D. $\rho = R/AL$

42. The SI unit of resistivity is
A. ohm B. ohm per metre squared
C. ohm-metre D. ohm per metre

43. Good electrical conductors have
A. very low resistivities B. resistivity equal to insulators
C. very high resistivities D. zero conductivity

44. The resistivity of semiconductors lies
A. below conductors
B. equal to metals
C. above insulators
D. between those of conductors and insulators

45. Which of these metals has the lowest resistivity in the book's table?
A. Silver B. Gold C. Copper D. Aluminium

46. The resistivity of copper is about
A. 1.72×10^{8} Ω m B. 1.72×10^{-4} Ω m
C. 1.72×10^{-8} Ω m D. 1.72×10^{-2} Ω m

47. A 1 m silver wire ($\rho = 1.6\times10^{-8}$ Ω m) with area 0.4 cm² has resistance
A. 40 mΩ B. 0.4 Ω C. 4 Ω **D. 0.4 mΩ**

48. A wire of length 2 m and area 0.4 mm² has resistance 0.085 Ω. Its resistivity is
A. 1.7×10^{-3} Ω m **B. 1.7×10^{-8} Ω m**
C. 1.7×10^{-6} Ω m D. 1.7×10^{-10} Ω m

49. The resistivity of a metal _____ with rising temperature.
A. becomes zero B. remains constant
C. decreases **D. increases**

50. The temperature coefficient of resistivity is positive for
A. metals B. glass
C. semiconductors D. insulators

51. The temperature coefficient of resistivity is negative for
A. silver **B. semiconductors**
C. metals D. copper

52. The relation between final and initial resistivity is
A. $\rho_t = \rho_0 \alpha\Delta T$ B. $\rho_t = \rho_0/(\alpha\Delta T)$
C. $\rho_t = \rho_0(1 + \alpha\Delta T)$ D. $\rho_t = \rho_0(1 - \alpha\Delta T)$

53. The resistivity of a metal is 1.7×10^{-8} Ω m. After a rise of 50 K with $\alpha = 0.004\ K^{-1}$, the new resistivity is
A. 2.04×10^{-8} Ω m B. 1.36×10^{-8} Ω m
C. 3.4×10^{-8} Ω m D. 1.7×10^{-8} Ω m

54. An ammeter is used to measure
A. resistance B. potential difference
C. power **D. current**

55. An ammeter must be connected in
A. parallel **B. series**
C. series-parallel D. any manner

56. An ammeter is designed to have
A. very high resistance B. no wires
C. very low resistance D. infinite resistance

57. The resistance of an ammeter is usually of the order of
A. 10 MΩ **B. 1 Ω** C. 1 MΩ D. 1000 Ω

58. A voltmeter is used to measure
A. power B. current
C. potential difference D. resistance

59. A voltmeter must be connected in
A. parallel B. series-parallel
C. any manner D. series

60. A voltmeter is designed to have
A. zero resistance B. very low resistance
C. no resistance **D. very high resistance**

61. The resistance of a voltmeter is usually of the order of
A. 10 Ω **B. 10 MΩ** C. 1 Ω D. 1 kΩ

62. Ammeters and voltmeters are modified forms of the
A. galvanometer B. diode
C. capacitor D. transformer

63. In the resistance experiment, the resistance is calculated using
A. R = I/V B. R = VI **C. R = V/I** D. R = V + I