Unit 17: Electric Circuits

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

1. Active elements in a circuit
A. can supply or generate energy B. do nothing
C. only absorb energy D. only store energy

2. A component whose function is to provide a specified value of resistance is a
A. inductor **B. resistor** C. capacitor D. diode

3. Resistors dissipate electrical energy as
A. sound B. light **C. heat** D. magnetism

4. The resistance of a carbon resistor is indicated by
A. a magnetic strip B. a numeric screen
C. a hologram **D. colour bands**

5. The first two bands of a resistor represent
A. the multiplier B. the power rating
C. the significant figures D. the tolerance

6. The fourth band, silver or gold, indicates the
A. multiplier B. first digit
C. second digit **D. tolerance**

7. A resistor with bands green, blue, orange and gold has a resistance of
A. 56 kΩ ± 5 % B. 56 Ω ± 5 %
C. 560 kΩ ± 10 % D. 5.6 kΩ ± 5 %

8. A resistor has first three bands brown, black and red. Its value is
A. 10 kΩ **B. 1 kΩ** C. 2 kΩ D. 100 Ω

9. A variable resistor used to regulate current in a circuit is called a
A. capacitor B. thermistor
C. potentiometer **D. rheostat**

10. A circuit that produces an output voltage that is a fraction of its input voltage is called a
A. rectifier **B. potential divider**
C. relay D. transformer

11. In a potential divider, the output voltage across R_2 is
A. V $R_2/(R_1 + R_2)$ B. V $R_1/(R_1 + R_2)$
C. V $(R_1 + R_2)$ D. V R_1R_2

12. If $R_1 = R_2$ in a potential divider, the output voltage is
A. zero B. double the input voltage
C. half the input voltage D. equal to the input voltage

13. A thermistor is a resistor whose resistance varies significantly with
A. voltage only B. light
C. length **D. temperature**

14. The resistance of an NTC thermistor _____ with increasing temperature.
A. remains constant **B. decreases**
C. becomes infinite D. increases

15. The best metal for resistance thermometers (RTDs) is
A. platinum B. aluminium C. gold D. lead

16. The resistance of an LDR as light intensity increases
A. increases B. becomes infinite
C. decreases D. stays constant

17. An LDR is used in
A. automatic lighting control B. fuses
C. heating elements D. generators

18. For resistors in series, the _____ is the same through each resistor.
A. voltage **B. current**
C. power D. resistance

19. The equivalent resistance in series is
A. $R_1 - R_2 - R_3$ B. $R_1R_2R_3$
C. $R_1 + R_2 + R_3$ D. $1/R_1 + 1/R_2 + 1/R_3$

20. Resistors of 10 Ω, 20 Ω and 30 Ω in series have equivalent resistance
A. 5.45 Ω B. 6000 Ω C. 20 Ω **D. 60 Ω**

21. Resistors of 10 Ω, 20 Ω and 30 Ω in series across 20 V carry a current of
A. 0.333 A B. 0.67 A C. 3 A D. 1 A

22. In that series circuit (10 Ω, 20 Ω, 30 Ω, 20 V), the voltage across the 30 Ω resistor is about
A. 6.7 V **B. 10 V** C. 20 V D. 3.3 V

23. The equivalent resistance in parallel is given by
A. $Req = R_1R_2R_3$ B. $Req = R_1 + R_2 + R_3$
C. $1/Req = 1/R_1 + 1/R_2 + 1/R_3$ D. $Req = R_1 - R_2$

24. Resistors of 5 Ω, 10 Ω and 15 Ω in parallel have equivalent resistance about
A. 0.37 Ω B. 30 Ω C. 10 Ω **D. 2.73 Ω**

25. Resistors of 8 Ω, 12 Ω and 18 Ω in parallel have equivalent resistance about
A. 3.789 Ω B. 38 Ω C. 0.26 Ω D. 12.7 Ω

26. Resistors of 5 Ω, 10 Ω and 15 Ω in parallel across 12 V: the current through the 5 Ω resistor is
A. 1.2 A **B. 2.4 A** C. 4.4 A D. 0.8 A

27. The total current in that parallel circuit (5 Ω, 10 Ω, 15 Ω across 12 V) is
A. 2.4 A B. 1.2 A C. 0.8 A **D. 4.4 A**

28. Two 4 Ω resistors are in parallel and in series with a 6 Ω resistor. The equivalent resistance is
A. 4 Ω B. 14 Ω **C. 8 Ω** D. 10 Ω

29. A wire of resistance R is divided into 10 equal parts connected in parallel. The equivalent resistance is
A. 10 R B. 0.1 R C. R **D. 0.01 R**

30. In a parallel connection of two bulbs, if bulb A glows brighter than B, then the resistance
A. RA = 0 **B. RA < RB** C. RA > RB D. RA = RB

31. Series combination of emf sources is used to obtain
A. a higher voltage B. lower current only
C. lower voltage D. a higher ampere-hour value

32. Four 1.5 V, 2.5 Ah batteries in series give
A. 6.0 V, 10 Ah B. 1.5 V, 10 Ah
C. 6.0 V, 2.5 Ah D. 1.5 V, 2.5 Ah

33. In a parallel connection of identical emf sources, the equivalent emf is
A. equal to the emf of one source B. the product of emfs
C. zero D. the sum of the emfs

34. Parallel combination of emf sources is used when we need
A. a lower ampere-hour B. a higher voltage
C. a higher ampere-hour value D. less current

35. Three 12 V, 2 Ah batteries in parallel give
A. 36 V, 2 Ah **B. 12 V, 6 Ah**
C. 36 V, 6 Ah D. 12 V, 2 Ah

36. When four cells each of 0.5 V are connected in parallel, the net emf is
A. 0.75 V B. 4.5 V C. 2.0 V **D. 0.5 V**

37. The number of 0.4 V cells in series needed to get 12 V is
A. 30 B. 12 C. 48 D. 3

38. The electrical energy consumed in a device is given by
A. E = I/Vt B. E = V/It **C. E = VIt** D. E = VI/t

39. The electrical energy can also be written as
A. $E = IRt^2$ **B. $E = I^2Rt$** C. $E = R/I^2t$ D. E = IR/t

40. An iron working at 200 V draws 7 A for 1 hour. The energy it consumes is
A. 50.4 MJ B. 504 kJ C. 1400 J **D. 5.04 MJ**

41. The formula for electric power is
A. P = I + V B. P = I/V **C. P = IV** D. P = V/I

42. The SI unit of power is the
A. watt B. volt C. joule D. ampere

43. The power consumption of a toaster of 19 Ω resistance at 200 V is about
A. 3800 W B. 10.5 W C. 380 W **D. 2100 W**

44. A device of 10 Ω connected to 120 V consumes
A. 14.4 W **B. 1440 W** C. 1200 W D. 12 W

45. A 100 Ω resistor of power rating 0.5 W connected to 10 V will dissipate
A. 10 W, and be safe B. 0.5 W, and be safe
C. 0.1 W, and be safe **D. 1 W, and will be damaged**

46. A 60 W bulb switched on for 5 hours consumes
A. 300 Wh B. 3 Wh C. 65 Wh D. 12 Wh

47. 1 kilowatt-hour equals
A. 3600 J
B. 3.6×10^3 J
C. 3.6×10^6 J
D. 1000 J

48. A device rated 500 W operating for 2 hours consumes
A. 250 kWh **B. 1 kWh** C. 0.25 kWh D. 1000 kWh

49. An air conditioner of 2200 W used 24 hours daily for 30 days consumes
A. 1584 kWh B. 52.8 kWh C. 158.4 kWh D. 15840 kWh

50. The monthly cost of that air conditioner at Rs 25 per kWh is
A. Rs 396,000
B. Rs 3,960
C. Rs 39,600
D. Rs 1,584

51. In household wiring, a mains circuit consists of
A. only an earth wire
B. only live and neutral wires
C. four live wires
D. a live wire, a neutral wire and an earth wire

52. The wire that carries the current from the power source to the appliance is the
A. earth wire
B. live wire
C. ground rod
D. neutral wire

53. The earth wire is a safety measure providing a
A. path to the supply
B. high-resistance path
C. low-resistance path for current to the ground
D. path for the neutral current

54. A fuse contains a metal strip that
A. melts when the current is larger than the rated value
B. never melts
C. increases current
D. stores charge

55. A circuit breaker
A. increases electrical resistance
B. interrupts the flow of electricity in case of a fault
C. stores energy
D. regulates voltage

56. The purpose of grounding electrical systems is to
A. reduce resistance
B. increase voltage
C. increase energy efficiency
D. protect against electric shocks

57. If a live wire touches a metal case that is earthed, a large current flows and the
A. current stops by itself
B. fuse blows or circuit breaker trips
C. bulb glows
D. case becomes safe without any effect

58. An RCD or GFCI detects a difference in current between the
A. two live wires only
B. earth and ground
C. live and neutral wires
D. bulb and switch

59. A GFCI interrupts the circuit when it detects a current difference of about
A. 5 milliamperes
B. 0.5 amperes
C. 500 amperes
D. 5 amperes

60. A current of 20 to 30 mA through the body can make a person
A. immune to shock
B. feel nothing
C. feel a slight tingle
D. unable to let go of the circuit