RK VISION ACADEMY

PHYSICS

XII – CURRENT ELECTRICITY

SECTION A

1. **The temperature coefficient of resistance for a wire is 0.00125/^{O}C . At 300K its resistance is 1 ohm. The temperature at which the resistance becomes 2 ohm is**
   (A) 1154 K
   (B) 1100 K
   (C) 1400 K
   (D) 1127 K

2. **The resistivity of a wire**
   (A) Increases with the length of the wire
   (B) Decreases with the area of cross-section
   (C) Decreases with the length and increases with the cross-section of wire
   (D) None of the above statement is correct

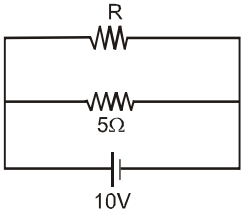
3. **Ohm's law is true**
   (A) For metallic conductors at low temperature
   (B) For metallic conductors at high temperature
   (C) For electrolytes when current passes through them
   (D) For diode when current flows

4. **The specific resistance of a wire is ρ , its volume is 3m^2 and its resistance is 3 ohms, then its length will be**
   (A) $\sqrt{\frac{1}{\rho}}$
   (B) $\frac{3}{\sqrt{\rho}}$
   (C) $\frac{1}{\rho}\sqrt{3}$
   (D) $\rho\sqrt{\frac{1}{3}}$

5. **The resistance of a wire of uniform diameter d and length L is R . The resistance of another wire of the same material but diameter 2d and length 4L will be**
   (A) 2R
   (B) 3R
   (C) R/2
   (D) R/4

6. **There is a current of 1.344 amp in a copper wire whose area of cross-section normal to the length of the wire is 1mm^3. If the number of free electrons per cm^3 is 8.8 x 10^{22}, then the drift velocity would be**
   (A) 1.0 mm/s
   (B) 1.0 m/s
   (C) 0.1 mm/s
   (D) 0.01 mm/s

7. **The power dissipated in the circuit shown in the figure is 30 Watts. The value of R is :**



   (A) 20 ohm
   (B) 15 ohm
   (C) 10 ohm
   (D) 30 ohm

8. **A certain piece of silver of given mass is to be made like a wire. Which of the following combination of length (L) and the area of cross-sectional (A) will lead to the smallest resistance**
   (A) L and A
   (B) 2L and A/2
   (C) L/2 and 2 A
   (D) Any of the above, because volume of silver remains same

9. The resistance of a wire is 10 Ω . Its length is increased by 10% by stretching. The new resistance will now be
(A) 12 Ω
(B) 1.2 Ω
(C) 13 Ω
(D) 11 Ω

10. The resistance of a wire is R. If the length of the wire is doubled by stretching, then the new resistance will be
(A) 2R
(B) 4R
(C) R
(D) R/4

11. The resistivity of a wire depends on its
(A) Length
(B) Area of cross-section
(C) Shape
(D) Material

12. If σ_1 and σ_2 are the electrical conductivities of Ge and Na respectively. If these substances are heated, then
(A) Both σ_1 and σ_2 increase
(B) σ_1 increases and σ_2 decreases
(C) σ_1 decreases and σ_2 increases
(D) Both σ_1 and σ_2 decrease

13. Masses of three wires of copper are in the ratio of 1 : 3 : 5 and their lengths are in the ratio of The ratio of their electrical resistances are
(A) 1 : 3 : 5
(B) 5 : 3 : 1
(C) 1 : 15 : 125
(D) 125 : 15 : 1

14. The charge of an electron is 1.6×10^{-19} C. How many electrons strike the screen of a cathode ray tube each second when the beam current is 16 mA
(A) 10^{17}
(B) 10^{19}
(C) 10^{-19}
(D) 10^{-17}

15. A nichrome wire 50 cm long and one square millimetre cross-section carries a current of 4A when connected to a 2V battery. The resistivity of nichrome wire in ohm metre is
(A) 1×10^{-6}
(B) 4×10^{-7}
(C) 3×10^{-7}
(D) 2×10^{-7}

16. What length of the wire of specific resistance 48×10^{-8} Ω is needed to make a resistance of 4.2 Ω (diameter of wire = 0.4 mm)
(A) 4.1 m
(B) 3.1 m
(C) 2.1 m
(D) 1.1 m

17. We have two wires A and B of same mass and same material. The diameter of the wire A is half of that B. If the resistance of wire A is 24 ohm then the resistance of wire B will be
(A) 12 Ohm
(B) 3.0 Ohm
(C) 1.5 Ohm
(D) None of the above

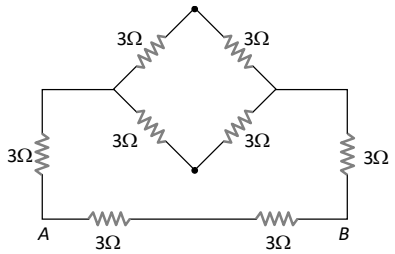
18. The lead wires should have
A) Larger diameter and low resistance
(B) Smaller diameter and high resistance
(C) Smaller diameter and low resistance
(D) Larger diameter and high resistance

19. The electric field E, current density J and conductivity σ of a conductor are related as
(A) σ = E/J
(B) σ = J/E
(C) σ =JE
(D) σ = 1/ JE

20. There are 8 equal resistances R. Two are connected in parallel, such four groups are connected in series, the total resistance of the system will be

(A) R / 2
(B) 2 R
(C) 4 R
(D) 8 R

21. Equivalent resistance between A and B will be



(A) 2 *ohm*
(B) 18 *ohm*
(C) 6 *ohm*
(D) 3.6 *ohm*

22. A wire has a resistance of 12 ohm. It is bent in the form of equilateral triangle. The effective resistance between any two corners of the triangle is

(A) 9 ohms
(B) 12 ohms
(C) 6 ohms
(D) 8/3 ohms

23. Lamps used for household lighting are connected in

(A) Series
(B) Parallel
(C) Mixed circuit
(D) None of the above

24. The equivalent resistance of resistors connected in series is always

(A) Equal to the mean of component resistors
(B) Less than the lowest of component resistors
(C) In between the lowest and the highest of component resistors
(D) Equal to sum of component resistors

25. Four wires of equal length and of resistances 10 ohms each are connected in the form of a square. The equivalent resistance between two opposite corners of the square is

(A) 10 Ω
(B) 40 Ω
(C) 20 Ω
(D) 10/4 Ω

26. Three resistances, each of 1 ohm, are joined in parallel. Three such combinations are put in series, then the resultant resistance will be

(A) 9 ohm
(B) 3 ohm
(C) 1 ohm
(D) 1/3 ohm

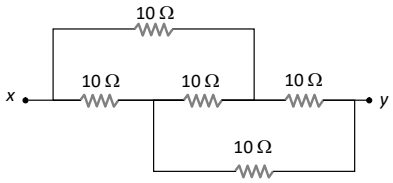
27. Two wires of same metal have the same length but their cross-sections are in the ratio 3:1. They are joined in series. The resistance of the thicker wire is 10 ohm. The total resistance of the combination will be

(A) 40 ohm
(B) 40/3 ohm
(C) 5/2 ohm
(D) 100 ohm

28. Three resistances 4 ohm each of are connected in the form of an equilateral triangle. The effective resistance between two corners is

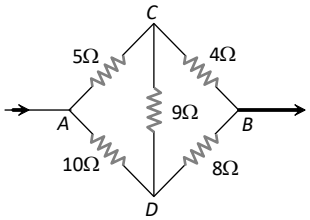
(A) 8 ohm
(B) 12 ohm
(C) 3/8 ohm
(D) 8/3 ohm

29. The equivalent resistance between x and y in the circuit shown is



(A) 10 ohm
(B) 40 ohm
(C) 20 ohm
(D) 2.5 ohm

30. Five resistors are connected as shown in the diagram. The equivalent resistance between A and B is



(A) 6 Ω
(B) 9 Ω
(C) 12 Ω
(D) 15 Ω

31. If three resistors of resistance 2 Ω, 4 Ω and 5 Ω are connected in parallel then the total resistance of the combination will be
(A) 20/19 Ω
(B) 19/20 Ω
(C) 19/10 Ω
(D) 10/19 Ω

32. When a wire of uniform cross-section a, length l and resistance R is bent into a complete circle, resistance between any two of diametrically opposite points will be
(A) R/4
(B) R/8
(C) 4R
(D) R/2

33. Kirchhoff's first law at a junction is based on the law of conservation of
(A) Charge
(B) Energy
(C) Momentum
(D) Angular momentum

34. A 50V battery is connected across a 10 ohm resistor. The current is 4.5 A. The internal resistance of the battery is
(A) Zero
(B) 0.5 ohm
(C) 1.1 ohm
(D) 5.0 ohm

35. A cell whose e.m.f. is 2 V and internal resistance is 0.1 ohm, is connected with a resistance of 3.9 ohm. The voltage across the cell terminal will be
(A) 0.50 V
(B) 1.90 V
(C) 1.95 V
(D) 2.00 V

SECTION B

36. The reading of a high resistance voltmeter when a cell is connected across it is 2.2 V. When the terminals of the cell are also connected to a resistance of 5 ohm the voltmeter reading drops to 1.8 V. Find the internal resistance of the cell
(A) 1.2 ohm
(B) 1.3 ohm
(C) 1.1 ohm
(D) 1.4 ohm

37. Electromotive force is the force, which is able to maintain a constant
(A) Current
(B) Resistance
(C) Power
(D) Potential difference

38. Kirchoff's I law and II law of current, proves the
(A) Conservation of charge and energy
(B) Conservation of current and energy
(C) Conservation of mass and charge
(D) None of these

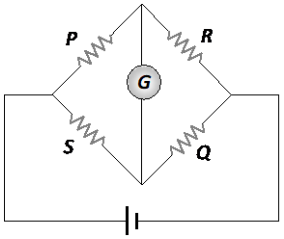
39. A milli voltmeter of 25 milli volt range is to be converted into an ammeter of 25 ampere range. The value (in ohm) of necessary shunt will be :
(A) 0.001
(B) 0.01
(C) 1
(D) 0.05

40. To convert a galvanometer into a voltmeter, one should connect a
(A) High resistance in series with galvanometer
(B) Low resistance in series with galvanometer
(C) High resistance in parallel with galvanometer
(D) Low resistance in parallel with galvanometer

41. Resistance of 100 cm long potentiometer wire is 10 ohm, it is connected to a battery (2 volt) and a resistance R in series. A source of 10 mV gives null point at 40 cm length, then external resistance R is
(A) 490 ohm
(B) 790 ohm
(C) 590 ohm
(D) 990 ohm

42. The current flowing in a coil of resistance 90 ohm is to be reduced by 90%. What value of resistance should be connected in parallel with it
(A) 9 ohm
(B) 90 ohm
(C) 1000 ohm
(D) 10 ohm

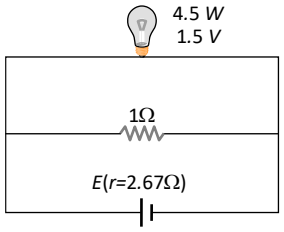
43. In the circuit given, the correct relation to a balanced Wheatstone bridge is



(A) P/Q = R/S
(B) P/Q = S/R
(C) P/R = S/Q
(D) None of these

44. In an electrical cable there is a single wire of radius 9 mm of copper. Its resistance is 5 ohm. The cable is replaced by 6 different insulated copper wires, the radius of each wire is 3mm. Now the total resistance of the cable will be
(A) 7.5 ohm
(B) 45 ohm
(C) 90 ohm
(D) 270 ohm

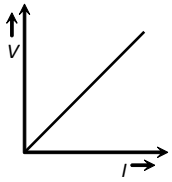
45. A torch bulb rated as 4.5 W, 1.5 V is connected as shown in the figure. The e.m.f. of the cell needed to make the bulb glow at full intensity is



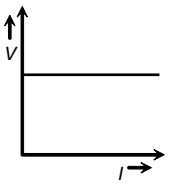
(A) 4.5 V
(B) 1.5 V
(C) 2.67 V
(D) 13.5 V

46. Which of the adjoining graphs represents ohmic resistance

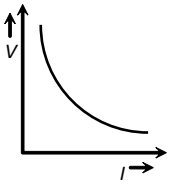
(A)



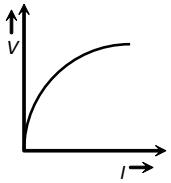
(B)



(C)



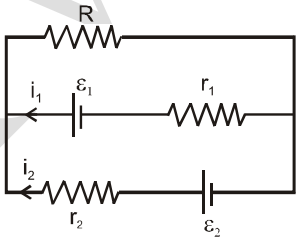
(D)



47. **Assertion :** The drift velocity of electrons in a metallic wire will decrease, if the temperature of the wire is increased.
Reason : On increasing temperature, conductivity of metallic wire decreases.

(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If the assertion and reason both are false

48. See the electrical circuit shown in this figure. Which of the following equations is a correct equation for it ?



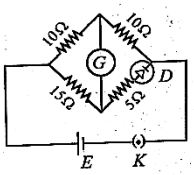
(A) $\varepsilon_1 - (i_1 + i_2)R - i_1 r_1 = 0$
(B) $\varepsilon_2 - i_2 r_2 - \varepsilon_1 - i_1 r_1 = 0$
(C) $-\varepsilon_2 - (i_1 + i_2)R + i_2 r_2 = 0$
(D) $\varepsilon_1 - (i_1 + i_2)R + i_1 r_1 = 0$

49. **By ammeter, which of the following can be measured**

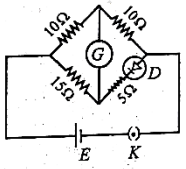
(A) Electric potential
(B) Potential difference
(C) Current
(D) Resistance

50. **Choose the correct circuit in which can achieve the bridge balance.**

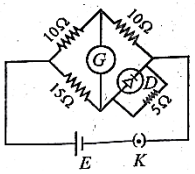
(1)



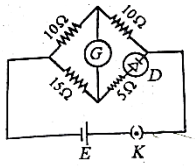
(2)



(3)



(4)



XII – CURRENT ELECTRICITY	
ANSWER KEYS	
1.	D
2.	D
3.	A
4.	B
5.	B
6.	C
7.	C
8.	C
9.	A
10.	B
11.	D
12.	B
13.	D
14.	A
15.	A
16.	D
17.	C
18.	A
19.	B
20.	B
21.	D
22.	D
23.	B
24.	A
25.	D
26.	C
27.	A
28.	D
29.	A
30.	A
31.	A
32.	A
33.	A
34.	C
35.	C
36.	C
37.	D
38.	A
39.	A
40.	A
41.	B
42.	D
43.	C
44.	A
45.	D
46.	A
47.	B
48.	A
49.	C
50.	B