NEET PHYSICS 2018-19 - Chennai

Periodic Test :13 **Test ID :** 025

Number of questions: 150 **Test date: 02.04.2019**

Name: _____ **Time**: 3HRS

ID No: _____

Negative Marks : 4 marks for correct attempt & 1 mark deducted for every wrong attempt.

1. The resistance of a wire is `R' ohm. If it is melted and stretched to `n' times its original length, its new resistance will be

(a) R/n

(b) n^2R

(c) R/n^2

(d) nR

2. A potentiometer is an accurate and versatile device to make electrical measurements of EMF because the method involves

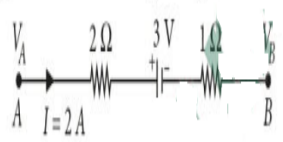
(a) potential gradients

(b) a condition of no current flow through the galvanometer

(c) a combination of cells, galvanometer and resistances

(d) cells

3. The potential difference (V_A — V_B) points A and B in the given figure is



(a) -3 V

(b) +3 V

(c) +6 V

(d) +9 V

4. A filament bulb (500 W, 100 V) is to be used in a 230 V main supply. When a resistance R is connected in series, it works perfectly and the bulb consumes 500 W. The value of R is

(a) 230 Ω

(b) 46 Ω

(c) 26 Ω

(d) 13 Ω

5. A potentiometer wire is 100 cm long and a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obtained at 50 cm and 10 cm from the positive end of the wire in the two cases. The ratio of emf is

(a) 3 : 4

(b) 3 : 2

(c) 5 : 1

(d) 5 : 4

6. The charge flowing through a resistance R varies with time t as $Q = \alpha t - bt^2$, where α and b are positive constants. The total heat produced in R is

(a) $\alpha^2R/2b$

(b) α^3R/b

(c) $\alpha^3R/6b$

(d) $\alpha^3R/3b$

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7. Two metal wires of identical dimensions are connected in series. If are the conducti-vities of the metal wires respectively, the effective conductivity of the combination is

(a) $\frac{\sigma_1+\sigma_2}{\sigma_1\sigma_2}$ (b) $\frac{\sigma_1\sigma_2}{\sigma_1+\sigma_2}$

(c) $\frac{2\sigma_1\sigma_2}{\sigma_1+\sigma_2}$ (d) $\frac{\sigma_1+\sigma_2}{2\sigma_1\sigma_2}$

8. A circuit contains an ammeter, a battery of 30 V and a resistance 40.8 ohm all connected in series. If the ammeter has a coil of resistance 480 ohm and a shunt of 20 ohm, the reading in the ammeter will be

(a) 2 A

(b) 1 A

(c) 0.5 A

(d) 0.25 A

9. A potentiometer wire of length L and a resistance r are connected in series with a battery of e.m.f. E_0 and a resistance r_1. An unknown e.m.f. E is balanced at a length l of the potentiometer wire. The e.m.f. E will be given by

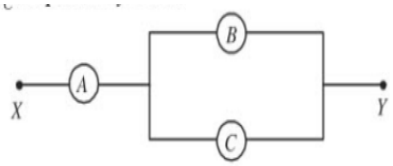
(a) E_0l/L

(b) $LE_0l/(r+r_1)l$

(c) LE_0r/lr_1

(d) $E_0r/(r+r_1)$. (l/L)

10. A, B and C are voltmeters of resistance R, 1.5R and 3R respectively as shown in the figure. When some potential difference is applied between X and Y the voltmeter readings are V_A,V_B and Vc respectively. Then



(a) $V_A=V_B\neq V_C$

(b) $V_A\neq V_B\neq V_C$

(c) $V_A=V_B=V_C$

(d) $V_A\neq V_B=V_C$

11. Across a metallic conductor of non-uniform cross section a constant potential difference is applied. The quantity which remains constant along the conductor is

(a) drift velocity

(b) electric field

(c) current density

(d) current

12. A potentiometer wire has length 4 m and resistance 8 Ω. The resistance that must be connected in series with the wire and an accumulator of e.m.f. 2 V, so as to get a potential gradient 1 mV per cm on the wire is

(a) 44 Ω

(b) 48 Ω

(c) 32 Ω

(d) 40 Ω

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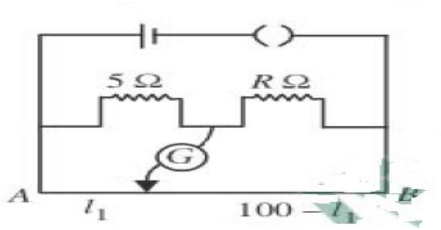
13. The resistances in the two arms of the meter bridge arc 5 Ω and R Ω respectively. When the resistance R is shunted with an equal resistance, the new balance point is at $1.6l_1$. The resistance R is



(a) 10 Q
(b) 15 Si
(c) 20
(d) 25

14. Two cities are 150 km, apart. Electric power is sent from one city to another city through copper wires. The fall of potential per km is 8 volt and the average resistance per km is 0.5 Ω. The power in the wire is
(a) 19.2 W
(b) 19.2 kW
(c) 19.2 J
(d) 12.2 kW

15. A potemeter circuit has been set up for finding the internal resistance of a given cell. The main battery, used across the potentiometer wire, has an emf of 2.0 V and a negligible internal resistance. The potentiometer wire itself is 4 m long. When the resistance R, connected across the given cell, has values of
(i) infinity (ii) 9.5 Ω the balancing lengths on the potentiometer wire are found to be 3 m and 2.85 m, respectively. The value of internal resistance of the cell is
(a) 0.25 Ω
(b) 0.95 Ω
(c) 0.5 Ω
(d) 0.75 Ω

16. The resistances of the four arms P, Q, R and S in a Wheatstone's bridge are 10 ohm, 30 ohm, 30 ohm and 90 ohm, respectively. The e.m.f and internal resistance of the cell are 7 volt and 5 ohm respectively. If the galvanometer resistance is 50 ohm, the current drawn from the cell will be
(a) 0.1 A
(b) 2.0 A
(c) 1.0 A
(d) 0.2 A

17. The internal resistance of a 2.1 V cell which gives a current of 0.2 A thro a resistance of 10 Ω is
(a) 0.8 Ω
(b) 1.0 Ω
(c) 0.2 Ω
(d) 0.5 Ω

18. A wire of resistance s stretched to twice its original length. The resistance of stretched wire would be
(a) 8 Ω
(b) 16 Ω
(c) 2 Ω
(d) 4 Ω

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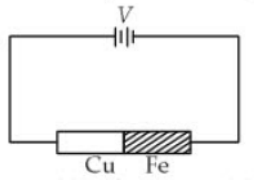
19. Two rods are joined to end as shown. Both have a cross-sectional area of 0.01 cm^2. Each is 1 meter long. One rod is of copper with a resistivity of 1.7 x 10^{-6} ohm-centimeter, the other is of iron with a resistivity of 10^{-5} ohm-centimeter. How much voltage is required to produce a current of 1 ampere in the rods?



(a) 0.00145 V

(b) 0.0145 V

(c) 1.7 x 10^{-6} V

(d) 0.117 V

20. A 12 cm wire is given a shape of a right angled triangle having sides 3 cm, 4 cm and 5 cm as shown in the figure. The resistance between two ends (AB, BC, CA) of the respective sides are measured one by one by a multi-meter. The resistances will be in the ratio

(a) 9 : 16 : 25

(b) 27 : 32 : 35

(c) 21 : 24 : 25

(d) 3 : 4 : 5

21. Ten identical cells connected in series are needed to heat a wire of length one meter and radius `r' by 10°C in time 't'. How many cells will be required to heat the wire of length two meter of the same radius by the same temperature in time 't'?

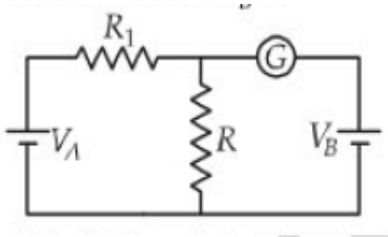
(a) 20

(b) 30

(c) 40

(d) 10

22. In the circuit shown the cells A and B have negligible resistances. For V_A = 12 V, R1= 500 Ω and R= 100 Ω the galvanometer (G) shows no deflection. The value of V_B is



(a) 4 V

(b) 2 V

(c) 12 V

(d) 6 V

23. A ring is made of a wire having a resistance Ro = 12 Ω . Find the points A and B, as shown in the figure, at which a current carrying conductor should be connected so that the resistance R of the sub circuit between these points is equal to 8/3 Ω.

(a) $\frac{l_1}{l_2}=\frac{5}{8}$ (b) $\frac{l_1}{l_2}=\frac{1}{3}$ (c) $\frac{l_1}{l_2}=\frac{3}{8}$ (d) $\frac{l_1}{l_2}=\frac{1}{2}$

24. If voltage across a bulb rated 220 volt-100 watt drops by 2.5% of its rated value, the percentage of the rated value by which power would decrease is

(a) 20%

(b) 2.5 %

(c) 5%

(d) 10%

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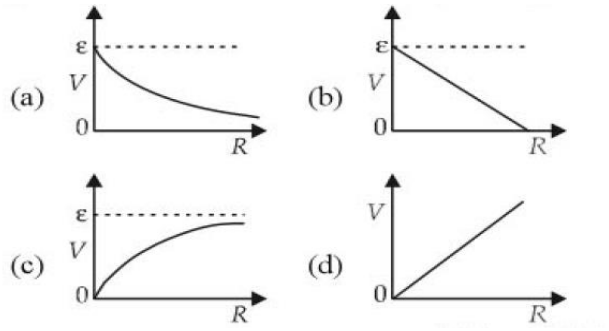
25. A cell-having an emf ϵ and internal resistance r is connected across a variable external resistance R. As the resistance R is increased, the plot of potential difference V across R is given by



26. One kilowatt hour is equal to

(a) 36 x 10^{-5} J

(b) 36 x 10^{-4} J

(c) 36x 10^{5}J

(d) 36x 10^{3} J

27. If two bulbs, whose resistances are in the ratio 1 : 2 are connected in series, the dissipated in them has the ratio of

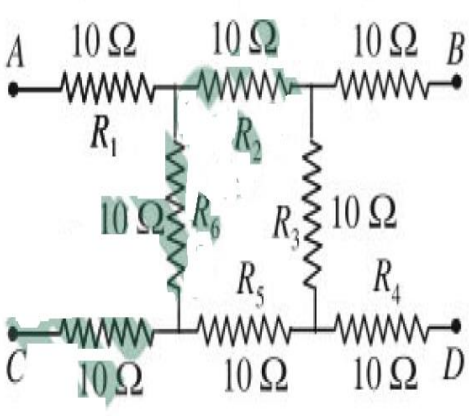
(a) 2 : 1

(b) 1 : 4

(c) 1 : 1

(d) 1 : 2

28. What will be the equivalent between the two points A and D?



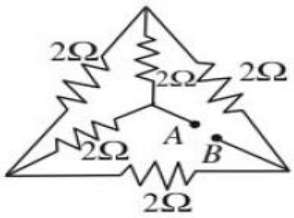
(a) 30 Ω

(b) 40 Ω

(c) 10 Ω

(d) 10 Ω.

29. In the network shown in the figure, each of the resistance is equal to 2 Ω. The resistance between the points A and B is



(a) 3 Ω

(b) 4 Ω

(c) 1 Ω

(d) 2 Ω.

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

(a) 40 Ω

(b) 100 Ω

(c) (5/2) Ω

(d) (40/3) Ω.

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31. In good conductors of electricity, the type of bonding that exists is

(a) metallic

(b) Vandar Waals

(c) ionic

(d) Covalent.

32. A heating coil is labelled 100 W, 220 V. The coil is cut in half and the two pieces are joined in parallel to the same source. The energy now liberated, per second is

(a) 200W

(b) 400 W

(c) 25 W

(d) 50 W

33. A 4μF capacitor is charged to 400 V. If its plates joined through a resistance of 2 kΩ then heat produced in the resistance is

(a) 0.64 J

(b) 1.28 J

(c) 0.16 J

(d) 0.32 J

34. A wire 50 cm long and 1 mm^2 in cross-section carries a current of 4 A when connected to a 2 V battery. The resistivity of the wire is

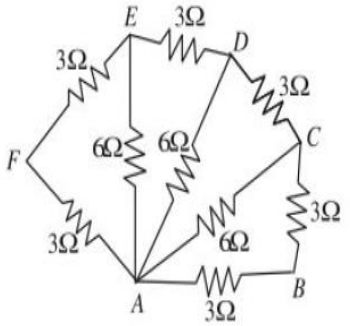
(a) 4×10^{-6} Ωm

(b) 1×10^{-6} Ωm

(c) 2×10^{-7} Ωm

(d) 5×10^{-7} Ωm .

35. Six resistors of 3 Ω each are connected along the sides of a hexagon and three resistors of 6 Ω each are connected along AC, AD and AE as shown in the figure. The equivalent resistance between A and B is equal to



(a) 2 Ω

(b) 6 Ω

(c) 3 Ω

(d) 9 Ω

36. A flow of 10^7 electrons per second in a conducting wire constitutes a current of

(a) 1.6×10^{-12} A

(b) 1.6×10^{26} A

(c) 1.6×10^{-26} A

(d) 1.6×10^{12} A.

37. Identify the set in which all the three materials are good conductors of electricity

(a) Cu, Hg and NaCI

(b) Cu, Ge and Hg

(c) Cu, Ag and Au

(d) Cu, Si and diamond.

38. An electric bulb is rated 60 W, 220 V. The resistance of its filament is

(a) 870 Ω

(b) 780 Ω

(c) 708 Ω

(d) 807 Ω.

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39. Three resistances each of 4 Ω are connected to form a triangle. The resistance between any two terminals is

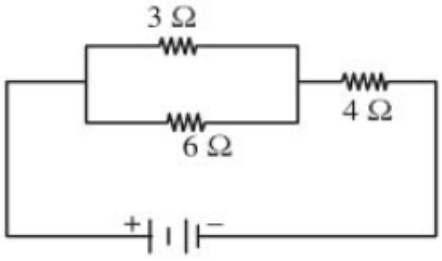
(a) 12 Ω

(b) 2 Ω

(c) 6 Ω

(d) 8/3 Ω

40. Current through 3 Ω resistor is 0.8 ampere, then potential drop through 4 Ω resistor is



(a) 9.6 V

(b) 2.6 V

(c) 4.8 V

(d) 1.2 V

41. A battery of e.m.f 10 V and internal resistance 0.5 Ω is connected across a variable resistance R. The value of R for which the power delivered in it is maximum is given by

(a) 0.5 Ω

(b) 1.0 Ω

(c) 2.0 Ω

(d) 0.25 Ω

42. The velocity of charge carriers of current (about 1 ampere) in a metal under normal conditions is of the order of

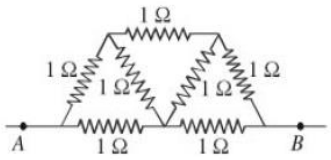
(a) a fraction of mm/sec

(b) velocity of light

(c) several thousand metres/second

(d) a few hundred metres per second

43. In the network shown in figure each resistance is 1 Ω. The effective resistance between A and B is



(a) 4/3 Ω

(b) 3/2 Ω

(c) 7 Ω

(d) 8/7 Ω

44. Two identical batteries each of e.m.f 2 V and internal resistance 1 Ω are available to produce heat in an external resistance by passing a current through it. The maximum power that can be developed across R using these batteries is

(a) 3.2 W

(b) 2.0 W

(c) 1.28 W

(d) 8/9 W

45. You are given several identical, resistances each of value R = 10 Ω and each capable of carrying a maximum current of one ampere. It is required to make a suitable combination of these resistances of 5 Ω which can carry a current of 4 ampere. The minimum number of resistances of the type R that will be required for this job is

(a) 4

(b) 10

(c) 8

(d) 2

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46. A current of 2 A, passing through a conductor produces 80 J of heat in 10 seconds. The resistance of the conductor in ohm is

(a) 0.5

(b) 2

(c) 4

(d) 20

47. 40 electric bulbs are connected in series across a 220 V supply. After one bulb is fused the remaining 39 are connected again in series across the same supply. The illumination will be

(a) more with 40 bulbs than with 39

(b) more with 39 bulbs than with 40

(c) equal in both the cases

(d) in the ratio $40^2 : 39^2$

48. n equal resistors are first connected in series and then connected in parallel. What is the ratio of the maximum to the minimum resistance?

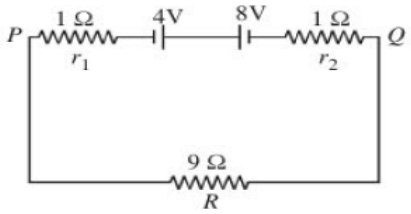
(a) n

(b) $1/n^2$

(c) n^2

(d) 1/n

49. Two batteries of emf 4 V and 8 V with internal resistance 1 Ω and 2 Ω are connected in a circuit with resistance of 9 Ω as shown in figure. The current and potential difference between the points P and Q are



(a) 1/3 A and 3 V

(b) 1/6 A and 4 V

(c) 1/9 A and 9 V

(d) 1/12 A and 12 V

50. The masses of the wires of copper is in the ratio of 1 : 3 : 5 and their lengths are in the ratio of 5 : 3 : 1. The ratio of their electrical resistance is

(a) 1 : 3 : 5

(b) 5 : 3 : 1

(c) 1 : 25 : 125

(d) 125: 15 : 1

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