TEST

JEE Mains PYQS Electricty current (Physics Master Academy)

QUESTIONS

SECTIONS

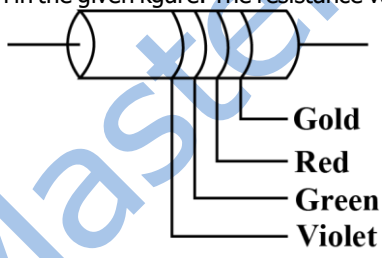
1. Section A - 30 Questions

Section 1 : Section A - 30 Questions

SECTION INSTRUCTIONS

This section contains 30 MCQs. +4 mark for every correct answer, - 1 for every incorrect answer

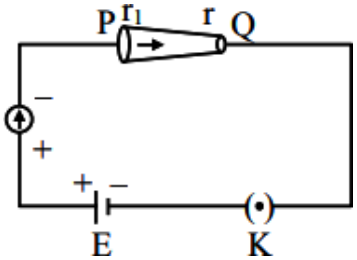
1 The colour coding on a carbon resistor is shown in the given kgure. The resistance value of the given resistor is



- ◯ $(5700 \pm 285)\Omega$
- ◯ $(7500 \pm 750)\Omega$
- ◯ $(5700 \pm 375)\Omega$
- ◯ $(7500 \pm 375)\Omega$

Correct: +4 · Incorrect: -1

2 In the given kgure, a battery of emf E is connected across a conductor PQ of length 'l' and different area of cross sections having radii r_1 and r_2 ($r_2 < r_1$)



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Choose the correct option as one moves from P to Q.

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- Drift velocity of electron increases
- Electric keld decreases
- Electron current decreases
- All of these

Correct: +4 · Incorrect: -1

3 A current of 10A exists in a wire if cross sectional area of 5 mm^2 with a drift velocity of 2×10^{-3} ms^{-1}. The number of free electrons in each cubic meter of the wire is

- 2×10^{25}
- 2×10^{23}
- 625×10^{25}
- 2×10^{6}

Correct: +4 · Incorrect: -1

4 A current through a wire depends on time as $i = \alpha_0 t + \beta t^2$ where $a_0 = 20A/s$ and $\beta = 8As^{-2}$. Find the charge crossed through a section of the wire in 15s.

- 2250C
- 11250C
- 2100C
- 260C

Correct: +4 · Incorrect: -1

5 A wire of 1Ω has a length 1m. It is stretched till its length increases by 25%. The percentage change in resistance to the nearest integer is

- 76%
- 56%
- 12.5%
- 25%

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Correct: +4 · Incorrect: -1

6 A circuit to verify Ohm's law uses ammeter and voltmeter in series or parallel connected correctly to the resistor. In the circuit:

- ammeter is always used in parallel and voltmeter in series
- both ammeter and voltmeter must be connected in parallel
- ammeter is always connected in series and voltmeter in parallel
- both ammeter and voltmeter must be connected in series

Correct: +4 · Incorrect: -1

7 What equal length of an iron wire and a copper-nickel alloy wire, each of 2mm diameter connected parallel t give an equivalent resistance of 3Ω?
(Given resistivities of iron and copper nickel alloy wire are 12 μΩ and 51 μΩ respectively)

- 82m
- 97m
- 110m
- 90m

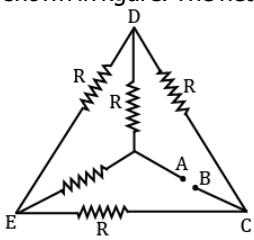
Correct: +4 · Incorrect: -1

8 If you are provided a set of resistances 2Ω, 4Ω, 6Ω and 8Ω. Connect these resistances so as to obtain an equivalent resistance of 46/3 Ω.

- 4Ω and 6Ω are in parallel with 2Ω and 8Ω in series.
- 6Ω and 8Ω are in parallel with 2Ω and 4Ω in series.
- 2Ω and 6Ω are in parallel with 6Ω and 8Ω in series.
- 2Ω and 4Ω are in parallel with 6Ω and 8Ω in series.

Correct: +4 · Incorrect: -1

9 Five equal resistances are connected in a network as shown in kgure. The net resistance between the points A and B is



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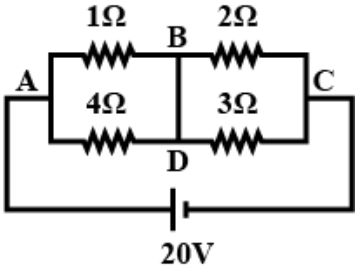
- R/2
- 3R/2
- R
- 2R

Correct: +4 · Incorrect: -1

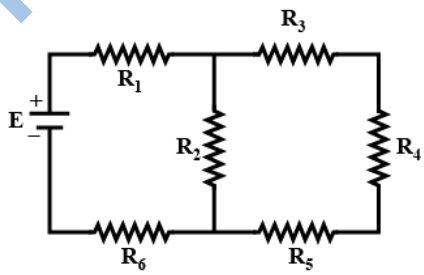
10 In the given circuit diagram, a sire is joining points B and D. The current in this wire is



- 0.4A
- 2A
- 4A
- zero

Correct: +4 · Incorrect: -1

11 In the kgure shown, what is the current (in Ampere) drawn from the battery? You are given: $R_1 = 15\Omega$, $R_2 = 10\Omega$, $R_3 = 20\Omega$, $R_4 = 5\Omega$, $R_5 = 25\Omega$, $R_6 = 30\Omega$, E = 15V.



- 13/24
- 7/18
- 9/32
- 20/3

Correct: +4 · Incorrect: -1

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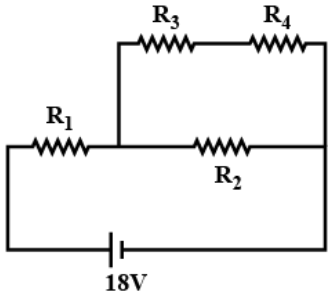
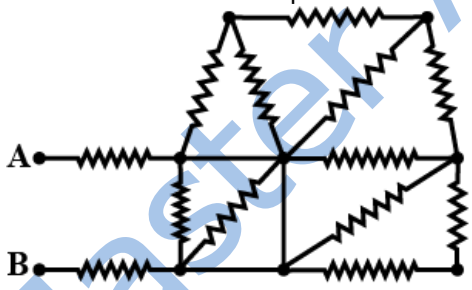
12 In the given circuit the internal resistance of te18V cell is negligible. If $R_1 = 400\Omega$, $R_3 = 100\Omega$ and $R_4 = 500\Omega$ and the reading of an ideal voltmeter across R_4 is 5V, then the value of R_2 will be



- 300W
- 450W
- 550W
- 230W

Correct: +4 · Incorrect: -1

13 In the given circuit all resistances are of the value R ohm each. The equivalent resistance between A and B is



- 2R
- 5R/2
- 5R/3
- 3R

Correct: +4 · Incorrect: -1

14 Five identical cells of internal resistance 1W and emf 5V are connected in series and in parallel with an external resistance 'R'. For what value of 'R', current in series and parallel combination will remain the same?

- 1Ω
- 25 Ω
- 5 Ω

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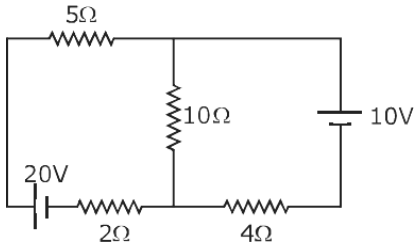
○ 10 Ω

Correct: +4 · Incorrect: -1

15 In the kgure shown the current in the 10V battery is close to



○ 0.71A from positive to negative terminal

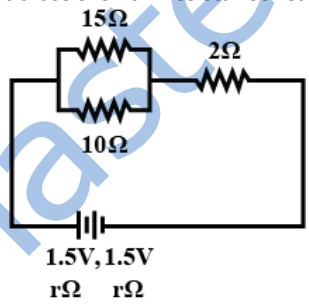
○ 0.42A from positive to negative terminal

○ 0.21A from positive to negative terminal

○ 0.36A from negative to positive terminal

Correct: +4 · Incorrect: -1

16 In the given circuit, an ideal voltmeter connected across the 10Ω resistance reads 2V. The internal resistance r of each cell is



○ 1 Ω

○ 0.5 Ω

○ 1.5 Ω

○ 0 Ω

Correct: +4 · Incorrect: -1

17 A cell of internal resistance r drives current through an external resistance R. The power delivered by the cell to the eternal resistance will be maximum when

○ R = 0.001r

○ R = 1000r

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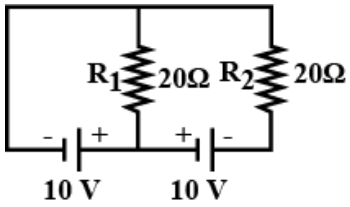
- R = 2r
- R = r

Correct: +4 · Incorrect: -1

18 In the given circuit the cells have zero internal resistance. The currents (in Amperes) passing through resistance R_1 and R_2 respectively are



- 1, 2
- 2, 2
- 0.5, 0
- 0, 1

Correct: +4 · Incorrect: -1

19 Two batteries with emf 12V and 13V are connected in parallel across a load resistor of 10Ω. The internal resistances of the two batteries are 1Ω and 2Ω respectively. The voltage across the load lies between

- 11.6V ad 11.7V
- 11.5V ad 11.6V
- 11.4V ad 11.5V
- 11.7V ad 11.8V

Correct: +4 · Incorrect: -1

20 An electric appliance supplies 6000 J/min heat to the system. If the system delivers a power of 90W. How long it would take to increase the internal energy by 2.5×10^3J?

- 2.5×10^2s
- 4.1×10^1s
- 2.5×10^3s
- 2.5×10^1s

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Correct: +4 · Incorrect: -1

21 An electric bulb of 50 watt at 100 volt is used in a circuit having a 200V supply. Calculate the resistance R to be connected in series with the bulb so that the power delivered b the bulb is 500W

- ○ 20 Ω
- ○ 30 Ω
- ○ 5 Ω
- ○ 10 Ω

Correct: +4 · Incorrect: -1

22 One kg of water, at 20°C is heated in an electric kettle whose heating element has a mean (temperature averaged) resistance of 20 Ω. The rms voltage in the mains is 200V. Ignoring heat loss from the kettle, time taken for water to evaporate fully is close to (specikc heat of water = 4200J/(kg°C). Latent heat of water = 2260 kJ/kg)

- ○ 16 minutes
- ○ 22 minutes
- ○ 3 minutes
- ○ 3 minutes

Correct: +4 · Incorrect: -1

23 A 2W carbon resistor is color coded wit green, black, red and brown respectively. The maximum current which can be passed through this resistor is

- ○ 20 mA
- ○ 100 mA
- ○ 0.4 mA
- ○ 63 mA

Correct: +4 · Incorrect: -1

24 A constant voltage is applied between two ends of a metallic wire. If the length is halved and the radius of the wire is doubled, the rate of heat developed in the wire will be

- ○ increased 8 times
- ○ doubled

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- ○ halved
- ○ unchanged

Correct: +4 · Incorrect: -1

25 A heater coil is cut into two equal parts and only one part is now used in the heater. The heat generated will now be

- ○ four times
- ○ doubled
- ○ halved
- ○ one fourth

Correct: +4 · Incorrect: -1

26 Two resistors 400Ω and 800Ω are connected in series across a 6V battery. The potential difference measured by a voltmeter of 10kΩ across 400Ω resistor is close to

- ○ 2V
- ○ 1.8V
- ○ 2.05V
- ○ 1.95V

Correct: +4 · Incorrect: -1

27 Which of the following will NOT be observed when a multimeter (operating in resistance measuring mode) probes connected across a component, are just reversed?

- ○ Multimeter shows an equal deflection in both cases i.e. before and after reversing the probes if the chosen component is resistor.
- ○ Multimeter shows NO deflection in both cases i.e. before and after reversing the probes if the chosen component is capacitor.
- ○ Multimeter shows a deflection, accompanied by a splash of light out of connected and NO deflection on reversing the probes if the chosen component is LED.
- ○ Multimeter shows NO deflection in both cases i.e. before and after reversing the probes if the chosen component is metal wire.

Correct: +4 · Incorrect: -1

28 An ideal battery of 4V and resistance R re conned in series in the primary circuit of a potentiometer of length 1m and resistance 5Ω. The value of R to give potential difference of 5mV across 10 cm of potentiometer wire is

- ○ 490 Ω

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- ○ 480 Ω
- ○ 395 Ω
- ○ 495 Ω

Correct: +4 · Incorrect: -1

29 In a potentiometer experiment, it is found that no current passes through the galvanometer when the terminals of the cell are connected across 52cm of the potentiometer wire. If the cell is shunted by a resistance of 5 Ω, balance is found when the cell I connected across 40 cm of the wire. Find the internal resistance of the cell

- ○ 1 Ω
- ○ 1.5 Ω
- ○ 2 Ω
- ○ 2.5 Ω

Correct: +4 · Incorrect: -1

30 On interchanging the resistances, the balance point of a meter bridge shifts to the left by 10cm. The resistance of their series combination is 1k Ω. How much was the resistance on the left slot before interchanging the resistances?

- ○ 990 Ω
- ○ 505 Ω
- ○ 550 Ω
- ○ 910 Ω

Correct: +4 · Incorrect: -1

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TEST

JEE Mains PYQS Electricty current (Physics Master Academy)

ANSWERS

SECTIONS

1. Section A - 30 Questions

Section 1 : Section A - 30 Questions

1 $(7500 \pm 375)\Omega$

2 Drift velocity of electron increases

3 625×10^{25}

4 11250C

5 56%

6 ammeter is always connected in series and voltmeter in parallel

7 97m

8 2Ω and 4Ω are in parallel with 6Ω and 8Ω in series.

9 R

10 2A

11 9/32

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12 300W

13 2R

14 1Ω

15 0.21A from positive to negative terminal

16 0.5 Ω

17 R = r

18 0.5, 0

19 11.5V ad 11.6V

20 2.5×10^{2}s

21 20 Ω

22 22 minutes

23 20 mA

24 increased 8 times

25 doubled

26 1.95V

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27 Multimeter shows NO deflection in both cases i.e. before and after reversing the probes if the chosen component is capacitor.

28 395 Ω

29 1.5 Ω

30 550 Ω

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