PHYSICS

BOOKS - UNIVERSAL BOOK DEPOT 1960 PHYSICS (HINGLISH)

HEATING AND CHEMICAL EFFECT OF CURRENT

Exercise

1. One kilowatt hour is equal to

A. 36×10^5 joules

B. 36×10^3 joules

C. 10^3 joules

D. 10^5 joules

Answer: A

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2. If R_1 and R_2 are respectively the filament resistances of a 200 watt bulb and 100 watt bulb designed to operate on the same voltage, then

A. R_1 is two times R_2

B. R_2 is two times R_1

C. R_2 is four times R_1

D. R_1 is four times R_2

Answer: B

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3. Two electric bulbs, one of 200 volt 40 watt and the other 200 volt 100 watt are connected in a house wiring circuit

A. They have equal currents through them

B. The resistance of the filaments in both the bulbs is same

C. The resistance of the filament in 40 watt bulb is more than the resistance in 100 watt bulb

D. The resistance of the filament in 100 watt bulb is more than the resistance in 40 watt bulb

Answer: C

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4. The two bulbs as in the above question are connected in series to a 200 volt line. Then

A. The potential drop across the two bulbs is the same

B. The potential drop across the 40 watt bulb is greater than the potential drop across the 100 watt bulb

C. The potential drop across the 100 W bulb is greater than the potential drop across the 40 W bulb

D. The potential drop across both the bulb is 200 volt

Answer: B

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5. 40 electric bulb are connected in series across a $220V$ 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 of $49^2 : 39^2$

Answer: B

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6. The material of fuse wire should should have

A. A high specific resistance and high melting point

B. A low specific resistance and low melting point

C. A high specific resistance and low melting point

D. A low specific resistance and a high melting point

Answer: C

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7. Two electric bulbs whose resistances are in the ratio of $1:2$ are connected inparallel to a constant voltage source. The powers dissipated in them have the ratio

A. $1:2$

B. $1:1$

C. $2:1$

D. $1:4$

Answer: C

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8. A heater coil is cut into two parts of equal length and one of them is used in the leader. The ratio of the heat procued by this half coil to that by the original coil is

A. $2:1$

B. $1:2$

C. $1:4$

D. $4:1$

Answer: A

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9. Resistance of one carbon filament and one tungsten lamp are measured individually when the lamp are lit and compared with their respective resistances when cold. Which one of the following statements will be true

A. Resistance of the carbon filament lamp will increase but that of the tungsten will diminish when hot

B. Resistance of the tungsten filament lamp will increase but that of carbon will diminish when hot

C. Resistances of both the lamps will increase when hot

D. Resistances of both the lamps will decrease when hot

Answer: B

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10. The mechanism of the heat produced in a conductor when an electric current flows through it, can be explained on the basis of

A. Viscosity

B. Friction

C. Free electron theory

D. Gauss's theorem

Answer: C

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11. Two electric bulbs whose resistances are in the ratio of $1:2$ are connected inparallel to a constant voltage source. The powers dissipated in them have the ratio

A. $1:2$

B. $2:1$

C. $1:1$

D. $1:4$

Answer: A

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12. You are given a resistance coil and a battery. In which of the following cases is largest amount of heat generated?

A. When the wire is connected to the battery directly

B. When the wire is divided into two parts and both the parts connected to the battery in parallel

C. When the wire is divided into four parts and all the four connected to the battery in parallel

D. When only half the wire is connected to the battery

Answer: C

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13. What is immeterial for an electric fuse wire ?

A. Its specific resistance

B. Its radius

C. Its length

D. Current flowing through it

Answer: C

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14. Two electric bulbs have tungsten filament of same length. If one of them gives $60W$ and the other $100W$, then

A. 100 watt bulb has thicker filament

B. 60 watt bulb has thicker filament

C. Both filaments are of same thickness

D. It is possible to get different wattage unless the lengths are different

Answer: A

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15. Three equal resistor connected in series across a source of enf together dissipate $10Wa$. If the same resistors aer connected in parallel across the same emf, then the power dissipated will be

A. 100 watt

B. 30 watt

C. 10/3 watt

D. 90 watt

Answer: D

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16. Ten $50W$ bulbs are operated for 10 hours per day. The energy consumed in kWh in a 30 day month is

A. 1500

B. $5,000$

C. 15

D. 150

Answer: D

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17. Read the following statements carefully : (i) product of a volt and an ampere is a joude/second (ii) The product of a volt and watt is horse power (iii) The product of a volt and a coulomns is joule (iv) Walt-hour can be measured in terms of electron-volt

A. All four are correct

B. (1), (2) and (4) are correct

C. (1) and (3) are correct

D. (3) and (4) are correct

Answer: B

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18. A 25 W , 220 V bulb and a 100 W , 220 V bulb are connected in parallel across a 440 V line

A. Only 100 watt bulb will fuse

B. Only 25 watt bulb will fuse

C. Both bulbs will fuse

D. None of the bulbs will fuse

Answer: C

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19. Two electric lamps of 40 watt each are connected in parallel. The power consumed by the combination will be

A. 20 watt

B. 60 watt

C. 80 watt

D. 100 watt

Answer: C

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20. Two heating coils, one of fine wire and the other of thick wire of the same material and of the same length are connected in series and in parallel. Which of the following statement is correct ?

A. In series fine wire liberates more energy while in parallel thick wire will liberate more energy

B. In series fine wire liberates less energy while in parallel thick wire will liberate more energy

C. Both will liberate equally

D. In series the thick wire will liberate more while in parallel it will liberate less energy

Answer: A

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21. An electric bulb is rated 220 volt - 100 watt. The power consumed by it when operated on 110 volt will be

A. 50 watt

B. 75 watt

C. 90 watt

D. 25 watt

Answer: D

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22. A $25W, 220V$ bulb and a $100W, 220V$ bulb are connected in series across a $220V$ line , which electric bulb will glow brightly?

A. 25 watt bulb

B. 100 watt bulb

C. First 25 watt and then 100 watt

D. Both with same brightness

Answer: A

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23. A resistor R_1 dissipates the power P when connected to a certain generator. If the resistor R_2 is put in series with R_1, the power dissipated by R_1

A. Decreases

B. Increases

C. Remains the same

D. Any of the above depending upon the relative values of R_1 and R_2

Answer: A

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24. An electric fan and a heater are marked as 100 watt , 220 volt and 1000 watt , 220 volt respectively. The resistance of the heater is

A. Zero

B. Greater than that of the fan

C. Less than that of the fan

D. Equal to that of the fan

Answer: C

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25. According to Joule's law, if the potential difference across a conductor having a material of specific resistance remains constant, then the heat produced in the conductor is directly proportinal to

A. ρ

B. ρ^2

C. $\frac{1}{\sqrt{\rho}}$

D. $\frac{1}{\rho}$

Answer: D

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26. Two conducting wires of the same material and of equal length and equal diameters are first connected in series and then in parallel in an electric circuit. The ratio of the heat produced in series and parallel combinations would be :

A. $2:1$

B. $1:2$

C. $4:1$

D. $1:4$

Answer: D

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27. Two bulbs of same wattage, one having a carbon filament and the other having a metallic filament, are connected in series to the mains. Which one will glow more ?

A. Both bulbs glow equally

B. Carbon filament bulb glows more

C. Tungsten filament bulbs glows more

D. Carbon filament bulb glows less

Answer: C

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28. Two identical heaters rated $220V, 1000W$ are paced in series with each other across $220V$ line , then the combined power is

A. 1000 watt

B. 2000 watt

C. 500 watt

D. 4000 watt

Answer: C

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29. A 25 watt, 220 volt bulb and a 100 watt, 220 volt bulb are connected in series across 440 volt line

A. 25 watt bulb

B. 100 watt bulb

C. Both will have same brightness

D. First 25 watt then 100 watt

Answer: B

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30. If two bulbs of wattage 25 and 100 respectively each rated at 220 volt are connected in series with the supply of 440 volt , then which bulbs will fuse

A. 100 watt bulb

B. 25 watt bulb

C. None of them

D. Both of them

Answer: B

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31. If the current in the electric bulb changes by 1%, then by what percentage will the power change?

A. $1\ \%$

B. $2\ \%$

C. $4\ \%$

D. $\frac{1}{2}\ \%$

Answer: B

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32. Two identical batteries, each of e.m.f. 2 volt and internal resistance 1.0 ohm are available to produce heat in an external resistance $R = 0.5$ ohm by passing a current through it. The maximum Joulean power that can be developed across R using these batteries is

A. 1.28 watt

B. 2.0 watt

C. $\frac{8}{9}$ watt

D. 3.2 watt

Answer: B

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33. A constant voltage is applied between the two ends of a metallic wire . If both the length and the radius of the wire are doubled , the rate of

heat developed in the wire will

A. Will be doubled

B. Will be halved

C. Will remain the same

D. Will be quadrupled

Answer: A

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34. The heating coils rating at 220 volt and producing 50 cal / sec heat are available with the resistances 55Ω, 110Ω, 220Ω and 440Ω . The heater of maximum power will be of

A. 440Ω

B. 220Ω

C. 110Ω

D. 55Ω

Answer: D

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35. Which of the following statement is false

A. Heat produced in a conductor is proportional to its resistance

B. Heat produced in a conductor is proportional to the square of the current

C. Heat produced in a conductor is proportional to charge

D. Heat produced in a conductor is proportional to the time for which current is passed

Answer: C

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36. On an electric heater 220 volt and 1100 watt are marked. On using it for 4 hours, the energy consumed in kWh will be

A. 2

B. 4.4

C. 6

D. 8

Answer: B

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37. An electric heater kept in vacuum is heated continuously by passing electric current. Its temperature

A. Will go on rising with time

B. Will stop after sometime as it will loose heat to the surroundings by conduction

C. Will rise for sometime and there after will start falling

D. Will become constant after sometime because of loss of heat due to radiation

Answer: D

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38. Heat produced in a wire of resistance R due to current flowing at constant potential difference is proportional to

A. $\frac{1}{R^2}$

B. $\frac{1}{R}$

C. R

D. R^2

Answer: B

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39. The power rating of an electric motor that draws a current of $3.75A$, when operated at $200V$, is nearly

A. 1 H.P.

B. 500 W

C. 54 W

D. 750 H.P.

Answer: A

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40. An electric bulb of 100 watt is connected to a supply of electricity of 220 V . Resistance of the filament is

A. 484Ω

B. 100Ω

C. 22000Ω

D. 242Ω

Answer: A

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41. A cable of resistance 10Ω carries electric power from a generator producing $250kWat10,000V$. The current in the cable is

A. 25 A

B. 250 A

C. 100 A

D. 1000 A

Answer: A

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42. A cable of resistance 10Ω carries electric power from a generator producing $250kW at 10,000V$.the power lost in the cable during transmission is

A. $12.5kW$

B. $6.25kW$

C. 25 kW

D. $3.15kW$

Answer: B

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43. The heat generated through 2 ohm and 8 ohm resistances separately, when a condenser of $200\mu F$capacity charged to 200 V is discharged one by one, will be

A. 4 J and 16 J respectively

B. 16 J and 4 J respectively

C. 4 J and 8 J respectively

D. 4 J and 4 J respectively

Answer: D

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44. Two similar headlight lamps are connected in parallel to each other. Together , they consume $48W$ from a $6V$ battery . What is the resistance of each filament ?

A. 0.67Ω

B. 3.0Ω

C. 4.0Ω

D. 1.5Ω

Answer: D

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45. The heat developed in an electric wire of resistance R by a current I for a time t is

A. $\frac{I^2Rt}{4.2}cal$

B. I^2R

C. $\frac{I^2R}{4.2t}cal$

D. $\frac{Rt}{4.2I^2}cal$

Answer: A

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46. Two bulbs, one of 50 watt and another of 25 watt are connected in series to the mains. The ratio of the currents through them is

A. $2:1$

B. $1:2$

C. $1:1$

D. Without voltage, cannot be calculated

Answer: C

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47. The brightness of a bulb will be reduced, if a resistance is connected in

A. Series with it

B. Parallel with it

C. Series or parallel with it

D. Brightness of the bulb cannot be reduced

Answer: A

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48. A 100 watt bulb working on 200 volt and a 200 watt bulb working on 100 volt have

A. Resistances in the ratio of $4:1$

B. Maximum current ratings in the ratio of $1:4$

C. Resistances in the ratio of $2:1$

D. Maximum current ratings in the ratio of $1:2$

Answer: B

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49. There are two electric bulbs of 40 W and 100 W . Which one will be brighter when first connected in series and then in parallel,

A. 40 W in series and 100 W in parallel

B. 100 W in series and 40 W in parallel

C. 40 W both in series and parallel will be uniform

D. 100 W both in series and parallel will be uniform

Answer: A

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50. Two resistance R_1 and R_2 when connected in series and parallel with $120V$ line, power consumed will be $25W$ and $100W$ respectively. . Then the ratio of power consumed by R_1 to that consmed by R_2 will be

A. $1:1$

B. $1:2$

C. $2:1$

D. $1:4$

Answer: A

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51. A 220 volt and 800 watt electric kettle and three 220 volt and 100 watt bulbs are connected in parallel. On connecting this combination with 220 volt electric supply, the total current will be

A. 0.15 ampere

B. 5.0 ampere

C. 5.5 ampere

D. 6.9 ampere

Answer: B

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52. You are given three bulbs of 25, 40 and 60 watt . Which of them has lowest resistance

A. 25 watt bulb

B. 40 watt bulb

C. 60 watt bulb

D. Information is insufficient

Answer: C

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53. The value of internal resistance of ideal cell is

A. Zero

B. 0.5Ω

C. 1Ω

D. Infinity

Answer: A

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54. Electric power is transmitted over long distances through conducting wires at high voltage because

A. High voltage travels faster

B. Power loss is large

C. Power loss is less

D. Generator produced electrical energy at a very high voltage

Answer: C

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55. A coil develops heat of 800 cal / sec . When 20 volts is applied across its ends. The resistance of the coil is (1 cal = 4.2 joule)

A. 1.2Ω

B. 1.4Ω

C. 0.12Ω

D. 0.14Ω

Answer: C

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56. Resistances R_1 and R_2 are joined in parallel and a current is passed so that the amount of heat liberated is H_1 and H_2 respectively. The ratio $\frac{H_1}{H_2}$ has the value

A. $\frac{R_2}{R_1}$

B. $\frac{R_1}{R_2}$

C. $\frac{R_1^2}{R_2^2}$

D. $\frac{R_2^2}{R_1^2}$

Answer: A

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57. The internal resistance of primary cell is 4Ω it genrater a current of $0.2A$ and connected to a external resistance 0f '21Omega' in which resistance connected is providing the the heat per second is

A. $0.42J/s$

B. $0.84J/s$

C. 5 J/s

D. 1 J/s

Answer: D

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

A. 200 J

B. 400 J

C. 25 J

D. 50 J

Answer: B

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59. Which of the following is not a correct statement

A. Resistivity of electrolytes decreases on increasing temperature

B. Resistance of mercury falls on decreasing its temperature

C. When joined in series a 40 W bulb glows more than a 60 W bulb

D. Resistance of 40 W bulb is less than the resistance of 60 W bulb

Answer: D

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60. There bulbs 40 W, 60 W and 100 W are connected in series to 220 V 4 mains. Which bulb will glow brightly ?

A. 40 W

B. 60 W

C. 100 W

D. All with the same brightness

Answer: A

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61. The energy consumed in 1 kilowatt electric heater in 30 seconds will be

A. $6 \times 10^2 J$

B. $4.99 \times 10^7 J$

C. $9.8 \times 10^6 J$

D. $3 \times 10^4 J$

Answer: D

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62. Two bulbs of 500 watt and 200 watt are manufactured to operate on 220 volt line. The ratio of heat produced in $500W$ and $200W$, in two cases, when firstly they are joined in parallel and secondly in series, will be

A. $\frac{5}{2}, \frac{2}{5}$

B. $\frac{5}{2}, \frac{5}{2}$

C. $\frac{2}{5}, \frac{5}{2}$

D. $\frac{2}{5}, \frac{2}{5}$

Answer: A

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63. A 60 watt bulb carries a current of 0.5 amp . The total charge passing through it in 1 hour is

A. 3600 coulomb

B. 3000 coulomb

C. 2400 coulomb

D. 1800 coulomb

Answer: D

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64. An electric heater of resistance 6 ohm is run for 10 minutes on a 120 volt line. The energy liberated in this period of time is

A. $7.2 \times 10^3 J$

B. $14.4 \times 10^5 J$

C. $43.2 \times 10^{-4} J$

D. $28.8 \times 10^4 J$

Answer: B

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65. Two bulbs are working in parallel order. Bulb A is brighter than bulb B .

If R_A and R_B are their resistance respectively then

A. $R_A > R_B$

B. $R_A < R_B$

C. $R_A = R_B$

D. None of these

Answer: B

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66. Two conductors made of the same material are connected across a common potential difference. Conductor A has twice the diameter and twice the length of conductor B . The power delivered to the two conductors P_A and P_B respectively is such that P_A / P_B equals to

A. 0.5

B. 1.0

C. 1.5

D. 2.0

Answer: D

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67. A heating coil can heat the water of a vessel from $20^\circ C$ to $60^\circ C$ in 30 minutes . Two such heating coils are put in series and then used to heat the same amount of water through the same temperature range. The time taken now will be (neglecting thermal capacity of the coils)

A. 60 minutes

B. 30 minutes

C. 15 minutes

D. 7.5 minutes

Answer: A

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68. If 2.2 kilowatt power is transmitted through a 10 ohm line at 22000 volt , the power loss in the form of heat will be

A. 0.1 watt

B. 1 watt

C. 10 watt

D. 100 watt

Answer: A

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69. Two resistors having equal resistances are joined in series and a current is passed through the combination. Neglect any variation in resistance as the temperature changes. In a given time interval,

A. Equal amounts of thermal energy must be produced in the resistors

B. Unequal amounts of thermal energy may be produced

C. The temperature must rise equally in the resistors

D. The temperature must rise unequally in the resistors

Answer: A

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70. A $5^{\circ}C$ rise in the temperature is observed in a conductor by passing some current. When the current is doubled, then rise in temperature will be equal to

A. $16^{\circ} C$

B. $10^{\circ} C$

C. $20^{\circ} C$

D. $12^{\circ} C$

Answer: C

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71. Watt - hour meter measures

A. Electric energy

B. Current

C. Voltage

D. Power

Answer: A

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72. An electric lamp is marked 60 W , 230 V . The cost of 1 kilowatt hour of power is Rs . 1.25. The cost of using this lamp for 8 hours is

A. Rs. 1.20

B. Rs. 4.00

C. Rs. 0.25

D. Rs. 0.60

Answer: D

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73. 4 bulbs marked 40 W , 250 V are connected in series with 250 V mains. The total power is

A. 10 W

B. 40 W

C. 320 W

D. 160 W

Answer: A

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74. Pick out the wrong statement

A. In a simple battery circuit, the point of lowest potential is the negative terminal of the battery

B. The resistance of an incandescent lamp is greater when the lamp is switched off

C. An ordinary 100 W lamp has less resistance than a 60 W lamp

D. At constant voltage, the heat developed in a uniform wire varies inversely as the length of the wire used

Answer: B

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75. Two resistors of 6Ω and 9Ω are connected in series to a 120 volt source. The power consumed by the 6Ω resistor is

A. 384 W

B. 576 W

C. 1500 W

D. 1200 W

Answer: A

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76. Electric room radiator which operates at 225 volts has resistance of 50 ohms . Power of the radiator is approximately

A. 100 W

B. 450 W

C. 750 W

D. 1000 W

Answer: D

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77. If a power of 100 W is being supplied across a potential difference of 200 V , current flowing is

A. $2A$

B. $0.5A$

C. $1A$

D. $20A$

Answer: B

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

A. 0.5Ω

B. 2Ω

C. 4Ω

D. 20Ω

Answer: B

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79. A $4\mu F$ conductor is charged to 400 volts and then its plates are joined through a resistance of $1k\Omega$. The heat produced in the resistance is

A. $0.16J$

B. $1.28J$

C. $0.64J$

D. $0.32J$

Answer: D

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80. A 10 ohm electric heater operates on a 110 V line. Calculate the rate at which it develops heat in watts

A. 1310 W

B. 670 W

C. 810 W

D. 1210 W

Answer: D

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81. A $100W200V$ bulb is connected to a $160V$ power supply. The power consumption would be

A. 64 W

B. 80 W

C. 100 W

D. 125 W

Answer: A

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

A. $2.0ohm$

B. $0.25 ohm$

C. $1.0 ohm$

D. $0.5 ohm$

Answer: D

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83. A piece of fuse wire melts when a current of15 ampere flows through it. With this current, if it dissipates 22.5 W , the resistance of fuse wire will be

A. Zero

B. 10Ω

C. 1Ω

D. 0.10Ω

Answer: D

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84. Two wires $'A'$ and $'B'$ of the same material have their lengths in the ratio $1:2$ and radii in the ratio $2:1$ The two wires are connected in parallel across a battery. The ratio of the heat produced in $'A'$ to the heat produced in $'B'$ for the same time is

A. $1:2$

B. $2:1$

C. $1:8$

D. $8:1$

Answer: D

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85. A heater draws a current of 2 A when connected to a 250 V source. The rate of energy dissipation is

A. 500 W

B. 1000 W

C. 250 W

D. 125 W

Answer: A

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86. A bulb rated at (100 W – 200 V) is used on a 100 V line. The current in the bulb is

A. $\frac{1}{4}amp$

B. $4amp$

C. $\frac{1}{2}amp$

D. $2amp$

Answer: A

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87. A steel wire has a resistance twice that of an aluminium wire. Both of them are connected with a constant voltage supply. More heat will be dissipated in

A. Steel wire when both are connected in series

B. Steel wire when both are connected in parallel

C. Aluminium wire when both are connected in series

D. Aluminium wire when both are connected in parallel

Answer: A::D

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88. A current i passes through a wire of length l , radius of cross-section r and resistivity ρ . The rate of heat generation is

A. $\frac{i^2 l\rho}{\pi r^2}$

B. $i^2\left(\frac{l\rho}{\pi r^2}\right)^2$

C. $i^2 l\rho / r$

D. $il\rho / r$

Answer: A

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89. Which of the following is not equal to watt?

A. $(Amp)^2 \times ohm$

B. Amp / Volt

C. Amp $\times$ Volt

D. Joule / sec

Answer: B

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90. Two wires with resistances R and 2 R are connected in parallel, the ratio of heat generated in 2 R and R is

A. $1:2$

B. $2:1$

C. $1:4$

D. $4:1$

Answer: A

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91. If three bulbs 60 W , 100 W and 200 W are connected in parallel, then

A. 200 W bulb will glow more

B. 60 W bulb will glow more

C. 100 W bulb will glow more

D. All the bulbs will glow equally

Answer: A

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92. An expression for rate of heat generated, if a current of I ampere flows through a resistance of $R\Omega$, is

A. I^2Rt

B. I^2R

C. V^2R

D. IR

Answer: B

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93. On giving 220 V to a resistor the power dissipated is 40 W then value of resistance is

A. 1210Ω

B. 2000Ω

C. 1000Ω

D. None of these

Answer: A

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94. A 60 watt bulb operates on 220 V supply. The current flowing through the bulb is

A. 11/3 amp

B. 3/11 amp

C. 3 amp

D. 6 amp

Answer: B

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95. If two bulbs of wattage 25 and 30, each rated at 220 volts , are connected in series with a 440 volt supply, which bulb will fuse

A. 25 W bulb

B. 30 W bulb

C. Neither of them

D. Both of them

Answer: A

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96. Two electric bulbs (60 W and 100 W respectively) are connected in series. The current passing through them is

A. More in 100 W bulb

B. More in 60 W bulb

C. Same in both

D. None of these

Answer: C

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97. In the circuit shown below, the power developed in the 6Ω resistor is 6 watt. The power in watts developed in the 4Ω resistor is

A. 16

B. 9

C. 6

D. 4

Answer: B

Watch Video Solution

98. Two wires A and B of same material and mass have their lengths in the ratio $1:2$. On connecting them to the same source, the rate of heat dissipation in B is found to be 5 W . The rate of heat dissipation in A is

A. 10 W

B. 5 W

C. 20 W

D. None of these

Answer: C

Watch Video Solution

99. If two electric bulbs have 40 W and 60 W rating at V 220 , then the ratio of their resistances will be

A. $3:2$

B. $2:3$

C. $3:4$

D. $4:3$

Answer: A

Watch Video Solution

100. An electric bulb is designed to draw P_0 power at V_0 voltage. If the voltage is V, it drawas power. Then

A. $P = \left(\frac{V_0}{V}\right)^2 P_0$

B. $P = \left(\frac{V}{V_0}\right)^2 P_0$

C. $P = \left(\frac{V}{V_0}\right)P_0$

D. $P = \left(\frac{V_0}{V}\right)P_0$

Answer: B

Watch Video Solution

101. There bulbs 40 W, 60 W and 100 W are connected in series to 220 V 4 mains. Which bulb will glow brightly ?

A. 40 W

B. 60 W

C. 100 W

D. Equal in all bulbs

Answer: C

Watch Video Solution

102. An electric kettle has two heating coils. When one coil is used, water in the kettle boils in 5 minutes, while when second coil is used, same water boils in 10 minutes. If the two coils, connected in parallel are used simultaneously, the same water will boil in time

A. 3 mi n 20 sec

B. 5 min

C. 7 min 30 sec

D. 2 min 30 sec

Answer: A

Watch Video Solution

103. An external resistance R is connected to a battery of e.m.f. V and internal resistance r . The joule heat produced in resistor R is maximum when R is equal to

A. r

B. $\frac{r}{2}$

C. 2r

D. Infinitely large

Answer: A

Watch Video Solution

104. The amount of heat produced in a resistor when a current is passed through it can be found using

A. Faraday's Law

B. Kirchhoff's Law

C. Laplace's Law

D. Joule's Law

Answer: D

Watch Video Solution

105. Two wires have resistance of 2Ω and 4Ω connected to same voltage, ratio of heat dissipated at resistance is

A. $1:2$

B. $4:3$

C. $2:1$

D. $5:2$

Answer: C

Watch Video Solution

106. Two electic bulbs rated P_1 watt V volts and P_2 watt V volts are connected in parallel and V volts are applied to it. The total power will be

A. $P_1 + P_2$ watt

B. $\sqrt{P_1 P_2}$ watt

C. $\frac{P_1 P_2}{P_1 + P_2}$ watt

D. $\frac{P_1 + P_2}{P_1 P_2}$ watt

Answer: A

Watch Video Solution

107. n identical bulbs, each designed to draw a power p from a certain voltage supply, are joined in series across that supply. The total power which they will draw is

A. p/n^2

B. p/n

C. p

D. np

Answer: B

Watch Video Solution

108. A wire when connected to $220V$ mains sapply power dissipation P_1 Now the wire is cut into two equal pieces which are connected in parallel to the same apply power dissipation in this case is P_2 then $P_1 : P_2$ is

A. 1

B. 4

C. 2

D. 3

Answer: B

Watch Video Solution

109. An electric bulb, marked $40W$ and $200V$, is used in a circuit of supply voltage $100V$. Now its power is

A. 100 W

B. 40 W

C. 20 W

D. 10 W

Answer: D

Watch Video Solution

110. Electric bulb $50W - 100V$ glowing at full power are to be used in parallel with battery $120V, 10\Omega$. Maximum number of bulbs that can be connected so that they glow in full power is

A. 2

B. 8

C. 4

D. 6

Answer: C

Watch Video Solution

111. A bulb has specification of one kilowatt and 250 volts , the resistance of bulb is

A. 125Ω

B. 62.5Ω

C. 0.25Ω

D. 625Ω

Answer: B

Watch Video Solution

112. If a $30V, 90W$ bulb is to be worked on a $120V$ line, resistance of how many ohms should be connected in series with the bulb

A. 10 ohm

B. 20 ohm

C. 30 ohm

D. 40 ohm

Answer: C

Watch Video Solution

113. A fuse wire with radius 1 mm blows at 1.5 amp . The radius of the fuse wire of the same material to blow at 3 A will be

A. $4^{1/3}mm$

B. $3^{1/4}mm$

C. $2^{1/2}mm$

D. $3^{1/2}mm$

Answer: A

Watch Video Solution

114. Three electric bulbs of rating 60 W each are joined in series and then connected to electric mains. The power consumed by these three bulbs will be

A. 180 W

B. 60 W

C. 20 W

D. $\frac{20}{3}W$

Answer: C

Watch Video Solution

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

A. 708Ω

B. 870Ω

C. 807Ω

D. 780Ω

Answer: C

Watch Video Solution

116. A 220 volt, 1000 watt bulb is connected across a 110 volt mains supply. The power consumed will be

A. 1000 W

B. 750 W

C. 500 W

D. 250 W

Answer: D

Watch Video Solution

117. Two bulbs of 100 W and 200 W working at 220 volt are joined in series with 220 volt supply. Total power consumed will be approximately.

A. 65 watt

B. 33 watt

C. 300 watt

D. 100 watt

Answer: A

Watch Video Solution

118. How many calories of heat will be approximately developed in a $210W$ electric bulb in $5\ \min$?

A. 80000 cal

B. 63000 cal

C. 1050 cal

D. 15000 cal

Answer: D

Watch Video Solution

119. A $5^\circ C$ rise in the temperature is observed in a conductor by passing some current. When the current is doubled, then rise in temperature will be equal to

A. $5^\circ C$

B. $10^\circ C$

C. $20^\circ C$

D. $40^\circ C$

Answer: C

Watch Video Solution

120. If a 2 kW boiler is used everyday for 1 hour, then electrical energy consumed by boiler in thirty days is

A. 15 unit

B. 60 unit

C. 120 unit

D. 240 unit

Answer: B

Watch Video Solution

121. What will happen when a 40 watt 220 volt lamp and 100 watt-220 volt lamp are connected in series across 40 volt supply?

A. 100 watt lamp will fuse

B. 40 watt lamp will fuse

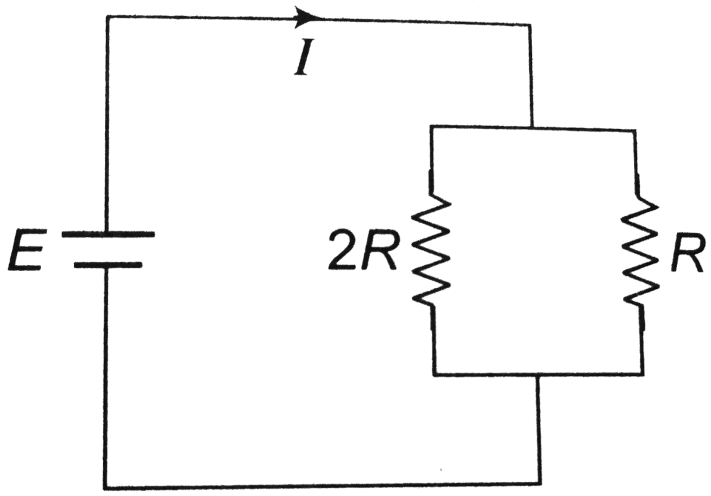
C. Both lamps will fuse

D. Neither lamp will fuse

Answer: D

Watch Video Solution

122. What is the ratio of heat generated in R and $2R$?



A. $2:1$

B. $1:2$

C. $4:1$

D. $1:4$

Answer: A

Watch Video Solution

123. In an electric heater 4 amp current passes for 1 minute at potential difference of 250 volt , the power of heater and energy consumed will be respectively

A. 1 kW, 60 kJ

B. 0.5 kW, 30 kJ

C. 10 kW, 600 kJ

D. None of these

Answer: A

Watch Video Solution

124. Some electric bulbs are connected in series across a 220 V supply in a room. If one bulb is fused then remaining bulbs are connected again in series across the same supply. The illumination in the room will

A. Increase

B. Decrease

C. Remains the same

D. Not continuous

Answer: A

Watch Video Solution

125. The resistor of resistance ' R ' is connected to 25 V supply and heat produced in it is 25 J / sec. The value of R is

A. 225Ω

B. 1Ω

C. 25Ω

D. 50Ω

Answer: C

Watch Video Solution

126. Three bulbs of 40 W , 60 W , 100 W are arranged in series with 220 volt supply which bulb has minimum resistance

A. 100 W

B. 40 W

C. 60 W

D. Equal in all bulbs

Answer: A

Watch Video Solution

127. If two electric bulbs have 40 W and 60 W rating at 220 V , then the ratio of their resistances will be

A. $9:4$

B. $4:3$

C. $3:8$

D. $3:2$

Answer: D

Watch Video Solution

128. A 10 V storage battery of negligible intenal resistance is connected across a 50Ω resistor. How much heat energy is produced in the resistor is 1 hour

A. 7200 J

B. 6200 J

C. 5200 J

D. 4200 J

Answer: A

Watch Video Solution

129. A hot electric iron has a resistance of 80Ω and is used on a 200 V source. The electrical energy spent, if it is used for two hours, will be

A. 8000 Wh

B. 2000 Wh

C. 1000 Wh

D. 800 Wh

Answer: C

Watch Video Solution

130. The heat produced by a 100 watt heater in 2 minute will be equal to

A. $12 \times 10^3 J$

B. $10 \times 10^3 J$

C. $6 \times 10^3 J$

D. $3 \times 10^3 J$

Answer: A

Watch Video Solution

131. If two wires having resistance R and 2 R . Both joined in series and in parallel then ratio of heat generated in this situation, applying the same voltage,

A. $2:1$

B. $1:2$

C. $2:9$

D. $9:2$

Answer: C

Watch Video Solution

132. Two electric bulbs A and B are rated as 60 W and 100 W . They are connected in parallel to the same source. Then,

A. Both draw the same current

B. A draws more current than B

C. B draws more current than A

D. Current drawn are in the ratio of their resistances

Answer: C

Watch Video Solution

133. Three identical resistances A , B and C are connected as shown in the given figure. The heat produced will be maximum

A. In B

B. In B and C

C. In A

D. Same for A, B and C

Answer: C

Watch Video Solution

134. A heater coil connected to a supply of a 220 V is dissipating some power . P_1 The coil is cut into half and the two halves are connected in parallel. The heater now dissipates a power . P_2 Theratio of power $P_1 : P_2$ is

A. $2:1$

B. $1:2$

C. $1:4$

D. $4:1$

Answer: C

Watch Video Solution

135. An electric lamp is marked 60 W , 230 V . The cost of a 1 kWh of energy is Rs . 1.25. The cost of using this lamp 8 hrs a day for 30 day is

A. Rs. 10

B. Rs. 16

C. Rs. 18

D. Rs. 20

Answer: C

Watch Video Solution

136. An electric iron draws 5 amp , a TV set draws 3 amp and refrigerator draws 2 amp from a 220 volt main line. The three appliances are connected in parallel. If all the three are operating at the same time, the fuse used maybe of

A. 20 amp

B. 5 amp

C. 15 amp

D. 10 amp

Answer: C

Watch Video Solution

137. Match the List I with the List II from the combination shown. In the left side (List I) there are four different conditions and in the right side

(List II), there are ratios of heat produced in each resistance for each condition :

List I

(I) Two wires of same resistance are connected in series and same curre

(II) Two wires of resistance R and 2 R ohm are connected in series and s

(III) Two wires of same resistance are connected in parallel and same cu

(IV) Two wires of resistances in the ratio $1:2$ are connected in parallel a

A. I-B, II-A, III-C, IV-D

B. I-C, II-D, III-C, IV-D

C. I-B, II-D, III-A, IV-C

D. I-A, II-B, III-D, IV-C

Answer: B

Watch Video Solution

138. The electric current passes through a metallic wire produces heat because of :

A. Collisions of conduction electrons with each other

B. Collisions of the atoms of the metal with each other

C. The energy released in the ionization of the atoms of the metal

D. Collisions of the conduction electrons with the atoms of the metallic wires

Answer: D

Watch Video Solution

139. The maximum current that flows through a fuse wire before it blows out varies with its radius as

A. $r^{3/2}$

B. r

C. $r^{2/3}$

D. $r^{1/2}$

Answer: A

Watch Video Solution

140. What is immeterial for an electric fuse wire ?

A. Specific resistance of the wire

B. Radius of the wire

C. Length of the wire

D. Current flowing through the wire

Answer: C

Watch Video Solution

141. The current flowing through a lamp marked as 50 W and 250 V is

A. 5 amp

B. $2.5amp$

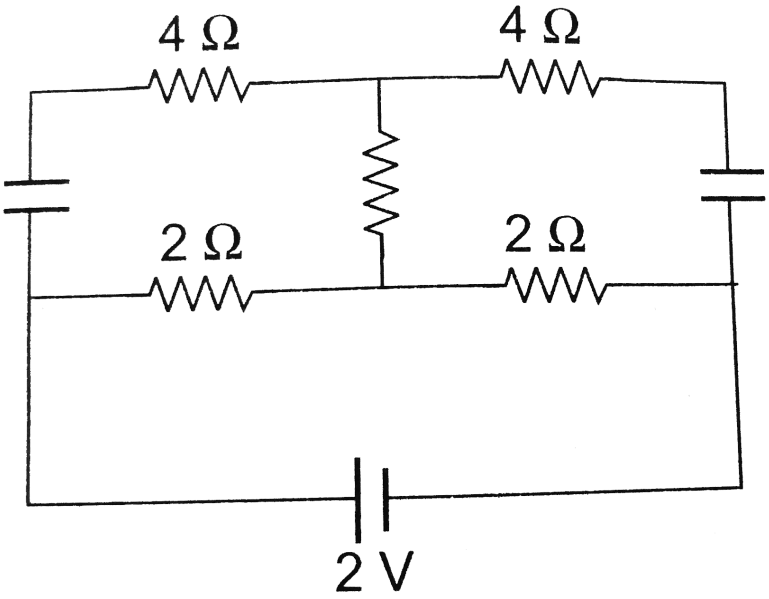
C. 2 amp

D. $0.2amp$

Answer: D

Watch Video Solution

142. Find the power of the circuit



A. $1.5W$

B. 2 W

C. 1 W

D. None of these

Answer: C

Watch Video Solution

143. If in the circuit shown in Fig.7.55, power dissipation is $150W$, then find the value of $R(\text{in}\Omega)$.

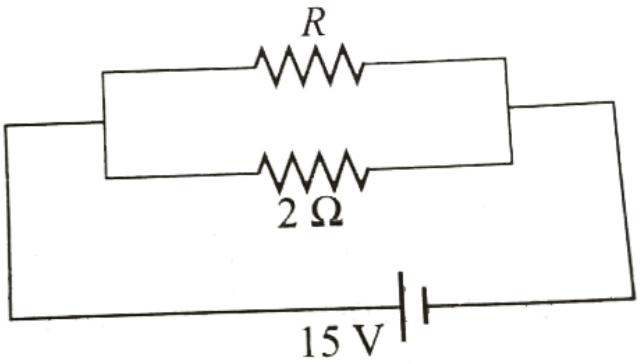


Fig. 7.55

A. 2Ω

B. 6Ω

C. 5Ω

D. 4Ω

Answer: B

Watch Video Solution

144. Two resistors whose value are in ratio $2:1$ are connected in parallel with one cell. Then ratio of power dissipated is

A. $2:1$

B. $4:1$

C. $1:2$

D. $1:1$

Answer: C

Watch Video Solution

145. 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

A. One fourth

B. Halved

C. Doubled

D. Four times

Answer: C

Watch Video Solution

146. The resistance of hot tungsten filament is about 10 times the cold resistance. What will be the resistance of 100 W and 200 V lamp when not in use?

A. 400Ω

B. 200Ω

C. 40Ω

D. 20Ω

Answer: C

Watch Video Solution

147. A 5.0 amp current is setup in an external circuit by a 6.0 volt storage battery for 6.0 minutes. The chemical energy of the battery is reduced by

A. $1.08 \times 10^4 J$

B. 1.08×10^{-4} volt

C. $1.8 \times 10^4 J$

D. 1.8×10^4 volt

Answer: A

Watch Video Solution

148. A railway compartment is lit up by thirteen lamps each taking 2.1 amp at 15 volts. The heat generated per second in each lamp will be

A. 4.35 cal

B. 5.73 cal

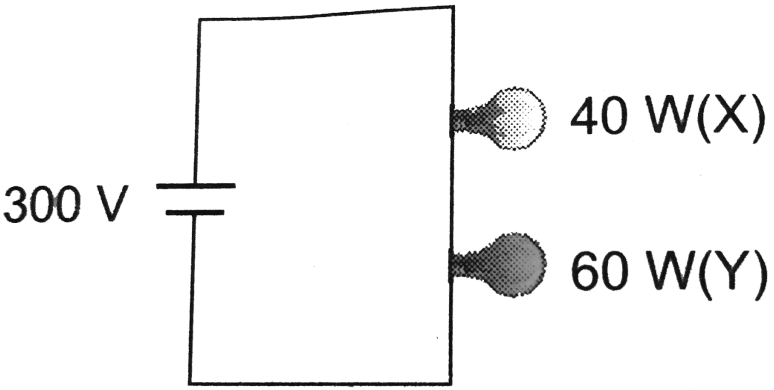
C. 7.5 cal

D. 2.5 cal

Answer: C

Watch Video Solution

149. Two bulbs X and Y having same voltage rating and of power 40 watt and 60 watt respectively are connected in series across a potential difference of 300 volt, then



A. X will glow brighter

B. Resistance of Y is greater than X

C. Heat produced in Y will be greater than X

D. Voltage drop in X will be greater than Y

Answer: A

Watch Video Solution

150. 3 identical bulbs are connected in series and these together dissipate a power P . If now the bulbs are connected in parallel, then the power dissipated will be

A. $\frac{P}{3}$

B. 3P

C. 9P

D. $\frac{P}{9}$

Answer: C

Watch Video Solution

151. A coil takes 15 min to boil a certain amount of water, another coil takes 20 min for the same process. Time taken to boil the same amount of water when both coil are connected in series

A. 5 min

B. 8.6 min

C. 35 min

D. 30 min

Answer: C

Watch Video Solution

152. The electrochemical equivalent Z of any element can be obtained by multiplying the electrochemical equivalent of hydrogen with

A. Atomic weight

B. Molecular weight

C. Chemical equivalent

D. A constant

Answer: C

Watch Video Solution

153. A silver and zinc voltameter are connected in series and a current i is passed through them for a time t liberating W gm of zinc. The weight of silver deposited is nearly

A. W

B. $1.7W$

C. $2.4W$

D. $3.5W$

Answer: D

Watch Video Solution

154. To deposit one gm equivalent of an element at an electrode. The quantity of electricity needed is

A. One ampere

B. 96000 amperes

C. 96500 farads

D. 96500 coulombs

Answer: D

Watch Video Solution

155. In an electrolysis experiment, a current i passes through two different cells in series, one containing a solution of $CuSO_4$ and the other a solution of $AgNO_3$. The rate of increase of the weight of the cathodes in the two cells will be

A. In the ratio of the densities of Cu and Ag

B. In the ratio of the at. weights of Cu and Ag

C. In the ratio of half the atomic weight of Cu to the atomic weight of Ag

D. In the ratio of half the atomic weight of Cu to half the atomic weight of Ag

Answer: C

Watch Video Solution

156. To deposit one litre of hydrogen at 22.4 atmosphere from acidulaled water, the quantity of electricity that must pass through is

A. 1 coulomb

B. 22.4 coulomb

C. 96500 coulomb

D. 193000 coulomb

Answer: D

Watch Video Solution

157. The amount of substance liberated on electrodes during electrolysis when 1 coulomb of electricity is passed, is

A. Chemical equivalent

B. Electrochemical equivalent

C. Equivalent weight

D. One mol

Answer: B

Watch Video Solution

158. For goldplating on a copper chain, the substance required in the form of solution is

A. Copper sulphate

B. Copper chloride

C. Potassium cyanide

D. Potassium aurocyanide

Answer: D

Watch Video Solution

159. On passing the current in water voltameter, the hydrogen

A. Liberated at anode

B. Liberated at cathode

C. Does not liberate

D. Remains in the solution

Answer: B

Watch Video Solution

160. In water voltameter, the electrolysis of ..... takes place

A. H_2O

B. H_2SO_4

C. H_2O and H_2SO_4 both

D. H_2 and O_2

Answer: A

Watch Video Solution

161. For depositing 1 gm of Cu in copper voltameter on passing 2 amperes of current, the time required will be (For copper $Z = 0.00033$ gm/C)

A. Approx. 20 minutes

B. Approx. 25 minutes

C. Approx. 30 minutes

D. Approx. 35 minutes

Answer: B

Watch Video Solution

162. A battery of e.m.f. 3 volt and internal resistance 1.0 ohm is connected in series with copper voltameter. The current flowing in the circuit is 1.5 amperes. The resistance of voltameter will be

A. Zero

B. $1.0ohm$

C. $1.5 ohm$

D. $2.0 ohm$

Answer: B

Watch Video Solution

163. According to Faraday's laws of electrolysis, the amount of decomposition is proportional to

A. $\frac{1}{\text{Time for which curent passes}}$

B. Electrochemical equivalent of the substance

C. $\frac{1}{\text{Current}}$

D. $\frac{1}{\text{Electrochemical equivalent}}$

Answer: B

Watch Video Solution

164. If in a voltaic cell 5 gm of zinc is consumed, then we get how many ampere hours ? (Given that E.C.E. of Zn is 3.387×10^{-7} kg/coulomb)

A. 2.05

B. 8.2

C. 4.1

D. $5 \times 3.387 \times 10^{-7}$

Answer: C

Watch Video Solution

165. The current flowing in a copper voltmeter is $1.6A$. The number of Cu^{++} ions deposite at the cathode per minute are

A. 1.5×10^{20}

B. 3×10^{20}

C. 6×10^{20}

D. 1×10^{19}

Answer: B

Watch Video Solution

166. In a copper voltameter experiment, current is decreased to one-fourth of the initial value but it is passed for four times the earlier duration. Amount of copper deposited will be

A. Same

B. One-fourth the previous value

C. Four times the previous value

D. $\frac{1}{16}th$ of the previous value

Answer: A

Watch Video Solution

167. A certain charge liberates 0.8 gm of O_2 . The same charge will liberate how many gm of silver

A. 108 gm

B. $10.8gm$

C. $0.8gm$

D. $\frac{108}{0.8}gm$

Answer: B

Watch Video Solution

168. In charging a battery of motor-car, the following effect of electric current is used

A. Magnetic

B. Heating

C. Chemical

D. Induction

Answer: C

Watch Video Solution

169. The Avogadro's number is 6×10^{23} per gm mole and electronic charge is $1.6 \times 10^{-19} C$. The Faraday's number is

A. $6 \times 10^{23} \times 1.6 \times 10^{-19}$

B. $\frac{6 \times 10^{23}}{1.6 \times 10^{-19}}$

C. $\frac{2}{6 \times 10^{23} \times 1.6 \times 10^{-19}}$

D. $\frac{1.6 \times 10^{-19}}{6 \times 10^{23}}$

Answer: A

Watch Video Solution

170. In $CuSO_4$ solution when electric current equal to 2.5 faraday is passed, the gm equivalent deposited on the cathode is

A. 1

B. 1.5

C. 2

D. 2.5

Answer: D

Watch Video Solution

171. The atomic weight of silver and copper are 108 and 64. A silver voltameter and a copper voltameter are connected in series and when current is passed 10.8 gm of silver is deposited. The mass of copper deposited will be

A. $6.4gm$

B. $12.8gm$

C. $3.2gm$

D. $10.8gm$

Answer: C

Watch Video Solution

172. Faraday's laws of electrolysis are related to

A. The atomic number of positive ion

B. The equivalent weight of electrolyte

C. The atomic number of negative ion

D. The velocity of positive ion

Answer: B

Watch Video Solution

173. In the process of electrolysis, the current is carried out inside the electrolyte by

A. Electrons

B. Atoms

C. Positive and negative ions

D. All the above

Answer: C

Watch Video Solution

174. In electrolysis the mass deposited on an electrode is directly proportional to:

A. The current

B. The resistance

C. The temperature

D. The electric power

Answer: A

Watch Video Solution

175. The amount of charge required to liberate 9 gm of aluminium (atomic weight = 27 and valency = 3) in the process of electrolysis is (Faraday's number = 96500 coulombs / gm equivalent)

A. 321660 coulombs

B. 69500 coulombs

C. 289500 coulombs

D. 96500 cou lombs

Answer: D

Watch Video Solution

176. In an electroplating experiment, m gm of silver is deposited when 4 ampere of current flows for 2 minute . The amount (in gm) of silver deposited by 6 ampere of current for 40 second will be

A. 4 m

B. m/2

C. m/4

D. 2 m

Answer: B

Watch Video Solution

177. In electrolysis, if the duration of the passage of current is doubled, the mass liberated is

A. Doubled

B. Halved

C. Increased four times

D. Remains the same

Answer: A

Watch Video Solution

178. A current of 16 ampere flows through molten NaCl for 10 minute . The amount of metallic sodium that appears at the negative electrode would be

A. $0.23gm$

B. $1.15gm$

C. $2.3gm$

D. $11.5gm$

Answer: C

Watch Video Solution

179. The mass of a substance liberated when a charge ' q ' flows through an electrolyte is proportional to

A. q

B. 1/q

C. q^2

D. $1/q^2$

Answer: A

Watch Video Solution

180. A steady current of 5 amps is maintained for 45 mins . During this time it deposits 4.572 gms of zinc at the cathode of a voltameter. E.C.E. of zinc is

A. $3.387 \times 10^{-4} gm/C$

B. $3.387 \times 10^{-4} C / gm$

C. $3.384 \times 10^{-3} gm / C$

D. $3.394 \times 10^{-3} C / gm$

Answer: A

Watch Video Solution

181. The relation between faraday constant F , electron charge e and avogadro number N is

A. F = N/e

B. F = Ne

C. $N = F^2$

D. $F = N^2 e$

Answer: B

Watch Video Solution

182. The electrochemical equivalent of magnesium is $0.126mg/C.A$. A current of 5 A is passed in a suitable solution for 1 hour . The mass of magnesium deposited will be

A. $0.0378gm$

B. $0.227gm$

C. $0.378gm$

D. $2.27gm$

Answer: D

Watch Video Solution

183. Two electrolytic cells containing $CuSO_4$ and $AgNO_3$ respectively are connected in series and a current is passed through them until 1 mg of copper is deposited in the first cell. The amount of silver deposited in the

second cell during this time is approximately [Atomic weights of copper and silver are respectively 63.57 and 107.88]

A. $1.7mg$

B. $3.4mg$

C. $5.1mg$

D. $6.8mg$

Answer: B

Watch Video Solution

184. A current I is passed for a time t through a number of voltameters. If m is the mass of a substance deposited on an electrode and z is its electrochemical equivalent, then

A. $\frac{zIt}{m}$ = constant

B. $\frac{z}{mIt}$ = constant

C. $\frac{I}{zmt}$ = constant

D. $\frac{It}{zm}$ = constant

Answer: A

Watch Video Solution

185. For electroplating a spoon, it is placed in the voltameter at

A. The position of anode

B. The position of cathode

C. Exactly in the middle of anode and the cathode

D. Anywhere in the electrolyte

Answer: B

Watch Video Solution

186. If nearly 10^5 coulomb liberate $1g$ equivalent of aluminium, then the amount of aluminium (equivalent weight 9) deposited through electrolysis in 20 minutes by a current of 50 amp will be

A. $0.6gm$

B. $0.09gm$

C. $5.4gm$

D. $10.8gm$

Answer: C

Watch Video Solution

187. Electroplating does not help in

A. Fine finish to the surface

B. Shining appearance

C. Metals to become hard

D. Protect metal against corrosion

Answer: C

Watch Video Solution

188. When a current is passed through water, acidified with a dilute sulphuric acid, the gases formed at the platinum electrodes are

A. 1 vol. hydrogen (cathode) and 2 vol. oxygen (anode)

B. 2 vol. hydrogen (cathode) and 1 vol. oxygen (anode

C. 1 vol. hydrogen (cathode) and 1 vol. oxygen (anode)

D. 1 vol. oxygen (cathode) and 2 vol. hydrogen (anode)

Answer: B

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189. The negative Zn pole of a Daniell cell, sending a constant current through a circuit, decreases in mass by 0.13 g in 30 minutes. If the electeochemical equivalent of Zn and Cu are 32.5 and 31.5 respectively, the increase in the mass of the positive. Cu pole in this time is

A. $0.242g$

B. $0.190g$

C. $0.141g$

D. $0.126g$

Answer: D

Watch Video Solution

190. when a copper votameter is connected with a battery of emf $12V$, $2g$ of copper is deposite in 30 min. if the same voltmeter is connected across a $6V$ battery then the mass of copper deposite in 45 min would be

A. 1 gm

B. $1.5gm$

C. 2 gm

D. $2.5gm$

Answer: B

Watch Video Solution

191. Calculate the electric current required to deposit $0.972g$ of chromium in three hours. ECE of chromium is $0.00018gC^{-1}$

A. 1 amp

B. $1.5amp$

C. $0.5amp$

D. 2 amp

Answer: C

Watch Video Solution

192. The current inside a copper voltameter

A. Is half the outside value

B. Is the same as the outside value

C. Is twice the outside value

D. Depends on the concentration of $CuSO_4$

Answer: B

Watch Video Solution

193. The resistance of a cell does not depend on

A. Current drawn from the cell

B. Temperature of electrolyte

C. Concentration of electrolyte

D. The e.m.f . of the cell

Answer: D

Watch Video Solution

194. The electrochemical equivalent of a metal is 3.35109^{-7} kg per Coulomb. The mass of the metal liberated at the cathode when a 3A current is passed for 2 seconds will be

A. $19.8 \times 10^{-7} kg$

B. $9.39 \times 10^{-7} kg$

C. $6.6 \times 10^{-7} kg$

D. $1.1 \times 10^{-7} kg$

Answer: A

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195. Faraday's 2nd law states that mass deposited on the electrode is directly proportional to

A. Atomic mass

B. Atomic mass × Velocity

C. Atomic mass/Valency

D. Valency

Answer: C

Watch Video Solution

196. The relation between faraday constant (F), chemical equicalent (E) and electrochemical equivalent (Z) is

A. $F = EZ$

B. $F = \frac{Z}{E}$

C. $F = \frac{E}{Z}$

D. $F = \frac{E}{Z^2}$

Answer: C

Watch Video Solution

197. The electrochemical equivalent of a material depends on

A. The nature of the material

B. The current through the electrolyte

C. The amount of charge passed through electrolyte

D. The amount of material present in electrolyte

Answer: A

Watch Video Solution

198. On passing 96500 coulomb of charge through a solution $CuSO_4$ the amount of copper liberated is

A. 64 gm

B. 32 gm

C. 32 kg

D. 64 kg

Answer: B

Watch Video Solution

199. If 96500 coulombs of electricity liberates one gram equivalent of any substance, the time taken for a current of 0.15 amperes to deposite 20 mg of copper from a solution of copper sulphate is (Chemical equivalent of copper = 32)

A. 5 min 20 sec

B. 6 min 42 sec

C. 4 min 40 sec

D. 5 min 50 sec

Answer: B

Watch Video Solution

200. How much current should be passed through acidified water for 100 s to liberate 0.224 litre of H_2

A. $22.4A$

B. $19.3A$

C. $9.65A$

D. $1A$

Answer: B

Watch Video Solution

201. Who among the following scientists made the statement –"Chemical change can produce electricity"

A. Galvani

B. Faraday

C. Coulomb

D. Thomson

Answer: A

Watch Video Solution

202. If a steady current of 4 amp maintained for 40 minutes, deposits 4.5 gm of zinc at the cathode and then the electro chemical equivalent will be

A. $51 \times 10^{-17} gm / C$

B. $28 \times 10^{-6} gm/C$

C. $32 \times 10^{-5} gm/C$

D. $47 \times 10^{-5} gm/C$

Answer: D

Watch Video Solution

203. The current flowing in a copper voltameter is 3.2 A . The number of copper ions $\left(Cu^{2+}\right)$ deposited at the cathode per minute is

A. 0.5×10^{20}

B. 1.5×10^{20}

C. 3×10^{20}

D. 6×10^{20}

Answer: D

Watch Video Solution

204. A copper voltameter is connected in series with a heater coil of resistance 0.1Ω . A steady current flows in the circuit for twenty minutes and mass of 0.99 g of copper is deposited at the cathode. If electrochemical equivalent of copper is 0.00033 gm/C , then heat generated in the coil is

A. 750 J

B. 650 J

C. 350 J

D. 250 J

Answer: A

Watch Video Solution

205. E.C.E. of Cu and Ag are 7×10^{-6} and 1.2×10^{-6}. A certain current deposits 14 gm of Cu . Amount of Ag deposited is

A. $1.2gm$

B. $1.6gm$

C. $2.4gm$

D. $1.8gm$

Answer: C

Watch Video Solution

206. The chemical equivalent of silver is 108. If the current in a silver voltameter is 2 Amp. , the time required to deposit 27 grams of silver will be

A. 8.57 hrs

B. 6.70 hrs

C. 3.35 hrs

D. 12.50 hrs

Answer: C

Watch Video Solution

207. Two voltameters, one of copper and another of silver, are joined in parallel. When a total charge q flows through the voltameters, equal amount of metals are deposited. If the electrochemical equivalents of copper and silver are Z_1 and Z_2 respectively the charge which flows through the silver voltameter is

A. $q\frac{z_1}{z_2}$

B. $q\frac{z_2}{z_1}$

C. $\frac{q}{1+\frac{z_1}{z_2}}$

D. $\frac{q}{1+\frac{z_2}{z_1}}$

Answer: D

Watch Video Solution

208. The chemical equivalent of copper and zinc are 32 and 108 respectively. When copper and silver voltameter are connected in series and electric current is passed through for sometimes, 1.6 g of copper is deposited. Then, the mass of silver deposited will be

A. $3.5g$

B. $2.8g$

C. $5.4g$

D. None of these

Answer: C

Watch Video Solution

209. Ampere-hour is a unit of

A. Quantity of charge

B. Potential

C. Energy

D. Current

Answer: A

Watch Video Solution

210. The production of emf by maintaining a difference of tempreture between the two junctions of two different metals is known as

A. Joule effect

B. Seebeck effect

C. Peltier effect

D. Thomson effect

Answer: B

Watch Video Solution

211. When a current passes through the junction of two different metals, evolution or absorption of heat at the junction is known as

A. Joule effect

B. Seebeck effect

C. Peltier effect

D. Thomson effect

Answer: C

Watch Video Solution

212. When a current passes through a wire whose different parts aremaintained at different temperatures, evolution or absorption of heat all along the length of wire is known as

A. Joule effect

B. Seebeck effect

C. Peltier effect

D. Thomson effect

Answer: D

Watch Video Solution

213. The thermocouple is based on the principle of

A. Seebeck effect

B. Thomson effect

C. Peltier effect

D. Joule effect

Answer: A

Watch Video Solution

214. For a thermocouple, the neutral temperature is $270^\circ C$ and the temperature of its cold junction is $20^\circ C$. If there is no deflection in the galvanometer, the temperature of the hot junction should be

A. $210^\circ C$

B. $540^\circ C$

C. $520^\circ C$

D. $209^\circ C$

Answer: C

Watch Video Solution

215. Thermocouple is a device for the measurement of

A. Absolute temperature of a metal

B. The temperature difference between two substances

C. The couple acting on a wire

D. Thermal conductivity of a substance

Answer: B

Watch Video Solution

216. The true statement for thermo e.m.f . of a thermocouple

A. Depends on the nature of metals

B. Depends only on temperature of cold junction

C. Depends only on temperature of hot junction

D. Depends on the length of the wires used for thermocouple

Answer: A

Watch Video Solution

217. The direction of current in an iron-copper thermocouple is

A. From copper to iron at the hot junction

B. From iron to copper at the hot junction

C. From copper to iron at cold junction

D. No current will flow

Answer: A

Watch Video Solution

218. Peltier coefficient for the junction of a pair of metals is proportional to

A. T absolute temperature of the junction

B. Square of absolute temperature of the junction

C. $\frac{1}{\text{absolute temperature of the junction}}$

D. $\frac{1}{\text{Square of absolute temperature of the junction}}$

Answer: A

Watch Video Solution

219. If for a thermocouple $T_n)$ is the neutral temperature, T_c is the tempreture of the cold junction and $T_i)$ is the temperature of inversion, then

A. $T_i = 2T_n - T_c$

B. $T_n = T_i - 2T_c$

C. $T_i = T_n - T_c$

D. None of these

Answer: A

Watch Video Solution

220. For a thermocouple, the temperature of inversion is that temperature at which thermo e.m.f. is

A. Zero

B. Maximum

C. Minimum

D. None of the above

Answer: A

Watch Video Solution

221. For a given thermocouple, the thermo e.m.f. can be

A. Zero

B. Positive

C. Negative

D. All of the above

Answer: D

Watch Video Solution

222. When current is passed in antimony-bismuth couple, then

A. The junction becomes hot when the current is from bismuth to antimony

B. The junction becomes hot when current flows from antimony to bismuth

C. Both junctions become hot

D. Both junctions become cold

Answer: B

Watch Video Solution

223. A thermocouple is made of Cu and Fe . If a battery is connected in it, then

A. Both junctions will be at the same temperature

B. Both junctions will become hot

C. One junction will be hotter than the other

D. None of these

Answer: C

Watch Video Solution

224. Thermopile is used for

A. Collecting the heat energy

B. The measurement of radiant heat energy

C. The measurement of current

D. The change of atomic energy into heat energy

Answer: B

Watch Video Solution

225. When a current of 1 ampere is passed through a conductor whose ends are maintained at temperature difference of $1.^{\circ} C$, the amount of heat evolved or absorbed is called

A. Peltier coefficient

B. Thomson coefficient

C. Thermoelectic power

D. Thermo e.m.f.

Answer: B

Watch Video Solution

226. In a thermocouple, the temperature that does not depend on the temperature of the cold junction is called

A. Neutral temperature

B. Temperature of inversion

C. Both the above

D. None of the above

Answer: A

Watch Video Solution

227. At neutral temperature, the thermoelectric power $\left(\frac{dE}{dT}\right)$ has the value

A. Zero

B. Maximum but negative

C. Maximum but positive

D. Minimum but positive

Answer: A

Watch Video Solution

228. In Cu - Fe couple, the flow of current at the temperature of inversion is

A. From Fe to Cu through the hot junction

B. From Cu to Fe through the hot junction

C. Maximum

D. None of the above

Answer: A

Watch Video Solution

229. In Seebeck series Sb appears before Bi . In a Sb-Bi thermocouple current flows from

A. Sb to Bi at the hot junction

B. Sb to Bi at the cold junction

C. Bi to Sb at the cold junction

D. None of the above

Answer: B

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230. Which of the following statement is correct

A. Both Peltier and Joule effects are reversible

B. Both Peltier and Joule effects are irreversible

C. Joule effect is reversible, whereas Peltier effect is irreversible

D. Joule effect is irreversible, whereas Peltier effect is reversible

Answer: D

Watch Video Solution

231. For a given temperature difference, which of the following pairs will generate maximum thermo e.m.f.

A. Antimony-bismuth

B. Silver-gold

C. Iron-copper

D. Lead-nickel

Answer: A

Watch Video Solution

232. The cold junction of a thermocouple is maintained at $10^{\circ}C$. No thermo e.m.f . is developed when the hot junction is maintained at $530^{\circ}C$. The neutral temperature is

A. $260^{\circ}C$

B. $270^{\circ}C$

C. $265^{\circ} C$

D. $520^{\circ} C$

Answer: B

Watch Video Solution

233. Which of the following is not reversible

A. Joule effect

B. Peltier effect

C. Seebeck effect

D. Thomson effect

Answer: A

Watch Video Solution

234. Neutral temperature of a thermocouple is define as the temperature at which

A. The thermo e.m.f. changes sign

B. The thermo e.m.f. is maximum

C. The thermo e.m.f . is minimum

D. The thermo e.m.f. is zero

Answer: B

Watch Video Solution

235. As the temperature of hot junction of a thermo-couple is increased (while cold junction is at constant temperature), the thermo e.m.f .

A. Increases uniformly at constant rate

B. Increases slowly in the beginning and more rapidly at higher temperatures

C. Increases more rapidly in the beginning but less rapidly at higher temperatures

D. In minimum at neutral temperature

Answer: C

Watch Video Solution

236. As the temperature of hot junction increases, the thermo e.m.f.

A. Always increases

B. Always decreases

C. May increase or decrease

D. Always remains constant

Answer: C

Watch Video Solution

237. The e.m.f. in a thermoelectric circuit with one junction at $0^\circ C$ and the other at $t^\circ C$ is given by $E = At - Bt^2$. The neutral temperature is then

A. $\frac{A}{B}$

B. $-\frac{A}{2B}$

C. $-\frac{B}{2A}$

D. $\frac{A}{2B}$

Answer: D

Watch Video Solution

238. The temperature of cold junction and neutral temperature of a thermocouple are $15^\circ C$ and $280^\circ C$ respectively. The temperature of inversion is

A. $295^\circ C$

B. $265^{\circ} C$

C. $545^{\circ} C$

D. $575^{\circ} C$

Answer: C

Watch Video Solution

239. Above neutral temperature, thermo e.m.f. in a thermocouple

A. Decreases with rise in temperature

B. Increases with rise in temperature

C. Remains constant

D. Changes sign

Answer: A

Watch Video Solution

240. Consider the following two statements A and B , and identify the correct choice out of given answers

A. Thermo e.m.f. is minimum at neutral temperature of a thermocouple

B. When two junctions made of two different metallic wires are maintained at different temperatures, an electric current is generated in the circuit.

A. A is false and B is true

B. A is true and B is false

C. Both A and B are false

D. Both A and B are true

Answer: A

Watch Video Solution

241. The temperature at which thermal electric power of a thermo couple becomes zero is called

A. Inversion temperature

B. Neutral temperature

C. Junction temperature

D. Null temperature

Answer: B

Watch Video Solution

242. Thomson coefficient of a conductor is $10\mu V / K$. The two ends of it are kept at $50^\circ C$ and $60^\circ C$ respectively. Amount of heat absorbed by the conductor when a charge of 10 C flows through it is

A. 1000 J

B. 100 J

C. 100 mJ

D. 1 mJ

Answer: D

Watch Video Solution

243. For a thermocouple the neutral temperature is $270^\circ C$ when its cold junction is at $20^\circ C$. What will be the neutral temperature and the temperature of inversion when the temperature of cold junction is increased to $40^\circ C$

A. $290^\circ C, 580^\circ C$

B. $270^\circ C, 580^\circ C$

C. $270^\circ C, 500^\circ C$

D. $290^\circ C, 540^\circ C$

Answer: C

Watch Video Solution

244. Two ends of a conductor are at different temperatures the electromotive force generated between two ends is

A. Seebeck electro motive force (e.m.f.)

B. Peltier electro motive force (e.m.f.)

C. Thomson electro motive force (e.m.f.)

D. None of these

Answer: C

Watch Video Solution

245. The neutral temperature of a thermocouple is $350^\circ C$ when the cold junction is at . $0^\circ C$ When the cold junction is immersed in a bath of $30^\circ C$, the inversion temperature is

A. $700^\circ C$

B. $600^\circ C$

C. $35^{\circ} C$

D. $670^{\circ} C$

Answer: D

Watch Video Solution

246. A thermoelectric refrigerator works on

A. Joule effect

B. Seeback effect

C. Peltier effect

D. Thermonic emission

Answer: C

Watch Video Solution

247. Consider the following statements regarding a thermocouple. (A) The neutral temperature does not depend on the temperature of the cold junction. (B) The inversion temperature does not depend on the temperature of the cold junction.

A. Increases

B. Approaches inversion temperature

C. Decreases

D. Remains the same

Answer: D

Watch Video Solution

248. Consider the following two statements A and B and identify the correct choice given in the answers

(A) Duddells thermo-galvanometer is suitable to measure direct current only

(B) Thermopile can measure temperature differences of the order of $10^{-3}.^{\circ} C$

A. Both A and B are true

B. Both A and B are false

C. A is true but B is false

D. A is false but B is true

Answer: D

Watch Video Solution

249. If $E = at + bt^2$, what is the temperature of inversion

A. $-\frac{a}{2b}$

B. $+\frac{a}{2b}$

C. $-\frac{a}{b}$

D. $+\frac{a}{b}$

Answer: A

Watch Video Solution

250. Antimony and bismuth are usually used in a thermocouple, because

A. Negative thermal e.m.f. produced

B. Constant thermal e.m.f. produced

C. Lower thermal e.m.f. produced

D. Higher thermal e.m.f. produced

Answer: D

Watch Video Solution

251. The smallest temperature difference that can be measured with a combination of a thermocouple of thermo e.m.f. $30\mu V$ per degree and a

galvanometer of 50 ohm resistance, capable of measuring a minimum current of 3×10^{-7} amp is

A. 0.5 degree

B. 1.0 degree

C. 1.5 degree

D. 2.0 degree

Answer: A

Watch Video Solution

252. $e = alpa - \frac{1}{2}\beta t^2$, If temperature of cold junction is $0^\circ C$ then temperature of inversion is (if $\alpha = 500.0\mu V/.^\circ C, \beta = 5.0\mu V/\text{Square}.^\circ C$)

A. 100

B. 200

C. 300

D. 400

Answer: B

Watch Video Solution

253. If the emf of a thermocouple, one junction of which is kep $0^\circ C$ is given by $e = at + 1/2bt^2$ then the neutral temperature will be

A. a/b

B. $-a/b$

C. $a/2b$

D. $-1/ab$

Answer: B

Watch Video Solution

254. The resistance of the filament of an electric bulb changes with temperature. If an electric bulb rated 220 volt and 100 watt is connected (220×8) volt sources, then the actual power would be

A. 100×0.8 watt

B. $100 \times (0.8)^2$ watt

C. Between 100×0.8 watt and 100 watt

D. Between $100 \times (0.8)^2$ watt and 100×0.8 watt

Answer: D

Watch Video Solution

255. An immersion heater is rated 836 watt . It should heat 1 litre of water from $10^\circ C$ to $40^\circ C$ in about

A. 200 sec

B. 150 sec

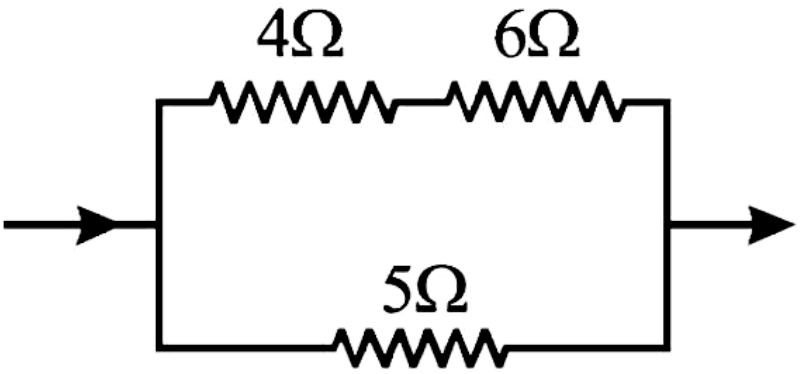
C. 836 sec

D. 418 sec

Answer: B

Watch Video Solution

256. In the circuit shown in fig the heat produced in the 5 ohm resistor due to the current flowing through it is 10 calories per second.



The heat generated in the 4 ohms resistor is

A. 1 cal/sec

B. 2 cal/sec

C. 3 cal/sec

D. 4 cal/sec

Answer: B

Watch Video Solution

257. A house writing, supplied with a $220V$ supply line is protected by a 9 ampere fuse. Find the maximum number of 60 W in parallel that can be turned on.

A. 44

B. 20

C. 22

D. 33

Answer: D

Watch Video Solution

258. Water boils in an electric kettle in 15 minutes after switching on. If the length of the heating wire is decreased to $2/3$ of its initial value, then the same amount of water will with the supply voltage in

A. 15 minutes

B. 12 minutes

C. 10 minutes

D. 8 minutes

Answer: C

Watch Video Solution

259. The resistance of a heater coil is $110 ohm$. A resistance R is connected in parallel with it and the combination is joined in series with

a resistance of $11ohm$ to a 220 volt main line. The heatter operates with a power of 110 watt. The value of R in ohm is

A. 12.22

B. 24.22

C. Negative

D. That the given values are not correct

Answer: A

Watch Video Solution

260. A $500W$ heating unit is designed to operate from a 115volt line. If the line voltage drop to 110Volt , the percentage drop in heat output will be

A. $10.20\ \%$

B. $8.1\ \%$

C. $8.6\ \%$

D. 7.6%

Answer: C

Watch Video Solution

261. If a given volume of water in a $220V$ heater is boiled in $5\ \min$, then how much time will it take for the same volume of water in a $110V$ heater to be boiled?

A. 5 minutes

B. 8 minutes

C. 10 minutes

D. 20 minutes

Answer: D

Watch Video Solution

262. An electric kettle takes $4A$ current at $220V$. How much time will it take to boil $1kg$ of wate from temperature $20^\circ C$? The temperature of boiling water is $100^\circ C$

A. 6.4 minutes

B. 6.3 minutes

C. 12.6 minutes

D. 12.8 minutes

Answer: B

Watch Video Solution

263. If a wire of resistance 20Ω is covered with ice and a voltage of $210V$ is applied across the wire , then the rate of melting of ice is

A. $0.85g/s$

B. $1.92g/s$

C. $6.56g/s$

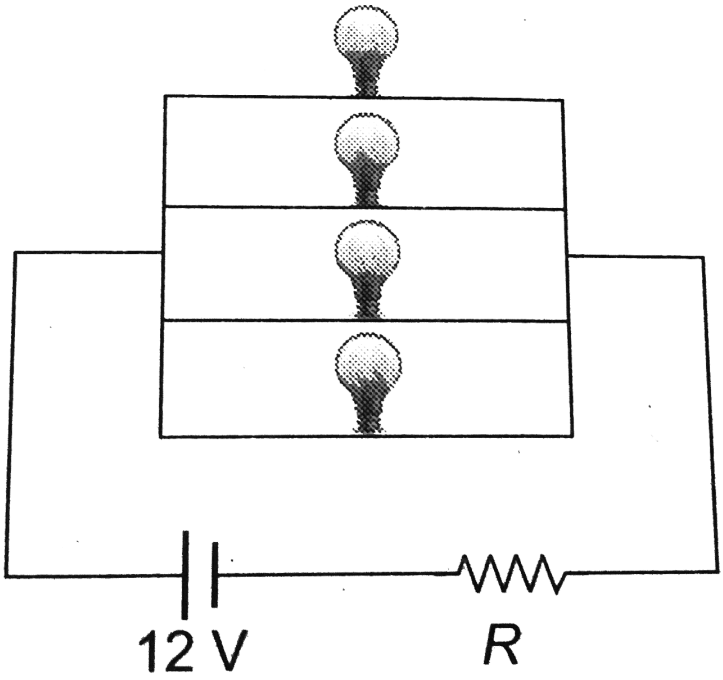
D. All of these

Answer: C

Watch Video Solution

264. Four identical electrical lamps are labelled $1.5V$ $0.5A$ which describes the condition necessary for them to operate at normal brightness. A $12V$ battery of negligible internal resistance is connected

to lamps as shon, then



A. The value of R for normal brightness of each lamp is $(3/4)\Omega$

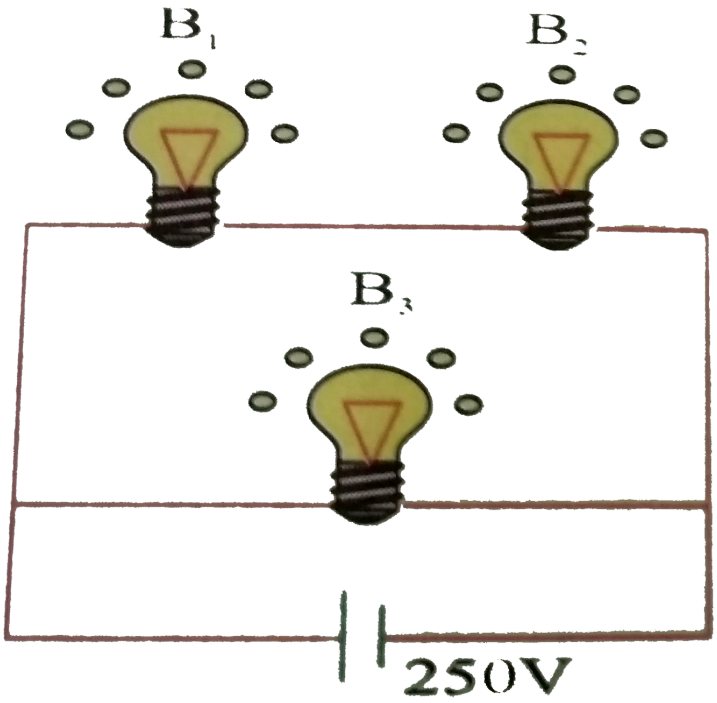
B. The value of R for normal brightness of each lamp is $(21/4)\Omega$

C. Total power dissipated in circuit when all lamps are normally bright is 24 W

D. Power dissipated in R is 21 W when all lamps are normally bright

Answer: B

Watch Video Solution



265.

A 100 W bulb B_1 and two 60 W bulbs B_2 and B_3, are connected to a 250V source, as shown in the figure now W_1, W_2 and W_3 are the output powers of the bulbs B_1, B_2 and B_3 respectively then

A. $W_1 > W_2 = W_3$

B. $W_1 > W_2 > W_3$

C. $W_1 < W_2 = W_3$

D. $W_1 < W_2 < W_3$

Answer: D

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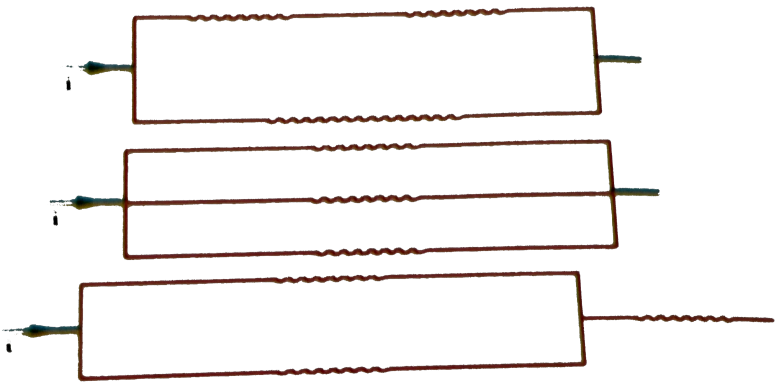
266.



The three resistances of equal value are arranged in the different combinations shown below. Arrange them in increasing order of power dissipation

A. $III < II < IV < I$

B. $II < III < IV < I$

C. $I < IV < III < II$

D. $I < III < II < IV$

Answer: A

Watch Video Solution

267. Silver and copper voltmeters are connected in parallel with a battery of emf $12V$. In 30 minutes, $1g$ of silver and $1.8g$ of copper are liberated. The power supplied by the battery is

$(Z_{Cu} = 6.6 \times 10^{-4} g/C \text{ and } Z_{Ag} = 11.2 \times 10^{-4} g/C)$

A. $24.13 J/\sec$

B. $2.413 J/\sec$

C. $0.2413 J/\sec$

D. $2413 J/\sec$

Answer: A

Watch Video Solution

268. A silver voltameter of resistance 2 ohm and a 3 ohm resistor are connected in series across a cell. If a resistance of 2 ohm is connected in parallel with the voltameter, then the rate of deposition of silver

A. Decreases by 25%

B. Increases by 25%

C. Increases by 37.5%

D. Decreases by 37.5%

Answer: D

Watch Video Solution

269. The expression for thermo emf in a thermocouple given by the relation $E = 40\theta - \frac{\theta^2}{20}$, where θ is the temperatue difference of two junctons. For this, the neutral temperature will be

A. $100^\circ C$

B. $200^\circ C$

C. $300^\circ C$

D. $400^\circ C$

Answer: D

Watch Video Solution

270. For Copper-iron (Cu-Fe) couple, the thermo e.m.f. (temperature of cold junction $=^\circ C$) is given by $E = \left(14\theta - 0.02\theta^2\right)\ \mu V$. The neutral temperature will be

A. $350^\circ C$

B. $350K$

C. $560^\circ C$

D. $560K$

Answer: A

Watch Video Solution

271. One junction of a certain thermoelectric couple is at a fixed temperature r T and the other junction is at temperature T . The thermo electromotive force for this is expressed by $E = K(T - T_r)\left[T_0 - \frac{1}{2}(T + T_r)\right]$. At temperature $T = \frac{1}{2}T_0$, the thermoelectric power is

A. $\frac{1}{2}KT_0$

B. KT_0

C. $\frac{1}{2}KT_0^2$

D. $\frac{1}{2}K(T_0 - T_r)^2$

Answer: A

Watch Video Solution

272. The temperature of the cold junction of thermo-couple is $0^{\circ}C$ and the temperature of hot junction is $T^{\circ}C$. The e.m.f . is $E = 16T - 0.04T^{2}\mu$ volts. The temperature of inversion is

A. $200^{\circ}C$

B. $400^{\circ}C$

C. $100^{\circ}C$

D. $300^{\circ}C$

Answer: B

Watch Video Solution

273. The temperature of the cold junction of the thermocouple is ˆ $(\circ)C$ and the temperature of the hot junction is $T^{\circ}C$. The relation for the thermo emf is given by, $E = AT = \frac{1}{2}BT^{2}$ ltbRgt (when $A = 16$ and $B = 0.08$). The temperature of inversion will be

A. $100^\circ C$

B. $300^\circ C$

C. 400°

D. $500^\circ C$

Answer: C

Watch Video Solution

274. The thermo e.m.f. of a thermo- couple is $25\mu V/^\circ C$ at room temperature. A galvanometer of 40 ohm resistance, capable of detecting current as low as 10^{-5}A, is connected with the thermo couple. The smallest temperature difference that can be detected by this system is

A. $20^\circ C$

B. $16^\circ C$

C. $12^\circ C$

D. $8^\circ C$

Answer: B

Watch Video Solution

275. An electric bulb rated for $500W$ at $100V$ is used in a circuit having a $200V$ supply. The reistance R that must be put in series with bulb, so that the bulb delivers 500W is .....Ω.

A. 10Ω

B. 20Ω

C. 50Ω

D. 100Ω

Answer: B

Watch Video Solution

276. A thermo couple develops $200\mu V$ between $0^\circ C$ and . $100^\circ C$ If it develops $64\mu V$ and $76\mu V$ respectively between $(0^\circ C - 32^\circ C)$ and $(32^\circ C - 70^\circ C)$ then what will be the thermo emf it develops between $70^\circ C$ and $100^\circ C$

A. $65\mu V$

B. $60\mu V$

C. $55\mu V$

D. $50\mu V$

Answer: B

Watch Video Solution

277. A thermo couple is formed by two metals X and Y metal X comes earlier to Y in Seebeck series. If temperature of hot junction increases beyond the temperature of inversion. Then direction of current in thermocouple will so

A. X to Y through cold junction

B. X to Y through hot junction

C. Y to X through cold junction

D. Both (b) and (c)

Answer: D

Watch Video Solution

278. Peltier co-efficient of a thermo couple is 2 nano volts. How much heat is developed at a junction if 2.5 amp current flows for 2 minute

A. 6 ergs

B. 6×10^{-7} ergs

C. 16 ergs

D. 6×10^{-3} erg

Answer: A

Watch Video Solution

279. Resistance of a voltameter is , 2Ω it is connected in series to a battery of 10 V through a resistance of 3Ω . In a certain time mass deposited on cathode is 1 gm . Now the voltameter and the 3Ω resistance are connected in parallel with the battery. Increase in the deposited mass on cathode in the same time will be

A. 0

B. $1.5gm$

C. $2.5gm$

D. 2 gm

Answer: B

Watch Video Solution

280. A steady current of $1.5A$ flows through a copper voltameter for 10 min. If the electrochemical equivalent of copper is $30 \times 10^{-5} gC^{-1}$, the mass of copper deposited on the electrode will be

A. $2.6 \times 10^{-5} m$

B. $2.6 \times 10^{-4} m$

C. $1.3 \times 10^{-5} m$

D. $1.3 \times 10^{-4} m$

Answer: C

Watch Video Solution

281. The current flowing in a copper voltameter is 3.2 A . The number of copper ions $\left(Cu^{2+}\right)$ deposited at the cathode per minute is

A. 1.6×10^{19}

B. 3.1×10^{19}

C. 4.8×10^{19}

D. 6.2×10^{19}

Answer: B

Watch Video Solution

282. A silver and a copper voltameter are connected in series with a $12.0V$ battery of negligible resistance. It is found that $0.806g$ of silver is deposited in half an hour.Find (a) the mass of the copper deposited and (b) the energy supplied by the battery. ECE of silver $= 1.12 \times 10^{-6} kgC^{-1}$ and that of copper $= 6.6 \times 10^{-7} kgC^{-1}$

A. 64 W

B. 32 W

C. 96 W

D. 16 W

Answer: D

Watch Video Solution

283. A thermocouple of resistance 1.6Ω is connected in series with a galvanometer of 8Ω resistance. The thermocouple develops and e.m.f. of $10\mu V$ per degree temperature difference between two junctions. When one junction is kept at $0^\circ C$ and the other in a molten metal, the galvanometer reads 8 millivolt . The temperature of molten metal, when e.m.f. varies linearly with temperature difference, will be

A. $960^\circ C$

B. $1050^\circ C$

C. $1275^\circ C$

D. $1545^\circ C$

Answer: A

Watch Video Solution

284. A coil of wire of resistance 50Ω is embedded in a block of ice. If a potential difference of 210 V is applied across the coil, the amount of ice melted per second will be

A. $4.12gm$

B. $4.12kg$

C. $3.68kg$

D. $2.625gm$

Answer: D

Watch Video Solution

285. The same mass of copper is drawn into two wires $1mm$ and $2mm$ thick. These two wires are connected in series to the source of current .What is the ratio of the heat produced in the wires ?

A. $2:1$

B. $1:16$

C. $4:1$

D. $16:1$

Answer: D

Watch Video Solution

286. The temperature of hot junction of a thermo-couple changes from $80^\circ C$ to . $100^\circ C$. The percentage change in thermoelectric power is

A. $8\ \%$

B. $10\ \%$

C. $20\ \%$

D. $25\ \%$

Answer: D

Watch Video Solution

287. A thermo couple uses Bismuth and Tellurium as the dissimilar metals. The sensitivity of bismuth is $-72\mu V/^{\circ}C$ and that of the tellurium is $500\mu V/^{\circ}C$. If the difference between hot and cold junction is $100^{\circ}C$, then the maximum output will be

A. 50 mV

B. $7.2mV$

C. $42.8mV$

D. $57.2mV$

Answer: D

Watch Video Solution

288. Three wires of copper, iron and nickel are joined to form three junctions as shown in Fig. When the temperature of junction 1 is kept $50^{\circ}C$ with the other two junctions at $0^{\circ}C$, the sensitive galvanometer

gives a deflection of 14 divisions. When the temperature of junction 3 is kept , $50^\circ C$ with the other two junctions at , $0^\circ C$ the galvanometer gives a deflection of 11 divisions. Then the deflection given by the galvanometer, when temperature of the junction 2 is kept at , $50^\circ C$ with the other two junctions at , $0^\circ C$ will be

A. 3 div

B. 11 div

C. 14 div

D. 25 div

Answer: D

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289. The wiring of a house has resistance $6\Omega A100W$ bulb is glowing. If a geyser of $1000W$ is switched on, the changee in potential drop across the bulb is nearly

A. Nil

B. 23 V

C. 32 V

D. 12 V

Answer: B

Watch Video Solution

290. A 12 V lead accumulator is being charged using 24 V supply with an external resistance 2Ω . The internal resistance of the accumulator is 1Ω . Find the time in which it will store 360 W -hour energy.

A. 1 hr

B. 7.5 hr

C. 10 hr

D. None of these

Answer: B

Watch Video Solution

291. The atomic weight of silver and copper are 108 and 64. A silver voltameter and a copper voltameter are connected in series and when current is passed 10.8 gm of silver is deposited. The mass of copper deposited will be

A. 192 kJ

B. 192 J

C. 200 J

D. 132 kJ

Answer: A

Watch Video Solution

292. The thermo emf of thermocouple varies with the temperature θ of the hot junction as $E = a\theta + b\theta^2$ in volts where the ratio a/b is $700^\circ C$. If the cold junction is kept at $0^\circ C$, then the neutral temperature is

A. $700^\circ C$

B. $350^\circ C$

C. $1400^\circ C$

D. No neutral temperature is possible for this

Answer: D

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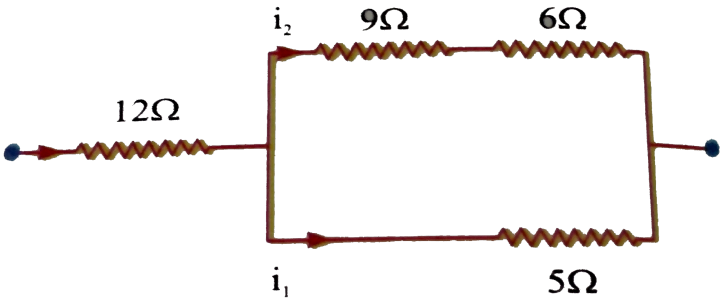
293.



In the following circuit, 5Ω resistor develops 45 J/s due to current flowing

through it. The power developed across 12Ω resistor is

A. 16 W

B. 192 W

C. 36 W

D. 64 W

Answer: B

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294. Water of volume 2 litre in a container is heated with a coil of $1kWat27^\circ C$. The lid of the container is open and energy dissipates at rate of $160J/s$. In how much time temperature will rise from $27^\circ C \to 77^\circ C$ Given specific heat of water is $[4.2kJ/kg]$

A. 8 min 20 s

B. 6 min 2 s

C. 7 min

D. 14 min

Answer: A

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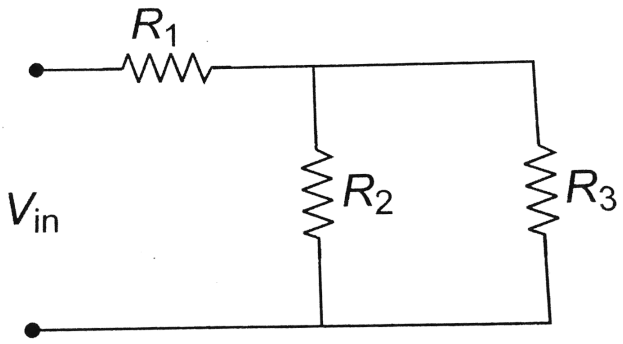
295. For ensuring dissipation of same energy in all three resistors (R_1, R_2, R_3) connected as shown in figure, their values must be related s



A. $R_1 = R_2 = R_3$

B. $R_2 = R_3$ and $R_1 = 4R_2$

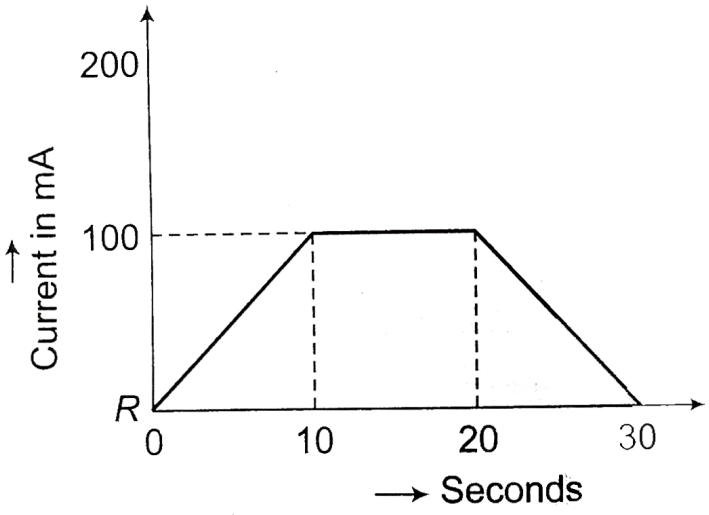
C. $R_2 = R_3$ and $R_1 = \frac{1}{4}R_2$

D. $R_1 = R_2 + R_3$

Answer: C

Watch Video Solution

296. In a copper voltmeter, mass deposite in 30 seconds is $'m'$ gram. If the time-current graph is as shown in figure. ECE of copper is



A. m

B. m/2

C. $0.1m$

D. $0.6m$

Answer: B

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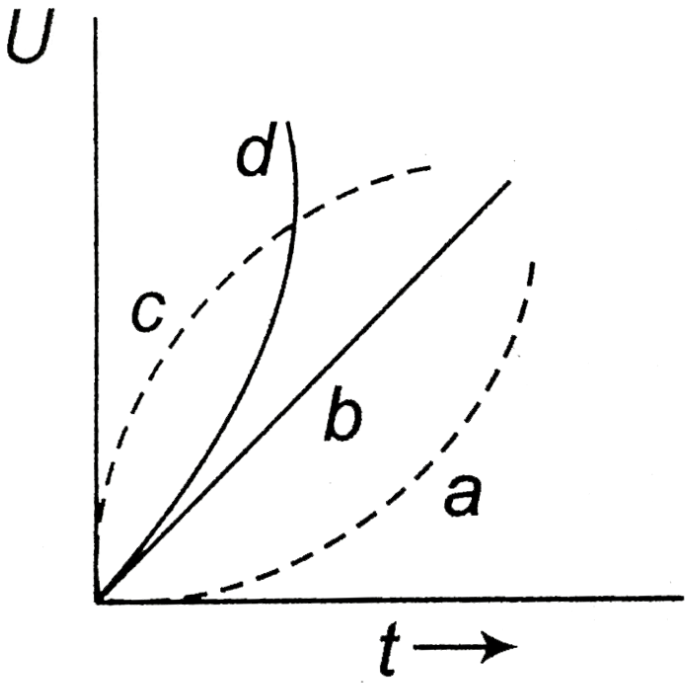
297. Which of the following plots may represent the thermal energy produced in a resistor for a given current as a function of time?



A. a

B. b

C. c

D. d

Answer: D

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298. Two different metals are joined end to end. One end is kept at constant temperature and the other end is heated to a very high temperature. The graph depicting the thermo e.m.f . is

A. 

B. 

C. 

D. 

Answer: D

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299. Which of the following graphs shows the variation of thermoelectric power with temperature difference between hot and cold junction in thermocouples

A. 

B. 

C. 

D. 

Answer: A

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300. When an electric heater is switched on, the current flowing through it (i) is plotted against time (t). Taking into account the variation of resistance with temperature, which of the following best represents the resulting curve

A. 

B. 

C. 

D. 

Answer: B

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301. The V - i graphs A and B drawn for two voltameters. Identify each graph

A. A for water voltameter and B for Cu voltameter

B. A for Cu voltameter and B for water voltameter

C. Both A and B represents Cu voltameter

D. None of these

Answer: A

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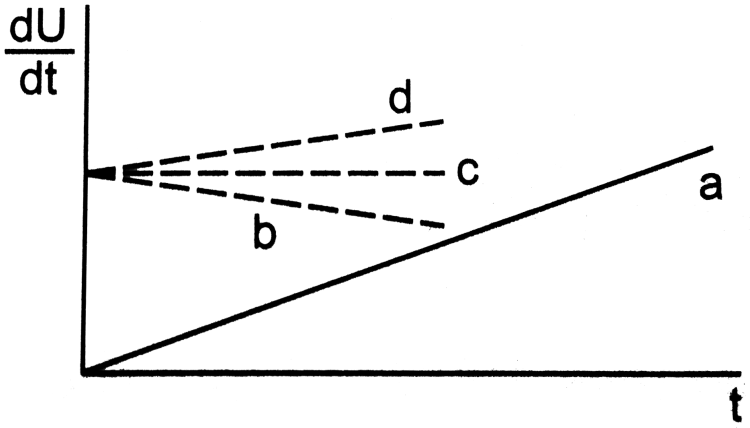
302. A constant current i is passed through a resistor. Taking the temperature coefficient of resistance into account, indicate which of the plots shown in Figure best represents the rate of production of thermal

energy in the resistor



A. a

B. b

C. c

D. d

Answer: D

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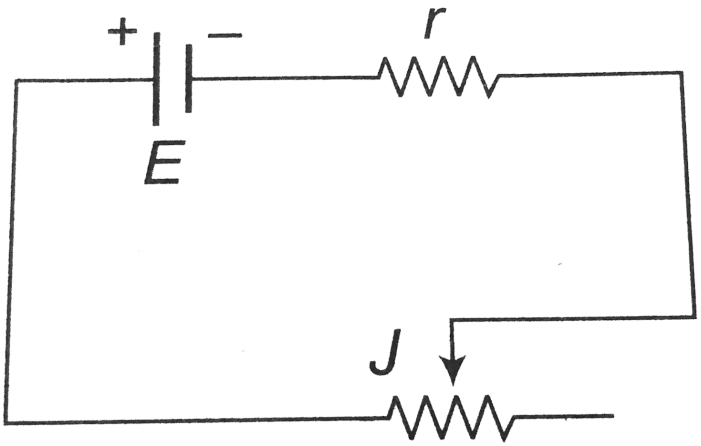
303. Battery shown in figure has e.m.f. E and internal resistance r. Current in the circuit can be varied by sliding the contact J. If at any instant current flowing through the circuit is I, potential difference between terminals of the cells is V, thermal power generated in the cell is equal to η fraction of total electrical power generated in it, then which of the following graphs is correct ?



A. 

B. 

C. 

D. Both (a) and (b) are correct

Answer: D

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304. Assertion: The probability of an electric bulb fusing is higher at the time of switching ON and OFF.

Reason: Inductive effects produce a surge at the time of switch OFF and switch ON.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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305. Assertion : The $200W$ bulbs glows with more brightness then $100W$ bulbs.

Reason : A $100W$ bulb has more resistance than a $200W$ bulb.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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306. Assertion : Fuse wire must have high resistance and low melting point.

Reason : Fuse is used for small current flow only.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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307. Assertion : Two electric bulbs of 50 and $100W$ are given. When connected in series $50W$ bulb glows more but When connected parallel

$100W$ bulb glows more .

Reason : In series combination, power is direclty proportional to the resistance of circuit. But in parallel combination, power is inversely proportional to the resistance of the circuit.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

Watch Video Solution

308. Assertion : Two electric bulbs of 50 and $100W$ are given. When connected in series $50W$ bulb glows more but When connected parallel

$100W$ bulb glows more .

Reason : In series combination, power is direclty proportional to the resistance of circuit. But in parallel combination, power is inversely proportional to the resistance of the circuit.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

Watch Video Solution

309. Assertion : Two bulbs of same wattage, one having a carbon filament and the other having a metallic filament are connected in series. Metallic

bulbs will glow more brightly than carbon filament bulb.

Reason : Carbon is a semiconductor.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: D

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310. Assertion : An electric bulb is first connected to a dc source and then to a ac source having the same brightness in both the cases.

Reason : The peak value of voltage for an A.C. source is $\sqrt{2}$ times the root mean square voltage.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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311. Assertion : Through the same current flows through the line wires and the filament of the bulb but heat produced in the filament is much higher then that in line wires.

Reason : The filament of bulbs is made of a material of high resistance and high melting point.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

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312. Assertion : Neutral temperature of a thermocouple does not depend upon temperature of cold junction.

Reason : Its value is constant for the given metals of the couple.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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313. Assertion : Leclanche cell is used, when constant supply of electric current is not required.

Reason : The e.m.f. of a Leclanche cell falls, if it is used continuously.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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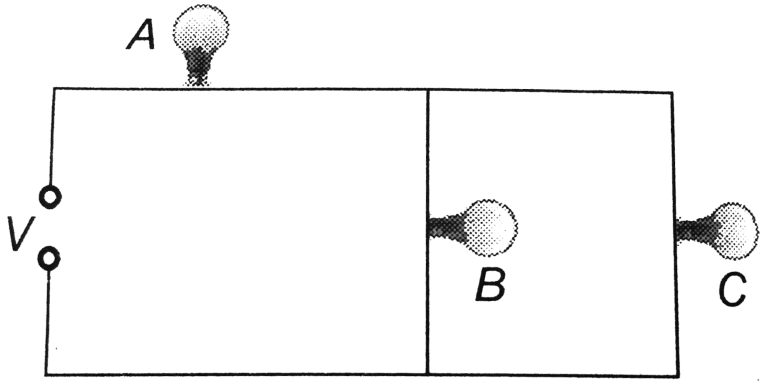
314. Assertion : In the given circuit if lamp B or C fuses then light emitted by lamp A decreaese.

Reason : Voltage on A 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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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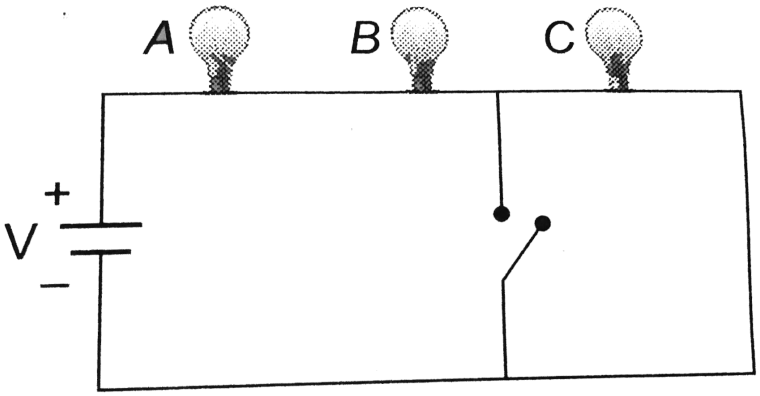
315. Assertion : If three identical bulbs are connected in series as shown in figure then on closing the switchs. Bulb C short circuited and hence illumination of bulbs A and B decreases.

Reason : Voltage on A and B 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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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316. Assertion : Electric appliances with metallic body, e.g. heaters, presses etc, have three pin connections, whereas an electric bulb has a two pin connection.

Reason : Three pin connection reduce heating of connecting cables.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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317. Assertion : A laser beam $0.2W$ power can drill holes through a metal sheet, whereas $1000W$ torch-light cannot.

Reason : The frequency of laser light is much higher than that of torch light.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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318. Assertion : A domestic electrical appliance working on a three pin continue working even if the top pin is removed

Reason : The third pin is used only as safety device.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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319. Assertion : In all conductors, for studying the thermoelectric behaviour or metals, lead is taken as a reference metal.

Reason : In lead, the Thomson effect is negative.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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320. Assertion : The presence of water molecules makes separation of ions easier in electrolyte.

Reason : The presence of water molecules in electrolyte decreases the resistance of electrolyte.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

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321. Assertion : Thermocouple acts as a heat engine.

Reason : When two junctions of thermocouple are at different temperature, thermo e.m.f. is produced.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

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322. Assertion : When temperature of cold junction of a thermocouple is lowered, the value of neutral temperature of this thermocouple is raised.

Reason : When the difference of temperature of two junction is raised, more thermo e.m.f. is produced.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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Heating Effect Of Current

1. If a high power heater is connected to electric mains, then the bulbs in the house become dim, because there is a

A. Current drop

B. Potential drop

C. No current drop

D. No potential drop

Answer: B

View Text Solution

2. If 2.2 kW power is transmitted through a 100Ω line at , 000,22 V the power loss in the form of heat will be

A. $0.1W$

B. 1 W

C. 10 W

D. 100 W

Answer: B

View Text Solution

Chemical Effect Current

1. Water can not be made conducting by adding small amount of any of the following except

A. Sodium chloride

B. Copper sulphate

C. Ammonium chloride

D. Sugar

Answer: D

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Objective Questions

1. In the circuit as shown in the figure, the heat produced by 6 ohm resistance due to current flowing in it is 60 calorie per second. The heat generated across 3 ohm resistance per second will be

A. 30 calorie

B. 60 calorie

C. 100 calorie

D. 120 calorie

Answer: D

View Text Solution

2. An ammeter, suspected to give inaccurate reading, is connected in series with a silver voltameter. The ammeter indicates $0.54A$. A steady current passed for one hour deposits $2.0124gm$ of silver . If the E.C.E . of silver is $1.118 \times 10^{-3}gmC^{-1}$, then the error in ammeter reading is

A. $+0.04A$

B. $+0.02A$

C. $-0.03A$

D. $-0.01A$

Answer: A

View Text Solution

3. The emf of a thermocouple, one junction of which is kept at $0^{\circ}C$ is given by $e = at + bt^2$ the Peltier co-efficient will be

A. $(t+273)(a+2bt)$

B. $(t+273)(a-2bt)$

C. $(t-273)(a-2bt)$

D. $(t-273)(a-2bt)$

Answer: A

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Graphical Questions

1. In a copper voltameter, mass deposited in 6 minutes is m gram. If the current-time graph for the voltameter is as shown here, then the E.C.E of the copper is

A. m/5

B. m/300

C. 5m

D. m/18000

Answer: B

View Text Solution

Assertion Reason

1. Assertion : Current is passed through a metallic wire, heating it red. When cold water is poured on half of its portion, then rest of the half portion become more hot.

Reason : Resistances decreases due to decrease in temperature and so current through wire increases.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

View Text Solution

2. Assertion : Heat is generated continuously is an electric heater but its temperature becomes constant after some time.

Reason : At the stage when heat produced in heater is equal to the heat dissipated to its surrounding the temperature of heater becomes constant.

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 cor rect explanation of the assertion.

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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Self Evaluation Test

1. An electric kettle has two coils. When one of these is switched on, the water in the kettle boils in 6 minutes. When the other coil is switched on, the water boils in 3 minutes. If the two coils are connected in series, find the time taken to boil the water in the kettle.

A. 3 minutes

B. 6 minutes

C. 2 minutes

D. 9 minutes

Answer: D

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2. A 3^0C rise in temperature is observed in a conductor by passing a certain current. When the current is doubled, the rise in temp -

A. $15^\circ C$

B. $12^\circ C$

C. $9^\circ C$

D. $3^\circ C$

Answer: B

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3. Two identical electric lamps marked $500W$, $220V$ are connected in series and then joined to a $110V$ line. The power consumed by each lamp is

A. $\frac{125}{4}W$

B. $\frac{25}{4}W$

C. $\frac{225}{4}W$

D. $125W$

Answer: A

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4. When 1 gm hydrogen $\left(e.c.e. = 1.044 \times 10^{-8} kg/C\right)$ forms water, 34 kcal heat is liberated. The minimum voltage required to decompose water is

A. $0.75V$

B. 3 V

C. $1.5V$

D. $4.5V$

Answer: C

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5. In how much time, one litre of H_2 will be collected by 5 A current ? (If $Z = 1 \times 10^{-8} kg/C$ and density of $H_2 = 0.09 kg/m^3$)

A. 30 minutes

B. 15 minutes

C. 45 minutes

D. 60 minutes

Answer: A

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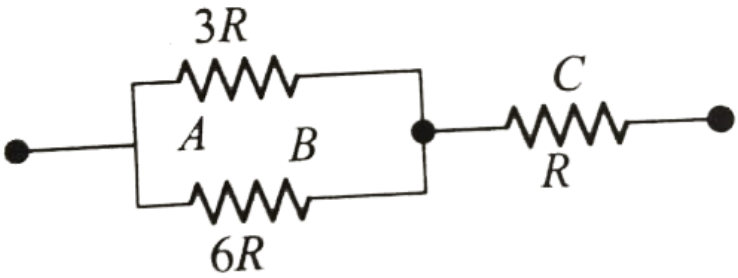
6. Figure 7.37 shows a network of three resistances. When some potential difference is applied across the network , thermal powers dissipated by A, B and C are in the ratio



A. $2:3:4$

B. $2:4:3$

C. $4:2:3$

D. $3:2:4$

Answer: C

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7. If the length of the filament of a heater is reduced by $10\,\%$, the power of the heater will

A. Increase by about 9%

B. Increase by about 11%

C. Increase by about 19%

D. Decrease by about 10%

Answer: B

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8. Find the thermo-emf developed in a copper-silver thermocopule when the junctions are kept at $0^\circ C$ and $40^\circ C$. Use the data in table.

A. 150 mV

B. 80 mV

C. 144 mV

D. 120 mV

Answer: D

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9. How much current should be passed through acidified water for 100 s to liberate 0.224 litre of H_2

A. 1 Faraday

B. $\frac{1}{2}$ Faraday

C. 2 Faraday

D. 3 Faraday

Answer: A

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10. The resistance of the filament of a lamp increases with the increase in temperature. A lamp rated $100W$ and $220V$ is connected across $220V$ power supply. If the voltage drops by $10\,\%$, then the power of the lamp will be

A. 90 W

B. 81 W

C. Between 90 W and 100 W

D. Between 81 W and 90 W

Answer: D

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11. In the following circuit, 18Ω resistor develops sec J/2 due to current flowing through it. The power developed across 10Ω resistance is

A. 125 W

B. 10 W

C. $\frac{4}{5}W$

D. 25 W

Answer: B

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12. If resistance of the filament increases with temperature, what will be power dissipated in a $220V - 100W$ lamp when connected to $110V$ power supply

A. 25 W

B. $< 25W$

C. $> 25W$

D. None of these

Answer: C

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13. In an electroplating experiment, m gm of silver is deposited when 4 ampere of current flows for 2 minute . The amount (in gm) of silver deposited by 6 ampere of current for 40 second will be

A. $2.4m$

B. $2.4\mu m$

C. $2.4\mu m$

D. None of these

Answer: C

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14. Two bulbs consume same energy when operated at $200V$ and $300V$, respectively . When these bulbs are connected in series across a dc source of $500V$, then

A. Ratio of potential difference across them is 3/2

B. Ratio of potential difference across them is 9/4

C. Ratio of power consumed across them is 4/9

D. Ratio of power consumed across them is 2/3

Answer: C

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