# Heating

**1.** Time taken by a 836 W heater to heat one *litre* of water from $10^{o}C$ to $40^{o}C$ is

(a) 150 *sec* (b) 100 *sec* (c) 50 *sec* (d) 200 *sec*

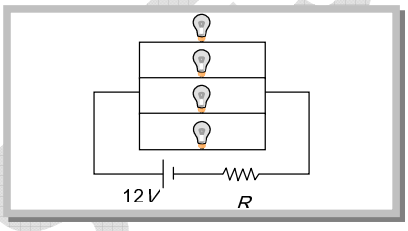
**2.** An electric lamp is marked 60 *W*, 230 *V*. The cost of a *KW* × *hour* of power is Rs. 1.25. The cost of using this lamp 8 *hrs* a day for 30 *days* is

(a) Rs. 10 (b) Rs. 16 (c) Rs. 18 (d) Rs. 24

**3.** A 100 *W* bulb and a 25 *W* bulb are designed for the same voltage. They have filaments of the same length and material. The ratio of the diameter of the 100 *W* bulb to that of the 25 *W* bulb is

(a) 4 : 1 (b) 2 : 1 (c) $\sqrt{2}$ : 1 (d) 1 : 2

**4.** Four identical electrical lamps are labelled 1.5*V*, 0.5*A* which describes the condition necessary for them to operate at normal brightness. A 12*V* battery of negligible internal resistance is connected to lamps as shown, then



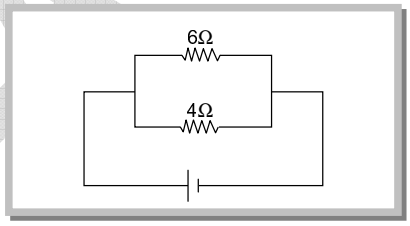

(a) The value of *R* for normal brightness of each lamp is $\frac{3}{4}\Omega$

(b) The value of *R* for normal brightness of each lamp is $\frac{21}{4}\Omega$

(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

**5.** 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

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

(a) $20^{o}$ *C* (b) $16^{o}$ *C* (c) $12^{o}$ *C* (d) $8^{o}$ *C*

**7.** Thomson coefficient of a conductor is 10 $\mu V / K$. The two ends of it are kept at $50^{o}$ *C* and $60^{o}$ *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*

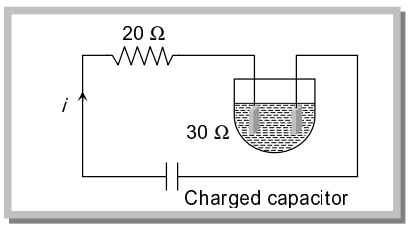
**8.** An ammeter, suspected to give inaccurate reading, is connected in series with a *silver* voltameter. The ammeter indicates 0.54 *A*. A steady current passed for one h*our* deposits 2.0124 *gm* of *silver*. If the *e.c.e.* of *silver* is $1.118 \times 10^{-3}$ $gmC^{-1}$, then the error in ammeter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

(a) + 0.04 *A* (b) + 0.02 *A* (c) – 0.03 *A* (d) – 0.01 *A*

**9.** A *silver* and a *copper* voltmeters are connected across a 6 *V* battery of negligible resistance. In half an *hour,* 1 *gm* of *copper* and 2 *gm* of *silver* are deposited. The rate at which energy is supplied by the battery will approximately be (Given *E.C.E.* of *copper* = $3.294 \times 10^{-4}$ *g/C* and *E.C.E.* of *silver* = $1.118 \times 10^{-3}$ *g/C*)

(a) 64 *W* (b) 32 *W* (c) 96 *W* (d) 16 *W*

**10.** A charged capacitor of $5 \times 10^{-2}$ *F* capacity is discharged through a resistor *R* of 20 Ω and a *Cu* voltmeter of internal resistance 30 Ω connected in series. If $4.62 \times 10^{-6}$ *kg Cu* is deposited, the heat generated in the resistor *R* will be (E.C.E. of *Cu* = $3.3 \times 10^{-7}$ *kg/C*)




(a) 200 *J*

(b) 784 *J*

(c) 830 *J*

(d) 2000 *J*

**11.** For a thermocouple the neutral temperature is $270^{o}$ *C* when its cold junction is at $20^{o}$ *C*. What will be the neutral temperature and the temperature of inversion when the temperature of cold junction is increased to $40^{o}$ *C*

(a) $290^{o}$ *C*, $580^{o}$ *C* (b) $270^{o}$ *C*, $580^{o}$ *C* (c) $270^{o}$ *C*, $500^{o}$ *C* (d) $290^{o}$ *C*, $540^{o}$*C*

**12.** In the Seebeck series *Bi* occurs first followed by *Cu* and *Fe* among other. The *Sb* is the last in the series. If $E_1$ be the thermo emf at the given temperature difference for *Bi*–*Sb* thermocouple and $E_2$ be that for *Cu*–*Fe* thermocouple, which of the following is true

(a) $E_1 = E_2$ (b) $E_1 < E_2$

(c) $E_1 > E_2$ (d) Data is not sufficient to predict it

**13.** When three identical bulbs of 60 *W*, 200 *V* rating are connected in series at a 200 *V* supply, the power drawn by them will be

(a) 10 *W* (b) 20 *W* (c) 60 *W* (d) 180 *W*

**14.** In India electricity is supplied for domestic use at 220 *V*. It is supplied at 110 *V* in USA. If the resistance of a 60 *W* bulb for use in India is *R*, the resistance of a 60 *W* bulb for use in USA will be

(a) $R/4$ (b) $R/2$ (c) $R$ (d) $2R$

**15.** Two 220 *V*, 100 *W* bulbs are connected first in series and then in parallel. Each time the combination is connected to 220 *V ac* supply line. The power drawn by the combination in each case respectively will be

(a) 100 *W*, 50 *W* (b) 200 *W*, 150 *W* (c) 50 *W*, 200 *W* (d) 50 *W*, 100 *W*