HEATING & CHEMICAL EFFECT OF CURRNT

1. A 220 *V*, 1000 *W* bulb is connected across a 110 *V* mains supply. The power consumed will be **[AIEEE 2003]**

(a) 1000 *W* (b) 750 *W* (c) 500 *W* (d) 250 *W*

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

(a) 708 Ω (b) 870 Ω (c) 807 Ω (d) 780 Ω

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

(a) 100 *W* (b) 40 *W* (c) 20*W* (d) 10 *W*

4. An electric bulb is designed to draw power P_0 at voltage V_0. If the voltage is *V* it draws a power *P*. 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) $P=\left(\frac{V_0}{V}\right) P_0$

5. Two wires have resistance of 2Ω and 4Ω connected to same voltage, ratio of heat dissipated at resistance is **[UPSEAT 2001]**

(a) 1 : 2 (b) 4 : 3 (c) 2 : 1 (d) 5 : 2

6. Three bulbs of 40*W*, 60*W* and 100*W* are arranged in series with 220*V*. Which bulb has minimum resistance **[AFMC 2001]**

(a) 40 *W* (b) 60 *W* (c) 100 *W* (d) Equal in all bulbs

7. If two electric bulbs have 40*W* and 60*W* rating at 220 *V*, then the ratio of their resistances will be
[BHU 1999; KCET (Engg./Med.) 2001]

(a) 3 : 2 (b) 2 : 3 (c) 3 : 4 (d) 4 : 3

8. 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 **[AMU (Engg.) 2000]**

(a) 10 *W* (b) 5 *W* (c) 20 *W* (d) None of these

9. A current *i* passes through a wire of length *l*, radius of cross-section *r* and density ρ. The rate of heat generation is **[AMU (Med.) 1999]**

(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) $il\rho/r$

10. If 2.2 *KW* power is transmitted through a 10 *ohm* line at 22000 *V*, the power lost in the form of heat will be **[MP PET/PMT 1998]**

(a) 0.1 *W* (b) 1 *W* (c) 10 *W* (d) 100 *W*

11. The rated powers of two instruments working at 220 *V* is 200 *W* and 100*W* respectively. If their resistances are R_1 and R_2 respectively, then **[NCERT 1980; CPMT 1991, 97]**

(a) $R_1 = 4R_2$ (b) $R_1 = 2R_2$ (c) $R_2 = 2R_1$ (d) $R_2 = 4R_1$

12. The heating element of an electric toaster has a resistance of 22 Ω and is connected to an ordinary house lighting circuit of 110 *V*. If *J* = 4.2 *J*/*cal*, the heat generated in 1 minute is **[CPMT 1997]**

(a) 26.19 *cal* (b) 130.95 *cal* (c) 7857 *cal* (d) 2310 *cal*

13. 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 produces electrical energy at a very high voltage

14. The ratio of diameters of two similar copper wires of equal length is 1 : 2. A constant current is passed through them when connected in series. The ratio of heat produced in the two will be **[MP PET 1991]**

(a) 1 : 2 (b) 1 : 3 (c) 4 : 1 (d) 1 : 5

15. Two identical batteries, each of *e.m.f.* 2 *V* 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 **[CBSE PMT 1990]**

(a) 1.28 *W* (b) 2.0 *W* (c) $\frac{8}{9}$ *W* (d) 3.2 *W*

16. A constant voltage is applied between the two ends of a uniform metallic wire. Some heat is developed in it. If both length and radius of the wire are halved then the heat developed in the same duration will become **[EAMCET 1983]**

(a) Half (b) Twice (c) One-fourth (d) Same

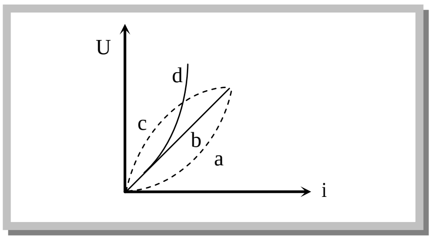
Advance Level

17. Time taken by a 836 W heater to heat one *litre* of water from $10^{o}C$ to $40^{o}C$ is **[AIEEE 2004]**
(a) 150 *sec* (b) 100 *sec* (c) 50 *sec* (d) 200 *sec*

18. 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 **[Kerala PMT 2002]**
(a) Rs. 10 (b) Rs. 16 (c) Rs. 18 (d) Rs. 24

19. 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 **[Roorkee 1999]**
(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

20. Which of the following plots may represent the thermal energy produced in a resistor in a given time as a function of the electric current **[MP PMT 1999]**



(a) *a*
(b) *b*
(c) *c*
(d) *d*

21. An electric kettle takes 4 *A* current at 220 *V*. How much time will it take to boil 1 *kg* of water from room temperature 20^{o} *C*? The temperature of boiling water is 100^{o} *C* **[RPET 1996]**
(a) 6.4 *minutes* (b) 6.3 *minutes* (c) 12.6 *minutes* (d) 12.8 *minutes*

22. The resistance of the filament of an electric bulb changes with temperature. If an electric bulb rated 220 *V* and 100 *W* is connected (220 × 0.8) *V* source, then the actual power would be **[CPMT 1989]**
(a) 100×0.8 *W* (b) $100 \times (0.8)^2$ *W*
(c) Between 100×0.8 *W* and 100 *W* (d) Between $100 \times (0.8)^2$ *W* and 100×0.8 *W*

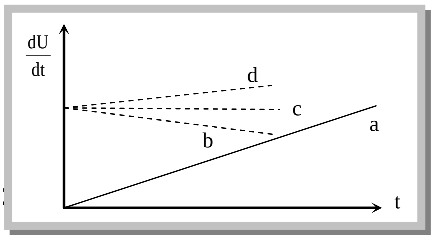
23. According to Joule's law, if the potential difference across a conductor having a material of specific resistance remains constant, then the heat produced in the conductor is directly proportional to
(a) ρ (b) ρ^2 (c) $\frac{1}{\sqrt{\rho}}$ (d) $\frac{1}{\rho}$

24. 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

25. A heating coil of 2000 *W* is immersed in an electric kettle. The time taken in raising the temperature of 1 *litre* of water from $4^{o}C$ to 100^{o} *C* will be – (Only 80% part of the thermal energy produced is used in raising the temperature of water
(a) 252 *s* (b) 250 *s* (c) 245 *s* (d) 247 *s*

26. A house is fitted with 10 lamps of 60W each, 10 fans consuming 0.5 *A* each and an electric kettle of resistance 110 Ω. If the energy is supplied at 220 *V* and costs 50 *paise* per *KWh*. The electric bill for 10 days, if all appliances are used for 6 hours daily will be approx. *Rs*.
(a) 60 (b) 64 (c) 68 (d) 70

27. 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*

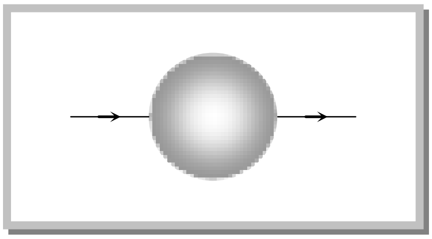
28. A dwelling house is installed with 15 lamps, each of resistance 10^3 Ω and 4 ceiling fans each driven by 1/8th *horse-power* motor. If the lamps and fans are run on an average for 6 hours daily, then the number of *B.O.T.* units consumed by lamps in a month of 31 days will be (Given supply voltage – 220 *V*)

(a) 135 (b) 150 (c) 165 (d) 180

29. A person decides to use his bath-tub water to generate electric power to run a 40 *W* bulb. The bath-tub is located at a height of 10 *m* from the ground and it holds 20 *litres* of water. He installs a water driven wheel generator on the ground. The rate at which he should drain the water from the bath tub to light the bulb and the time he keeps the bulb on will be respectively – (The efficiency of the generator is 90%) (g = 9.8 m/s^2)

(a) 0.345 *kg/ s*, 441 *s* (b) 40 *kg/ s*, 100 *s* (c) 0.454 *kg/ s*, 441 *s* (d) None of these

30. A current enters at a point in a solid metallic sphere and leaves from exactly opposite point. Heat produced in it will be



(a) Uniform throughout

(b) Maximum at the point of entrance and exist

(c) Maximum in the perpendicular diameter plane

(d) Minimum at the point of entry and exist

Grouping of Electrical Appliances

Basic Level

31. 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 **[CBSE PMT 2004; MP PET 2003]**

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

32. 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 **[CBSE PMT 2004]**

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

33. 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 **[CBSE PMT 2003]**

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

34. A wire when connected to 220*V* mains supply has power dissipation P_1. Now the wire is cut into two equal pieces which are connected in parallel to the same supply. Power dissipation in this case is P_2. Then $P_2 : P_1$ is **[AIEEE 2002]**

(a) 1 (b) 4 (c) 2 (d) 3

35. *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

36. Two electric 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 **[MP PMT 2001; MP PET 2002]**

(a) $P_1 + P_2$watt (b) $\sqrt{P_1 P_2}$ *W* (c) $\frac{P_1 P_2}{P_1 + P_2}$watt (d) $\frac{P_1 + P_2}{P_1 P_2}$watt

37. 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**[MP PET 2001]**

(a) 3 *min* 20 *sec* (b) 5 *min* (c) 7 *min* 30 *sec* (d) 2 *min* 30 *sec*

38. Two bulbs of 500 *W* and 200 *W* are manufactured to operate on 220 *V* line. The ratio of heat produced in 500 *W* and 200 *W*, in two cases, when firstly they are joined in parallel and secondly in series will be **[MP PET 1996]**

(a) $\frac{5}{2}, \frac{2}{5}$ (b) $\frac{5}{2}, \frac{5}{2}$ (c) $\frac{2}{5}, \frac{5}{2}$ (d) $\frac{2}{5}, \frac{2}{5}$

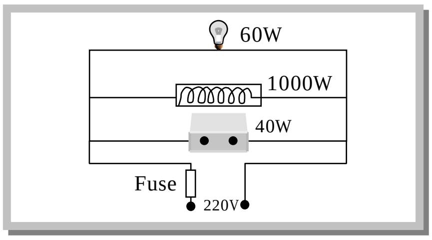
39. Two resistances are connected in series across a battery and consume a power P. If these are connected in parallel the power consumed will be **[CBSE PMT 1989]**

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

40. A uniform wire connected across a supply produces heat H per second. If the wire is cut into n equal parts and all the parts are connected in parallel across the same supply, the heat produced per second will be

(a) $\frac{H}{n^2}$ (b) $n^2 H$ (c) nH (d) $\frac{H}{n}$

41. In a house having 220 V line, following appliances are operating (i) 60 W bulb (ii) 1000 W heater and (iii) a 40 W radio set. The current passing through fuse for this line will be



(a) $\frac{3}{11}$ A

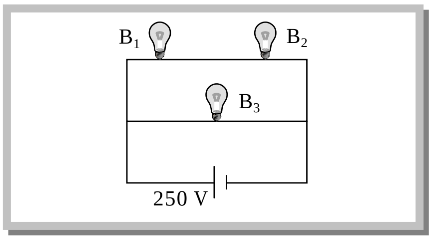
(b) $\frac{2}{11}$ A

(c) 5 A

(d) 6 A

Advance Level

42. A 100 W bulb B_1 and two 60 W bulbs B_2 and B_3 are connected to a 250 V 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



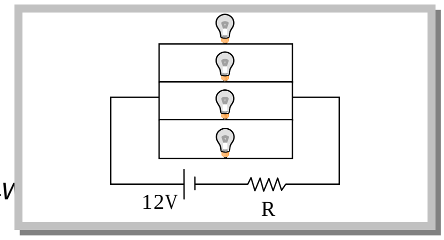
(a) $W_1 > W_2 = W_3$

(b) $W_1 > W_2 > W_3$

(c) $W_1 < W_2 = W_3$

(d) $W_1 < W_2 < W_3$

43. 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 shown, then **[UPSEAT 2001]**



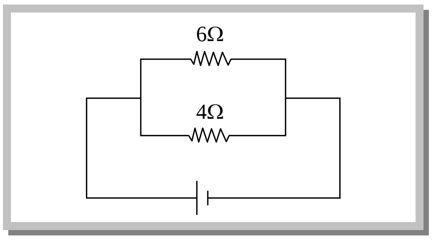
(a) The value of R for normal brightness of each lamp is $\frac{3}{4}\Omega$

(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 24W

(d) Power dissipated in R is 21W when all lamps are normally bright

44. 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 **[AMU (Med.) 2000]**



(a) 16

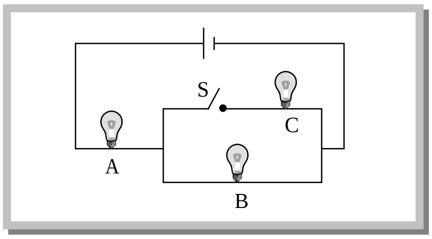
(b) 9

(c) 6

(d) 4

HEATING & CHEMICAL EFFECT OF CURRNT

45. If *A, B* and *C* are identical lamps, which of the following changes to the brightness of the lamps occur when switch *S* is closed **[AMU 1988]**



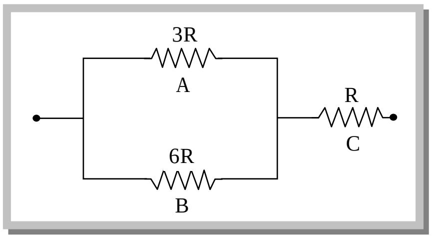
(a) *A* stays the same, *B* decreases

(b) *A* increases, *B* decreases

(c) *A* increases, *B* stays the same

(d) *A* decreases, *B* increases

46. The three resistances *A*, *B* and *C* have values 3 *R*, 6 *R* and *R* respectively. When some potential difference is applied across the network, the thermal powers dissipated by *A, B* and *C* are in the ratio



(a) 2 : 3 : 4

(b) 2 : 4 : 3

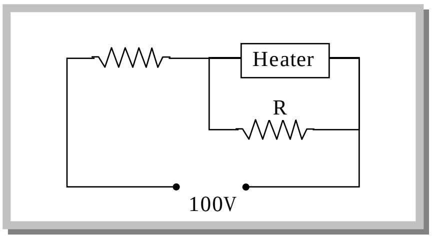
(c) 4 : 2 : 3

(d) 3 : 2 : 4

47. A house is served by 220 *V* supply line in a circuit protected by a 9 *ampere* fuse. The maximum number of 60 *W* lamps in parallel that can be turned on, is

(a) 44 (b) 20 (c) 22 (d) 33

48. A heater is designed to operate with a power of 1000 *W* in a 100 *V* line. It is connected to two resistance of 10 Ω and *R* Ω as shown in fig. If the heater is now giving a power of 62.5 *W*. The value of resistance *R* will be



(a) 5 Ω

(b) 10 Ω

(c) 2.5 Ω

(d) 1.25 Ω

Thermo electricity

Basic Level

49. The thermo emf of a thermocouple varies with the temperature θ of the hot junction as $E = a\theta + b\theta^2$ in *volts*. where the ratio $\frac{a}{b}$ is $700^\circ C$. If the cold junction is kept at $0^\circ C$, then the neutral temperature is **[AIEEE 2004]**

(a) $1400^\circ C$ (b) $350^\circ C$

(c) $700^\circ C$ (d) No neutral temperature is possible for this thermocouple

50. If the cold junction of thermocouple is lowered, then the neutral temperature **[JIPMER 2002]**

(a) Increases (b) Approaches inversion temperature

(c) Decreases (d) Remains the same

51. A thermoelectric refrigerator works on

(a) Joule effect (b) Seebeck effect (c) Peltier effect (d) Thermionic emission

52. 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 **[Kerala (Med.) 2002]**

(a) $700^\circ C$ (b) $600^\circ C$ (c) $350^\circ C$ (d) $670^\circ C$

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

[MP PMT 2001; MP PET 2002]

(a) Seebeck electro motive force (emf) (b) Peltier electro motive force (emf)

(c) Thomson electro motive force (emf) (d) None of these

54. $e = \alpha t - \frac{1}{2}\beta t^2$, If temperature of cold junction is $0^\circ C$ then temperature of inversion is (if $\alpha = 500.0\mu V/{}^\circ C, \beta = 5.0\mu V/\text{Square}{}^\circ C$) **[DCE 2001]**

(a) $100^\circ C$ (b) $200^\circ C$ (c) $300^\circ C$ (d) $400^\circ C$

55. 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 $40^\circ C$ **[Kerala PET 2001]**

(a) $290^\circ C$, $580^\circ C$ (b) $270^\circ C$, $580^\circ C$ (c) $270^\circ C$, $500^\circ C$ (d) $290^\circ C$, $540^\circ C$

56. 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 **[J & K CEET 2000]**

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

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

57. In a given thermocouple the temperature of the cold junction is $20^\circ C$ while the neutral temperature is $270^\circ C$. What will be the temperature of inversion **[AMU (Engg.) 2000]**

(a) $540^\circ C$ (b) $520^\circ C$ (c) $500^\circ C$ (d) $420^\circ C$

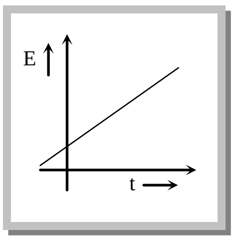
58. Consider the following two statements *A* and *B*, and identify the correct choice of given answers. **[EAMCET (Med.) 2000]**

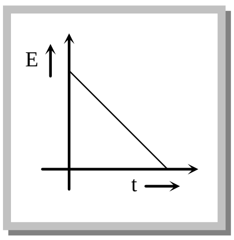
A. Thermo e.m.f. is minimum at neutral temperature of a thermocouple

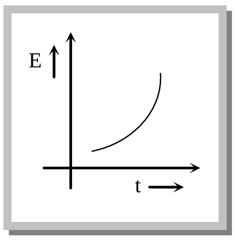
B. When two junctions made of two different metallic wires are maintained at different temperatures, an electric current is generated in the circuit.

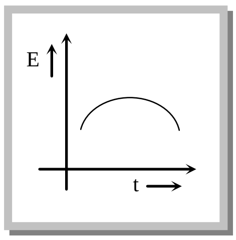
(a) *A* is false and *B* is true (b) *A* is true and *B* is false (c) Both *A* and *B* are false (d) Both *A* and *B* are true

59. 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 **[DCE 2000]**

(a) 

(b) 

(c) 

(d) 

60. For a thermocouple if the cold junction is maintained at $0^\circ C$ the inversion temperature is $680^\circ C$. Its Neutral temperature is **[EAMCET (Med.) 1999]**

(a) $1360^\circ C$ (b) $650^\circ C$ (c) $340^\circ C$ (d) $170^\circ C$

61. The temperature of the cold junction of thermocouple is $0^\circ C$ and the temperature of hot junction is $T\,^\circ C$. The emf is $E = 16\,T - 0.04\,T^2\,\mu V$. The temperature of inversion is **[EAMCET 1994]**

(a) $200^\circ C$ (b) $400^\circ C$ (c) $100^\circ C$ (d) $300^\circ C$

62. In a *Cu-Fe* thermo couple the battery current is driven from *Cu-Fe* through J_2. Then

(a) J_2 should heat's up

(b) J_2 should cool down

(c) J_1 should cool down

(d) Both J_1 and J_2 either heat's up or cool down depending upon the direction of current

Advance Level

63. 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*

64. 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 **[EAMCET 2001]**

(a) 1000 *J* (b) 100 *J* (c) 100 *mJ* (d) 1 *mJ*

65. A thermo couple of resistance 2.6 Ω is in series with a meter of resistance 7.4 Ω. It can produce 10 $\mu V/^{o}C$ difference between junctions. The meter reads 10 *mV* when a junction is at $0^{o}C$ and the other junction is in molten metal. Temperature of molten metal is

(a) 1350^{o} *C* (b) 1500^{o} *C* (c) 1000^{o} *C* (d) 1850^{o} *C*

Chemical Effect of Current

Basic Level

66. The electrochemical equivalent of a metal is 3.3×10^{-7} kg / Coulomb. The mass of the metal liberated at the cathode when a 3 *A* current is passed for 2 seconds will be **[AIEEE 2004]**

(a) 6.6×10^{-7} kg (b) 9.9×10^{-7} kg (c) 19.8×10^{-7} kg (d) 1.1×10^{-7} kg

67. The negative *Zn* pole of a Daniell cell sending a constant current through the circuit, decreases in mass by 0.13 *g* in 30 *minutes*. If the electrochemical 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

[AIEEE 2003]

(a) 0.242 *g* (b) 0.180 *g* (c) 0.141 *g* (d) 0.126 *g*

68. If 96500 *coulombs* of electricity liberates one gram equivalent of any substance, the time taken for a current of 0.15 *amperes* to deposit 20*mg* of copper from a solution of copper sulphate is (Chemical equivalent of copper = 32) **[Kerala (Engg.) 2002]**

(a) 5 *min* 20 *sec* (b) 6 *min* 42 *sec* (c) 4 *min* 40 *sec* (d) 5 *min* 50 *sec*

69. 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*

70. The electrochemical equivalent of a material in an electrolyte 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

71. 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) 1.7 *mg* (b) 3.4 *mg* (c) 5.1 *mg* (d) 6.8 *mg*

72. If nearly 10^{+5} *coulomb* liberate 1 *gm* equivalent of aluminium, then the amount of aluminium (equivalent weight 9) deposited through electrolysis in 20 *minutes* by a current of 50 *ampere* will be **[CBSE PMT 1998]**

(a) 0.6 *g* (b) 0.09 *g* (c) 5.4 *g* (d) 10.8 *g*

73. The electro-chemical equivalent of magnesium is 0.126 *mg/C*. A current of 5 *A* is passed in a suitable solution for 1 hour. The mass of magnesium deposited will be

(a) 0.0378 *g* (b) 0.227 *g* (c) 0.378 *g* (d) 2.27 *g*

74. A steady current of 5 *amps* is maintained for 45 *minutes*. During this time it deposits 4.572 *gms* of zinc at the cathode of a voltameter. E.C.E. of zinc is **[MP PET 1994]**

(a) 3.387×10^{-4} *gm/C* (b) 3.387×10^{-4} *C/gm* (c) 3.384×10^{-3} *gm/C* (d) 3.394×10^{-3} *C/gm*

75. 965 *C* charge deposits 1.08 *gm* of silver when passed through silver nitrate solution. What is the equivalent weight of silver

(a) 108 (b) 10.8 (c) 1.08 (d) None of these

76. 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/C*)

(a) 2.05 (b) 8.2 (c) 4.1 (d) $5 \times 3.387 \times 10^{-7}$

77. During the electrolysis, it is the

(a) Electronic conduction every where

(b) Ionic conduction every where

(c) Ionic conduction inside and electronic conduction outside the voltmeter

(d) Electronic conduction inside and ionic conduction outside the voltameter

78. During electrolysis of acidulated water, volumes of H_2 and O_2 are in the ratio of

(a) 1 : 1 (b) 1 : 2 (c) 2 : 1 (d) 8 : 1

Advance Level

79. 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%

80. If 100 *KWh* of energy is consumed at 33 *V* in a *copper* voltameter, the mass of *copper* liberated is (Given *e.c.e.* of *copper* = 3.3×10^{-7} *kg/.C*)

(a) 1.65 *kg* (b) 1.8 *kg* (c) 3.3 *kg* (d) 3.6 *kg*

81. A current of 1.5 *A* flows through a *copper* voltameter. The thickness of *copper* deposited on the electrode surface of area 50 cm^2 in 20 *minutes* will be (Density of *copper* = 9000 kg/m^3 and *e.c.e.* of *copper* = 0.00033 *g/C*)

(a) 2.6×10^{-5} *m* (b) 2.6×10^{-4} *m* (c) 1.3×10^{-5} *m* (d) 1.3×10^{-4} *m*

82. 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 hour deposits 2.0124 *gm* of *silver*. If the *e.c.e.* of *silver* is 1.118×10^{-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*

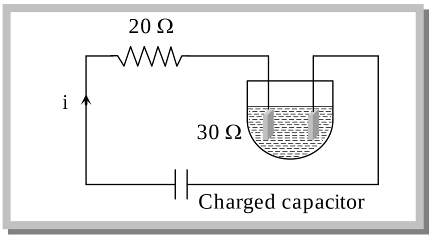
83. A *silver* and a *copper* voltmeters are connected across a 6 *V* battery of negligible resistance. In half an *hour*, 1 *gm* of *copper* and 2 *gm* of *silver* are deposited. The rate at which energy is supplied by the battery will approximately be (Given *E.C.E.* of *copper* = 3.294×10^{-4} *g/C*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

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

84. Area of a electrode is 32 cm^2. It is to be coated with *Cu*. Density of *Cu* is 9000 kg/m^2, thickness of *Cu* deposited on each side of the rectangular cathode is 0.01 *mm*. Energy spent by a battery of emf 10 *V* is (ECE of *Cu* is 3.2×10^{-4} *gm/C*)

(a) 18 *J* (b) 1800 *J* (c) 18 *kJ* (d) 180 *kJ*

85. A charged capacitor of 5×10^{-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 4.62×10^{-6} *kg* *Cu* is deposited, the heat generated in the resistor *R* will be (E.C.E. of *Cu* = 3.3×10^{-7} *kg/C*)



(a) 200 *J*

(b) 784 *J*

(c) 830 *J*

(d) 2000 *J*