



PHYSICS

BOOKS - SAI PHYSICS (TELUGU ENGLISH)

CURRENT ELECTRICITY AND ALTERENATING CURRENT

Mcq

1. A battery of the emf 18 V and internal resistance of $3\ \Omega$ and another of emf 10 V and internal resistance of $1\ \Omega$ are connected as shown in figure. Then the voltmeter reading is



A. 10V

B. 12V

C. 16V

D. 8V

Answer: B



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2. A voltmeter of 250 mV range having a resistance of 10Ω is converted into an ammeter of 250 mA range . The value of necessary shunt is (nearly)

A. 2Ω

B. 0.1Ω

C. 1Ω

D. 10Ω

Answer: B



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3. In a half wave rectifier, the AC input source of frequency 50 Hz is used. The fundamental frequency of the output is

- A. 50Hz
- B. 150Hz
- C. 200Hz
- D. 75Hz

Answer: C



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4. In a circuit L , C and R are connected in series with an alternating voltage source of frequency f . when current in the circuit leads the voltage by 45° the value of C .

A.
$$\frac{1}{2\pi f(2\pi fL + R)}$$

B.
$$\frac{1}{2\pi(2\pi fR + L)}$$

C.
$$\frac{1}{2\pi f(R + L)}$$

D.
$$\frac{1}{2\pi \frac{f(R+(1))}{L}}$$

Answer: A



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5. A constant potential difference is applied between the ends of the wire . If the length of the wire is elongated 4 times , then the drift velocity of electrons will be

A. Increase 4 times

B. Decrease 4 times

C. Increase 2 times

D. Decrease 2 times

Answer: A



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6. In a metre bridge , the gaps are enclosed by resistances of 2ω and 3Ω . The value of shunt to be added to 3Ω resistor to shift the balancing point by 22.5cm is

A. 1Ω

B. 2Ω

C. 2.5Ω

D. 5Ω

Answer: B



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7. In a AC circuit aV and I are given below , then
find the power dissipated in the circuit

$$V = 50 \sin(50t) \text{ V}$$

$$I = 50 \sin\left(50t + \left(\frac{\pi}{3}\right)\right) \text{ mA}$$

A. 0.625W

B. 1.25w

C. 2.50w

D. 5.0w

Answer: B



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8. Wires A and B have resistivities ρ_A and ρ_B . If the diameter of the wire B is twice that of A and the Two wires have same resistance, then

$\frac{L_b}{L_A}$ is

A. 2

B. 1

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

D. $\frac{1}{4}$

Answer: B



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9. In the circuit shown , the heat produced in 5Ω resistance due to current through is 50J/s . Then , the heat generated per second in 2Ω resistance is



- A. 5J/s
- B. 4 J/s
- C. 9 J/s
- D. 10 J/s

Answer: A



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10. A capacitor $50\mu F$ is connected to a power source $V = 220 \sin 50 t$ (V in volt , t in second).

The value of rms current (in ampere)

A. $\frac{\sqrt{10}}{0.55} A$

B. 0.55 A

C. $\sqrt{2} A$

D. $\frac{0.55}{\sqrt{2}} A$

Answer: D



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11. In the circuit shown in the figure , the current 'T' is



A. 6A

B. 2A

C. 4A

D. 7A

Answer: D



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12. In the meter bridge experiment , the length AB of the wire is 1m. The resistor X and Y have values 5Ω and Ω respectively. When a shunt resistance S is connected to X, the balancing point is found to be 0.625 m from A. Then the resistance of the shunt is



A. 5Ω

B. 10Ω

C. 7.5Ω

D. 12.5Ω

Answer: A



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13. A series LCR circuit is connected across a source of alternating emf of changing frequency and resonates at frequency f_0 .

Keeping capacitance constant, if the inductant (L) is increased by $\sqrt{3}$ times and resistance is increased (R) by 1.4 times, the resonant frequency now is

A. $3^{\frac{1}{4}} F_0$

B. $\sqrt{3} f_0$

C. $(\sqrt{3} - 1)^{\frac{1}{4}} F_0$

D. $\left(\frac{i}{3}\right)^{\frac{1}{4}} f_0$

Answer: B



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14. The sensitivity of a galvanometer that measure current is decreased by $\frac{1}{40}$ times by using shunt resistance of 10Ω .

Then , the value of the resistance of the galvanometer is

A. 400Ω

B. 410Ω

C. 30Ω

D. 390Ω

Answer: D



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15. Three resistances of equal values are arranged in four different configurations as shown below. Power dissipation in the increasing order is



A. (III) < (II) < (IV) < (I)

B. (II)It(III)It(IV)It(II)

C. (I)It(III)It(II)It(IV)

D. (IV)It(III)It(II)It(I)

Answer:



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16. Four resistors A, and D form a Wheatstone bridge.

The bridge is balanced , when $C = 100\Omega$ If A

and B are interchanged the bridge balances for $C = 121\Omega$. The value of D is

A. 10Ω

B. 100Ω

C. 110Ω

D. 120Ω

Answer: A



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17. The electric current I in the circuit shown is



A. 6A

B. 2A

C. 3A

D. 4A

Answer: C



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18. In the circuit shown below, the ammeter reading is zero. Then the value of the resistance R is



A. 50Ω

B. 100Ω

C. 200Ω

D. 400Ω

Answer: D



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19. A constant voltage of 25 V is applied to a series L-R circuit at $t = 0$, by closing a switch. What is the potential difference across the resistor and the inductor at time $t = 0$?

A. 0 V, 25 V

B. 12.5V, 1.25 V

C. 10 V, 15 V

D. 25 V, 0 V

Answer: B



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20. The sensitivity of a galvanometer is 60 division /A . When a shunt is used, its sensitivity becomes 10 division/A. If the galvanometer is of resistance 20Ω , the value of shunt used is

A. 4Ω

B. 5Ω

C. 20Ω

D. 2Ω

Answer: A



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21. 6Ω and 12Ω resistors are connected in parallel . This combination is connected in series with a 10 V battery and 6Ω resistor .
What is the potential difference between the terminals of the 12Ω resistor ?

A. 4V

B. 16V

C. 2V

D. 8V

Answer: A



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22. Charge passing through a conductor of cross-section area $A = 0.3 \text{ m}^2$ is given by $q = 3t^2 + 5t + 2$ in coulomb, where t is in second.

What is the value of drift velocity at $t = 2\text{s}$?

$$\left(\text{Given, } n = 2 \times \frac{10^{25}}{\text{m}^3} \right)$$

A. $0.77 \times 10^{-5} \frac{\text{m}}{\text{s}}$

B. $1.77 \times 10^{-5} \frac{\text{m}}{\text{s}}$

C. $2.08 \times 10^{-5} \frac{\text{m}}{\text{s}}$

D. $0.57 \times 10^{-5} \frac{\text{m}}{\text{s}}$

Answer: A



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23. In the adjacent shown circuit, a voltmeter of internal resistance R , When connected across B and C reads $\frac{100}{3}V$. Negative the internal resistance of the battery, The value of R is



A. 100Ω

B. 75Ω

C. 50Ω

D. 25Ω

Answer: B



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24. A cell in secondary circuit gives null deflection for 2.5 m length of potentiometer having 10 m length of wire . If the length of the potentiometer the cell in the primary , the position of the nul point now is

A. 3.5m

B. 3m

C. 2.75m

D. 2.0 m

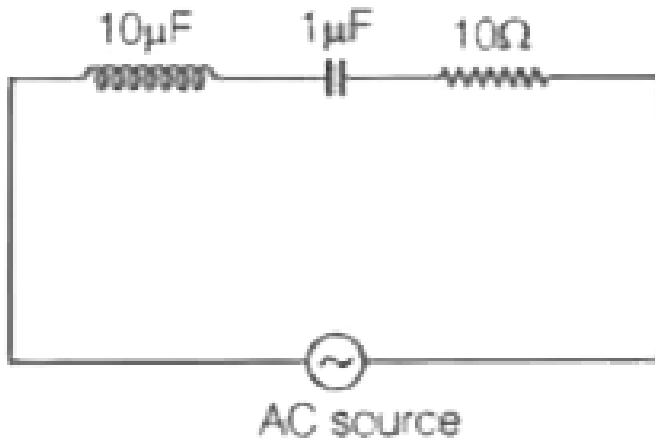
Answer: C



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25. In the given circuit, the angular frequency of the voltage source is $70 \times 10^3 \text{rads}^{-1}$. The

circuit effectively behaves like,



- A. purely resistive circuit
- B. Series R-L circuit
- C. Series R-C circuit
- D. Series L-C circuit with $R=0$

Answer: C





26. A current of 2 A flows in an electric circuit as shown in figure . The potential difference (V_R and V_3 are potentials at R and S respectively)is



- A. -4
- B. (+)2
- C. (+)4
- D. (-)2

Answer: C



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27. When a battery connected across a resistor of 16Ω , the voltage across the resistor is 12 V. When the same battery is connected across the resistor of 10Ω voltage across it is 11 V. The internal resistance of the battery in ohm is

A. $\frac{10}{7}$

B. $\frac{20}{7}$

C. $\frac{25}{7}$

D. $\frac{30}{7}$

Answer: C



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28. In a galvanometer 5% of the total current in the circuit passes through it . If the resistance of the galvanometer is G , the shunt resistance S connected to the galvanometer is

A. 19 G

B. $\frac{G}{19}$

C. 20G

D. $\frac{G}{20}$

Answer: B



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29. In a meter bridge experiment , the ratio of the left gap resistance to right gap resistance is 2:3 , the balance point form left is

A. 60cm

B. 50cm

C. 40cm

D. 20cm

Answer: C



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30. An aluminium (respectively $p = 2.2 \times 10^8 \Omega - m$) wire of a diameter 1.4

mm is used to make a 4Ω resistor . The length of the wire is

A. 220 m

B. 1000m

C. 280m

D. 1m

Answer: C



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31. twelve cells , each having emf E volt are connected in series and are kept in a closed box. Some of these cells are wrongly connected with positive and negative terminals reversed . This 12 cell battery is connected in series with an ammeter , an external resistance R ohms and a two -cell battery (two cells of the same type used earlier , connected perfectly in series) . The current in the circuit when the 12 cell battery oppose each other Then , the number of cells

ij 12 - cells battery that are connected wrongly

is

A. 4

B. 3

C. 2

D. 1

Answer: D



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32. A 6 V cell with 0.5Ω internal resistance , a 10 v cell with 1Ω internal resistance and a 12Ω external resistance are connected in parallel . The current (in amper) through the 10 V cell is

A. (0.60)

B. 2.27

C. 2.87

D. 5.14

Answer: C



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33. In a meter bridge a 30Ω resistance is connected in the left gap and a pair of resistance p and Q in the gap . Measured from the left , the balance point is 37.5 cm When they the parallel. The values of P and Q (in Ω) are

A. $(40, 10)$

B. $35, 15$

C. $30, 20$

D. 25, 25

Answer: C



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34. n conducting wires of same dimension but having resistances $1, 2, 3, \dots, n$ are connected in series. The equivalent resistivity of the combination is

A. $\frac{n + (n + 1)}{2}$

B. $\frac{n + 1}{2}$

C. $\frac{n + 2}{2n}$

D. $\frac{2n}{n + 1}$

Answer: C



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35. connected in the secondary circuit of a potentiometer one at a time and the balancing length are respectively 400cm and

440cm .The emf of the cell A is 1.08 V. The emf of the second cell B in volt is

A. 1.08

B. 1.188

C. 11.28

D. 12.8

Answer: A



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36. Two resistance of 400Ω and 800Ω are connected in series with 6 V battery of negligible internal resistance . A voltmeter of resistance 10000Ω is used to measure the potential difference across 400Ω The error in the measurement of potential difference in volt approximately is

A. 0.03

B. 0.02

C. 0.03

D. 0.05

Answer: B



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37. Three unequal resistor in parallel are equivalent to a resistance 1Ω If two of them are in the ratio 1:2 and if no resistance value is fractional the largest of the three resistance in ohm is

A. 4

B. 6

C. 8

D. 12

Answer: D



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38. A galvanometer having a resistance of 50Ω , gives a full scale deflection for a current of 0.05 A . The length in metre of a resistance wire of area of cross-section $2.97 \times 10^{-2}\text{ cm}^2$ that

can be used to convert the galvanometer into an ammeter which can read a maximum of 5 A current is (specific resistance of the wire = $5 \times 10^{-7} \Omega - m$)

A. 9

B. 6

C. 3

D. 1.5

Answer: B



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39. The balancing length for a cell is 560cm in a potentiometer experiment . When an external resistance of 10 ohm are connected in parallel to the cell, the balancing length changes by 60cm. find the internal resistance of the cell in ohm , is

A. 1.6

B. 1.4

C. 1.2

D. 0.12

Answer: C



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40. A conductor of resistance 3Ω is stretched uniformly till its length is doubled. The wire is now bent in the form of an equilateral triangle. The effective resistance between the ends of any side of the triangle in ohm is

A. $\frac{9}{2}$

B. $\frac{8}{3}$

C. 2

D. 1

Answer: C



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41. A uniform conductor of resistance R is cut into 20 equal pieces. Half of them are joined in series and the remaining half of them are connected in parallel . If the two combinations

are joined in series, the effective resistance of all the pieces is

A. R

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

C. $\frac{101R}{200}$

D. $\frac{201R}{200}$

Answer: B



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42. A moving coil galvanometer of resistance 100Ω shows full scale deflection when a current of $100\mu A$ passes through it. If it is intended to show full scale deflection when a current of 1mA passes through it the value of shunt resistance in ohm to be connected to the galvanometer is

A. $\frac{9}{4}$

B. $\frac{10}{3}$

C. $\frac{100}{9}$

D. $\frac{900}{7}$

Answer: C



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43. A nichrome wire 50cm long 1mm^2 cross-section carries a current of 4 A. When connected to 2V battery The resistivity of nichrome wire in $\Omega - m$ is

A. 1×10^{-6}

B. 4×10^{-7}

C. 3×10^{-2}

D. 2×10^7

Answer: C



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44. When a resistor of 11Ω is connected in series with an electric cell, the current flowing in it is 0.5 A. Instead, when a resistor of 5Ω is connected to the same electric cell in series,

the current increase by 0.4 A , The internal resistance of the cell is

A. 1.5Ω

B. 2Ω

C. 2.5Ω

D. 3.5Ω

Answer: A



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45. An ammeter and a voltmeter of resistance R are connected in series to an electric cell of negligible internal resistance. Their readings are A and V respectively. If another resistance R is connected in parallel with voltmeter

- A. Both A and V will increase
- B. Both A and V will decrease
- C. A will decrease and V will increase
- D. A increase and V will decrease

Answer: C



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46. Two wires of equal diameters of resistivities p_1 and p_2 and length x_1 and x_2 respectively are joined in series. The equivalent resistivity of the combination is

A.
$$\frac{P_1 X_1 + P_2 X_2}{X_1 + X_2}$$

B.
$$\frac{P_1 X_2 - P_2 X_1}{X_1 - X_2}$$

C.
$$\frac{P_2 X_2 + P_2 X_1}{X_1 + X_2}$$

D.
$$\frac{P_1 X_2 - P_2 X_1}{X_1 + X_2}$$

Answer: D



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47. In a metre bridge , the gaps are enclosed by resistances of 2ω and 3Ω . The value of shunt to be added to 3Ω resistor to shift the balancing point by 22.5cm is

A. 1Ω

B. 2Ω

C. 2.5Ω

D. 5Ω

Answer: A



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48. A wire of resistance 10Ω is elongated by 10% the resistance of the elongated wire

A. 11Ω

B. 11.1Ω

C. 12.1Ω

D. 13.1Ω

Answer: B



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49. In a meter bridge the balancing length from the left end (standard resistance of 1Ω is in the right gap) is found to be 20 cm . The value of the unknown resistance is

A. 0.3Ω

B. 0.2Ω

C. 0.25Ω

D. 0.5Ω

Answer: C



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50. A galvanmeter has a resistance of 50Ω and a current of 0.01 A will cause full scale deflection . To converted this into an ammeter

with full deflection for 5A , we have to connect approximately

- A. 0.1Ω in series
- B. 0.1Ω in parallel
- C. 0.2Ω in series
- D. 0.2Ω in parallel

Answer: B



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51. The emf of a daniel cell is 1.08V. When the terminals of the cell are connected to resistance of 3Ω , the potential difference across the terminals is found to be 0.6 V. Then , the internal resistance of the cell is

A. 1.8Ω

B. 2.4Ω

C. 0.2Ω

D. 0.24Ω

Answer: B



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52. A sensitive galvanometer like a moving coil galvanometer can be converted into an ammeter or into a voltmeter by connecting a proper resistance to it . Then , which of the following statement is not true ?

A. An ammeter is connected in series in a circuit and the potential difference across it is small

B. An ammeter is connected in series in a circuit and the current through it is negligible

C. A voltmeter is connected in parallel in a circuit and the current through it is negligible

D. A voltmeter is connected in parallel a circuit the potential difference across it is maximum .

Answer: B



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53. The potential difference across the terminals of a battery is 50 V when 11 A are drawn and 60V when 1A is drawn . The emf and the internal resistance of the battery are

A. $62\text{V}, 2\Omega$

B. $63\text{V}, 1\Omega$

C. $61\text{V}, 1\Omega$

D. $64\text{V}, 2\Omega$

Answer: B



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54. If in a wheatstone bridge the battery and galvanometer are interchanged the condition for balance

A. Is disturbed

B. Is not disturbed

C. Depend on the internal resistance of the
bridge

D. Depend on the values of the resistance
in the bridge

Answer: C



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55. An ammeter whose resistance is 180Ω shows full scale deflection when the current is 2 mA. The shunt required to convert into an ammeter reading 20mA is (in ohm)

A. 18

B. 20

C. 0.1

D. 10

Answer: B



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56. A current is passed through two coils connected in series. The potential difference across the first coil is 3V and that of the

second coil 4.5V. If the first coil has resistance of 2Ω , the resistance of the second coil is

A. 3Ω

B. 5Ω

C. 7Ω

D. 9Ω

Answer: B



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57. To convert a 800mV range millivoltmeter of resistance 40Ω , into a milliammeter of 100 mA range , the resistance to be connected as shunt is

A. 5Ω

B. 10Ω

C. 15Ω

D. 20Ω

Answer: A



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