**SAINIK SCHOOL GOPALGANJ**

**SUB: PHYSICS**

**CLASS - XII**

**SUMMER VACATION ASSIGNMENT**

**CHAPTER-3**

1. If each of the resistance of the network shown in the figure is *R*, the equivalent resistance between *A* and *B* is

*A*

*B*

*R*

*R*

*R*

*R*

*R*

(a) 5 *R* (b) 3 *R* (c)*R* (d) *R*/2

1. The equivalent resistance of the following diagram *A* and *B* is

(a) 

*A*

3Ω

3Ω

3Ω

3Ω

*B*

3Ω

(b) 9 Ω

(c) 6 Ω

(d) None of these

1. Thirteen resistances each of resistance *R* *ohm* are connected in the circuit as shown in the figure below. The effective resistance between *A* and *B* is

*R*

*R*

*R*

*R*

*R*

*R*

*R*

*R*

*R*

*R*

*R*

*R*

*R*

*B*

*A*

(a) 2*R* Ω (b) 

(c)  (d) *R* Ω

1. In a Wheatstone’s bridge all the four arms have equal resistance *R*. If the resistance of the galvanometer arm is also *R*, the equivalent resistance of the combination as seen by the battery is

(a) (b) *R* (c) 2 *R* (d) 

1. For what value of unknown resistance *X*, the potential difference between *B* and *D* will be zero in the circuit shown in the figure

*B*

*C*

1Ω

1Ω

12Ω

*X*

6Ω

*D*

*A*

1Ω

1Ω

(a) 4 Ω

(b) 6 Ω

(c) 2 Ω

(d) 5 Ω

1. A galvanometer with a resistance of 12 Ω gives full scale deflection when a current of 3 *mA* is passed. It is required to convert it into a voltmeter which can read up to 18 *V*. the resistance to be connected is (a) 6000 Ω (b) 5988 Ω

(c) 5000 Ω (d) 4988 Ω

1. The resistance of an ideal ammeter is

(a) Infinite (b) Very high

(c) Small (d) Zero

1. A galvanometer of 25 Ω resistance can read a maximum current of 6*mA*. It can be used as a voltmeter to measure a maximum of 6 *V* by connecting a resistance to the galvanometer. Identify the correct choice in the given answers (a) 1025 Ω in series (b) 1025 Ω in parallel

(c) 975 Ω in series (d) 975 Ω in parallel

1. A galvanometer has a resistance of 25 *ohm* and a maximum of 0.01 *A* current can be passed through it. In order to change it into an ammeter of range 10 *A*, the shunt resistance required is

(a) 5/999 *ohm* (b) 10/999 *ohm*

(c) 20/999 *ohm* (d) 25/999 *ohm*

1. In the circuit shown, a *meter* bridge is in its balanced state. The *meter* bridge wire has a resistance 0.1 *ohm*/*cm*. The value of unknown resistance *X* and the current drawn from the battery of negligible resistance is

*B*

*A*

60 *cm*

40 *cm*

*X*

6Ω

5*V*

***G***

(a) 6 Ω, 5 *amp*

(b) 10 Ω, 0.1 *amp*

(c) 4 Ω, 1.0 *amp*

(d) 12 Ω, 0.5 *amp*

1. A galvanometer has 30 divisions and a sensitivity 16It can be converted into a voltmeter to read 3 *V* by connecting

(a)Resistance nearly 6 in series

(b)  in parallel

(c)  in series

(d) It cannot be converted

1. Voltmeters *V*1 and *V*2 are connected in series across a *D.C.* line. *V*1 reads 80 *volts* and has a per *volt* resistance of 200 *ohms*. *V*2 has a total resistance of 32 *kilo ohms*. The line voltage is

(a) 120 *volts* (b) 160 *volts*

(c) 220 *volts* (d) 240 *volts*

1. A potentiometer having the potential gradient of 2 *mV*/*cm* is used to measure the difference of potential across a resistance of 10 *ohm*. If a length of 50 *cm* of the potentiometer wire is required to get the null point, the current passing through the 10 *ohm* resistor is (in *mA*)

(a) 1 (b) 2

(c) 5 (d) 10

1. *AB* is a potentiometer wire of length 100 *cm* and its resistance is 10 *ohms*. It is connected in series with a resistance *R* = 40 *ohms* and a battery of e.m.f. 2 *V* and negligible internal resistance. If a source of unknown e.m.f. *E* is balanced by 40 *cm* length of the potentiometer wire, the value of *E* is

*R*

*A*

*B*

2 *V*

40 *cm*

*E*

(a) 0.8 *V*

(b) 1.6 *V*

(c) 0.08 *V*

(d) 0.16 *V*

1. An ammeter gives full deflection when a current of 2 *amp.* flows through it. The resistance of ammeter is 12 *ohms*. If the same ammeter is to be used for measuring a maximum current of 5 *amp.*, then the ammeter must be connected with a resistance of

(a) 8 *ohms* in series (b) 18 *ohms* in series

(c) 8 *ohms* in parallel (d) 18 *ohms* in parallel

1. In a circuit 5 percent of total current passes through a galvanometer. If resistance of the galvanometer is *G* then value of the shunt is (a) 19 *G* (b) 20 *G*

(c)  (d) 

1. A voltmeter having resistance of 50 × 103 *ohm* is used to measure the voltage in a circuit. To increase the range of measurement 3 times the additional series resistance required is

(a) 105 *ohm* (b) 150 *k.ohm*

(c) 900 *k.ohm* (d) 9 × 106 *ohm*

1. In a potentiometer experiment two cells of e.m.f. *E*1 and *E*2 are used in series and in conjunction and the balancing length is found to be 58 *cm* of the wire. If the polarity of *E*2 is reversed, then the balancing length becomes 29 *cm*. The ratio  of the e.m.f. of the two cells is

(a) 1 : 1 (b) 2 : 1

(c) 3 : 1 (d) 4 : 1

1. A milliammeter of range 10 *mA* has a coil of resistance 1 Ω. To use it as voltmeter of range 10 *volt*, the resistance that must be connected in series with it, will be

(a) 999 Ω (b) 99 Ω

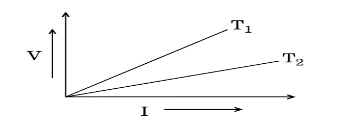
(c) 1000 Ω (d) None of these

1. A voltmeter has a range 0-*V* with a series resistance *R*. With a series resistance 2*R*, the range is 0-*V*′. The correct relation between *V* and *V*′ is

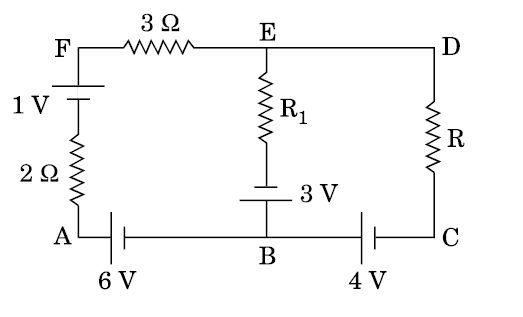
(a)  (b) 

(c)  (d) 

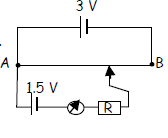
1. V – I graph for a metallic wire at two different temperatures T1 and T2 is as shown in the figure. Which of the two temperatures is higher and why?



1. Two wires, one of copper and the other of manganin, have same resistance and equal thickness. Which wire is longer? Justify your answer.
2. Define the term ‘mobility’ of charge carriers. Write its S.I. unit.
3. Define the term ‘power loss’ in a conductor of resistance R carrying a current I. In what form does this power loss appear? Show that to minimize the power loss in the transmission cables connecting the power stations to homes, it is necessary to have the connecting wires carrying current at enormous high values of voltage.
4. A variable resistor R is connected across a cell of emf **Ɛ** and internal resistance r. Draw a plot showing the variation of (i) terminal voltage V and (ii) the current I, as a function of R.
5. Use Kirchhoff’s rules to determine the potential difference between the points A and D when no current flows in the arm **BE** of the electric network shown in the figure.



1. Find the relation between drift velocity and relaxation time of charge carriers in a conductor. A conductor of length L is connected to a d.c. source of emf ‘E’. If the length of the conductor is tripled by stretching it, keeping ‘E’ constant, explain how its drift velocity would be affected.
2. A potentiometer wire of length 1 m is connected to a driver cell of emf 3 V as shown in the figure. When a cell of 1.5 V emf is used in the secondary circuit, the balance point is found to be 60 cm. On replacing this cell and using a cell of unknown emf, the balance point shifts to 80 cm.(i) Calculate unknown emf of the cell.(ii) explain with reason, whether the circuit works, if the driver cell is replaced with a cell of emf 1 V.(iii) Does the light resistance R, used in the secondary circuit affect the balance point? Justify.



1. Define emf and terminal potential difference of a cell. When is the terminal charging potential difference greater than emf? Explain how emf and terminal potential difference can be compared using a potentiometer and hence determine internal resistance of the cell.
2. State Kirchhoff’s rules for electrical networks. Use them to explain the principle of Wheatstone bridge for determining an unknown resistance. How is it realized in actual practice in the laboratory? State the formula used.