

Summer Holiday Homework
Session 2019-2020

Name: _____

S.No. : 1

Date: _____ / _05_____ / _2019

Class: XII-A1,A2

Subject: Physics

class-XII(Physics)

Instruction-

1.Learn chapters that have been done in class (Chapter 1,2,3,4).

2.Make a flow chart of all the formula from the chapter Electrostatics and current electricity on a separate A4 size sheet for each chapter and then paste sheets on a chart paper and please be creative as much as you can .

3) Prepare a innovative physics project in the grouping of two students as per discussion and allotation in the class.

4)Investigatory Projects- Physics (2018-19)

As per C.B.S.E. guidelines, all students have to prepare one Investigatory Project carrying 3 marks. All students are therefore, advised to prepare one Investigatory Project on any one of the following topics or any other topic of their choice based on concept of physics after consulting the teacher during the summer vacation.

5))Complete the assignment and M.C.Q. in the assignment notebook .

POINTERS FOR MAKING PROJECT REPORT

The material should be placed and bound in the following order:

1. Top Sheet of transparent plastic -The top page of your report should carry the following information in printed form or handwritten in neat block letters:

Name of project

Name of student

Roll no

Date of submission:

2. Aim of Project

3. Apparatus required

4. Principle/theory
5. construction with labeled diagram,
6. Working
7. Observations
8. calculations,
9. Result/ Conclusions
10. Applications,
11. Graphs if any,
12. References/bibliography
13. Back cover of plastic: may be opaque or transparent

List of Investigatory suggestive Projects

1. To study and construct Van de Graff generator
2. To study and construct A.C.Generator/ Motor
3. To study and construct Transformer
4. To study and show Diffraction of light
5. To investigate the dependence of the angle of deviation on the angle of incidence, using a hollow prism filled, one by one, with different transparent fluids.
6. Use of semiconductor devices (transistor) as amplifier, oscillator, fire alarm, rain alarm, etc.
7. To study and construct one way or two way intercom
8. To study Faraday law of EMI (self & mutual induction)
9. To study and construct Power/magnetic brake
10. To study and construct Thermo couple
11. To study various factors on which the internal resistance/emf of a cell depends.
12. To study the variations, in current flowing, in a circuit containing a LDR, because of a variation. (a) in the power of the incandescent lamp, used to 'illuminate' the LDR. (Keeping all the lamps at a fixed distance). (b) in the distance of a incandescent lamp (of fixed power) used to 'illuminate' the LDR.

13. To find the refractive indices of (a) water (b) oil (transparent) using a plane mirror, a equiconvex lens, (made from a glass of known refractive index) and an adjustable object needle.
 14. To design an appropriate logic gate combination for a given truth table.
 15. To investigate the relation between the ratio of (i) output and input voltage and (ii) number of turns in the secondary coil and primary coil of a self designed transformer.
 16. To estimate the charge induced on each one of the two identical styro foam (or pith) balls suspended in a vertical plane by making use of Coulomb's law.
 17. To set up a common base transistor circuit and to study its input and output characteristic and to calculate its current gain.
 18. To study the factor on which the self inductance of a coil depends by observing the effect of this coil, when put in series with a resistor/(bulb) in a circuit fed up by an a.c. source of adjustable frequency.
 19. To construct a switch using a transistor and to draw the graph between the input and output voltage and mark the cut-off, saturation and active regions.
 20. To study the earth's magnetic field using a tangent galvanometer.
- Note: Complete the investigatory project and submit the same within one week after reopening of school i.e. by 7th of July.2019.**

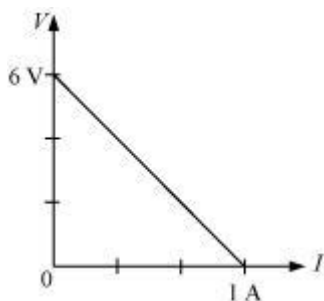
Topic: Unit3

GENERAL INSTRUCTIONS:

- A: The numerical are based on application of theory content. Attempt them in your physics notebook as practice assignment.**
- B: Do all questions in sequence.**

Question1.

The plot of the variation of potential difference across a combination of three identical cells in series versus current is as shown below. What is the emf of each cell?



Question 2. .

Prove that the current density of a metallic conductor is directly proportional to the drift speed of electrons.

Question3..

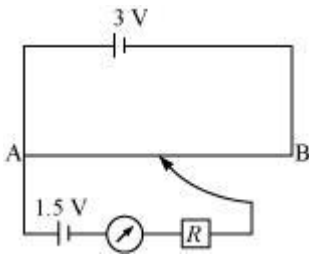
A number of identical cells, n , each of emf E , internal resistance r connected in series are charged by a d.c. source of emf E' , using a resistor R .

(i) Draw the circuit arrangement.

(ii) Deduce the expressions for (a) the changing current and (b) the potential difference across the combination of the cells.

Question4.

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 high resistance R , used in the secondary circuit affect the balance point? Justify your answer.

Question5.

Define resistivity of a conductor. Plot a graph showing the variation of resistivity with temperature for a metallic conductor. How does one explain such a behaviour using the mathematical expression of the resistivity of a material?

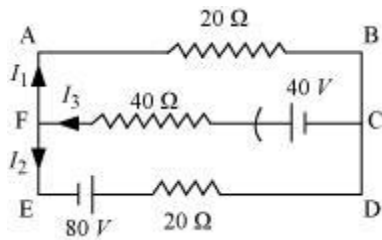
Question6.

A cylindrical metallic wire is stretched to increase its length by 5%. Calculate the percentage change in its resistance.

Question 7.

State Kirchhoff's rules of current distribution in an electrical network.

Using these rules determine the value of the current I_1 in the electric circuit given below.



Question 8.

Write the mathematical relation for the resistivity of material in terms of relaxation time, number density and mass and charge of charge carriers in it.

Explain, using this relation, why the resistivity of a metal increases and that of semi-conductor decreases with rise in temperature.

Question 9.

A cylindrical metallic wire is stretched to increase its length by 10%. Calculate the percentage change in its resistance. (2)

Question 10.

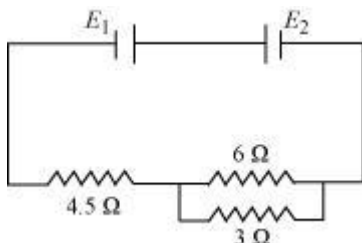
Sketch a graph showing variation of resistivity of carbon with temperature.

Question 11.

Write the mathematical relation between mobility and drift velocity of charge carriers in a conductor. Name the mobile charge carriers responsible for conduction of electric current in (i) an electrolyte (ii) an ionized gas.

Question 12.

Two cells E_1 and E_2 in the given circuit diagram have an *emf* of 5 V and 9 V and internal resistance of 0.3 Ω and 1.2 Ω respectively.



Calculate the value of current flowing through the resistance of 3 Ω.

Question 13.

A 10 m long wire of uniform cross-section and $20\ \Omega$ resistance is used in a potentiometer. The wire is connected in series with a battery of 5 V along with an external resistance of $480\ \Omega$. If an unknown emf E is balanced at 6 m length of the wire, calculate:

- (i) The potential gradient of the potentiometer wire
- (ii) The value of unknown emf E

Question 14.

Draw $V - I$ graph for ohmic and non-ohmic materials. Give one example for each.

Question 15.

Define the term 'resistivity' and write its S.I. unit. Derive the expression for the resistivity of a conductor in terms of number density of free electrons and relaxation time.

Question 16.

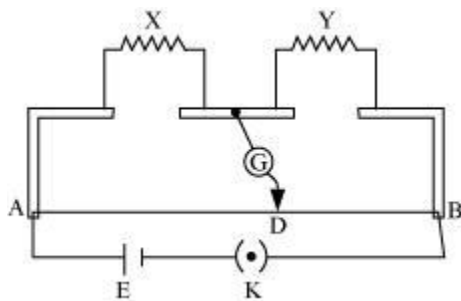
State the principle of potentiometer. Draw a circuit diagram used to compare the e.m.f. of two primary cells. Write the formula used. How can the sensitivity of a potentiometer be increased?

Question 17.

A voltage of 30 V is applied across a carbon resistor with first, second and third rings of blue, black and yellow colours respectively. Find the value of current through the resistor. (2)

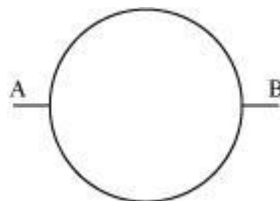
Question 18.

In a metre bridge, the balance point is found to be at 39.5 cm from the end A, when the resistor Y is of 12.5 ohm. Determine the resistance of X. Why are the connections between resistors in a metre bridge made of thick copper strips? What happens if the galvanometer and cell are interchanged at the balance point of the bridge? Would the galvanometer show any current? (3)



Question 19.

A wire of resistance $8R$ is bent in the form of a circle. What is the effective resistance between the ends



of a diameter AB?

Question20.

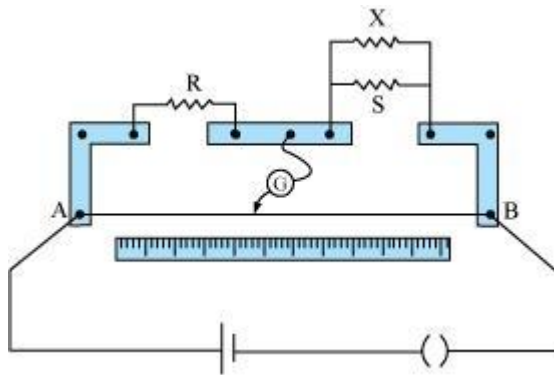
Define the terms 'resistivity' and 'conductivity' and state their S.I. units. Draw a graph showing the variation of resistivity with temperature for a typical semiconductor.

Question21.

State the principle of potentiometer. With the help of circuit diagram, describe a method to find the internal resistance of a primary cell.

Question22.

In a meter bridge, the null point is found at a distance of l_1 cm from A. If now a resistance of X is connected in parallel with S, the null point occurs at l_2 cm. Obtain a formula for X in terms of l_1 , l_2 and S.



Question 23.

Write the principle of working of a potentiometer. Describe briefly, with the help of a circuit diagram, how a potentiometer is used to determine the internal resistance of a given cell.

Question 24.

Two metallic wires of the same material have the same length but cross-sectional area is in the ratio 1:2. They are connected (i) in series and (ii) in parallel. Compare the drift velocities of electrons in the two wires in both the cases (i) and (ii).

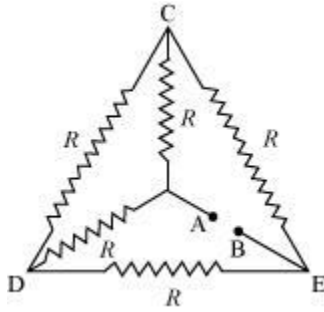
Question25.

Derive an expression for the resistivity of a good conductor, in terms of the relaxation time of electrons.

Question 26.

(i) Calculate the equivalent resistance of the given electrical network between points A and B.

(ii) Also calculate the current through CD and ACB, if a 10 V d.c source is connected between A and B, and the value of R is assumed as 2Ω .



Question27.

On what principle does a metre bridge work? Draw a circuit diagram and explain how this device can be used for determination of an unknown resistance.

Question28.

Derive a mathematical expression for resistivity of a conductor in terms of numberdensity of charge carriers in the conductor and relaxation time

