

Sample Paper – 2015
Class – XII
Subject – Physics
Electrostatics and Current

Time allowed: 1 hours

marks: 50

Maximum

General Instructions:

- (i) Question numbers **1 to 5** are very short answer type questions, carrying **two** mark each.
- (ii) Question numbers **6 to 10** are short answer type questions, carrying **three** marks each.
- (iii) Question numbers **11 to 15** are also short answer questions, carrying **five** marks each.

Q.1> In a hydrogen atom, an electron revolves around a proton. Which of these two exerts a greater electrostatic force on the other and why?

Q.2> The dielectric strength of air is 3×10^6 V/m. What is the maximum charge that can be safely stored on a sphere of radius 10m?

Q.3> Write the expression for the electric field at an axial point of a dipole. What is the angle b/w Electric field and Dipole moment?

Q.4> Write the formula for the voltage across a cell. State the condition in which terminal voltage across a secondary cell is equal to its emf.

Q.5> Define mobility and write its relation with relaxation time.

Q.6> A wire is stretched to increase length by 50%. Then it is cut into two equal halves. What is percentage change in Resistivity & Resistance for one of the parts?

Q.7> Mathematically explain why the resistance of semiconductors decreases with the rise in temperature. Draw the graph.

Q.8> What is the principle of a potentiometer. Explain why a potentiometer is preferred over a voltmeter for measuring potential differences.

Q.9> In a meter bridge experiment with a fixed resistor of 10 ohm in the right gap, the balance length is found to be 75cm. What resistance should be added in series with this fixed resistor so as to bring the null point comes in the center of the wire?

Q.10> During a thunderstorm, Vishal advises his friends to remain inside the car as this is safer. Explain using a figure why this is true. (b) What are the values shown by Vishal?

Q.11> Use kirchoff's laws to deduce the condition of a balanced wheatstone bridge.

Q.12> Cell A has an emf E_A and internal resistance r_A while cell B has emf E_B and internal resistance r_B . Derive an expression for the equivalent emf and internal resistance in parallel combination.

Q.13> Cells are connected in the form of a two dimensional array of "m" rows each having "n" number of cells. Each cell has an emf "E" and internal resistance "r".

(a) Find the equivalent emf and equivalent internal resistance

(b) Find the current if this combination is connected to an external resistor "R"

(c) Under what condition of "R" will the power loss in it be maximum?

Q.14> A potentiometer wire is of length 4m and has a resistance of 10ohms. It is connected in series with a resistance of 90 ohm to 200V power supply. Balance length for an unknown emf E is found to be 3m. Find the unknown value E.

(b) What is the use of the series resistance of 90 ohm?

Q.15> Draw the potentiometer circuit for the measurement of internal resistance of a primary cell. Also derive the corresponding formula.

OR

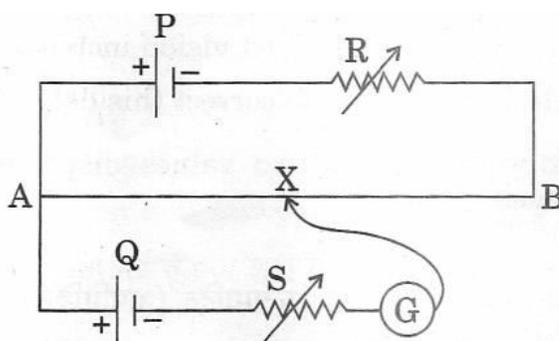
Define Potential gradient of a potentiometer. What do you mean by sensitivity of a potentiometer. Mention two ways of increasing the sensitivity.

In the adjacent circuit, how does the balance length change if

(a) Resistance S is decreased

(b) Resistance R is decreased

Give reasons.





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