KENDRIYA VIDYALAYA SANGATHAN AHMEDABAD REGION

Class- XII (2023-24)

Subject- Physics

Chapter 12: Atoms

Work sheet-12 Time : 30 min

Q.1	What is the ratio of radii of the orbits corresponding to first excited state and ground state in a hydrogen atom ?
Ans.	
Q.2	Name the series of hydrogen spectrum which lies in the (a) visible region of electromagnetic spectrum. (b) U.V region?
Ans	
Q.3	Calculate the de-Broglie wavelength of the electron orbiting in the state of hydrogen atom..
Ans	
Q.4	Calculate the shortest wavelength of the spectral lines emitted in Balmer series

Ans	
Q.5	Derive the Bohr's quantization condition for angular momentum of the orbiting of electron in hydrogen atom, Using de-Broglie's hypothesis.
Ans	
Q.6	Derive the Bohr's quantization condition for angular momentum of the orbiting of electron in hydrogen atom, Using de-Broglie's hypothesis.
Ans	

Q.7	Using Rydberg's formula, calculate the longest wavelengths belonging to Lyman and Balmer series. In which region f hydrogen spectrum do these transmission lie ?
Ans	
Q.8	Using Bohr's postulates, derive the expression for the total energy of the electron in the stationary states of the hydrogen atom. Hence, derive the expression for the orbital velocity and orbital period of the electron moving in the n th orbit of hydrogen atom.
Ans	

KENDRIYA VIDYALAYA SANGATHAN AHMEDABAD REGION

Class- XII (2023-24)

Subject- Physics

Chapter 13.NUCLEI

Work sheet-13 Time : 30 min

Q.1	Define the term mass defect.
Ans.	
Q.2	What are nuclear forces ? State any two characteristic properties of nuclear forces.
Ans	
Q.3	Compare the radii of two nuclei with mass numbers 1 and 27 respectively.
Ans	
Q.4	What is nuclear fission and fusion ? Give one representative equation of each.
Ans	

Q.5	(i) Write the relation between mass number and radius of a nucleus. (ii) Show that nuclear density in a given nucleus is independent of mass number .
Ans	
Q.6	(i) What is Impact parameter ? (ii) What is the significance of impact parameter ?
Ans	

Q.7	Define binding energy of a nucleus. What is meant by the term binding energy per nucleon?
Ans	
Q.8	Draw a plot of binding energy per nucleon (B.E/A) as a function of mass number A. (a) Write salient features of this curve. (b) Write two important conclusions that can be drawn regarding the nature of nuclear force. (c) Use this graph to explain the release of energy in both the processes of nuclear fission and fusion.
Ans	

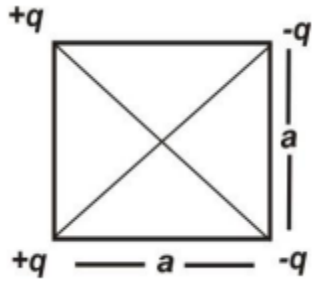
KENDRIYA VIDYALAYA SANGATHAN AHMEDABAD REGION

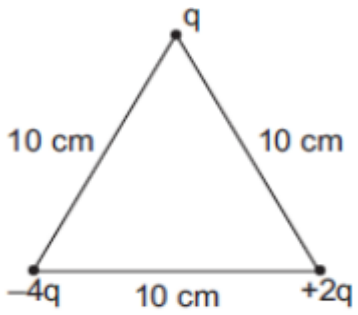
Class- XII (2023-24)

Subject- Physics

Chapter 2: Electrostatic potential & Capacitance

Work sheet-3 Time : 30 min

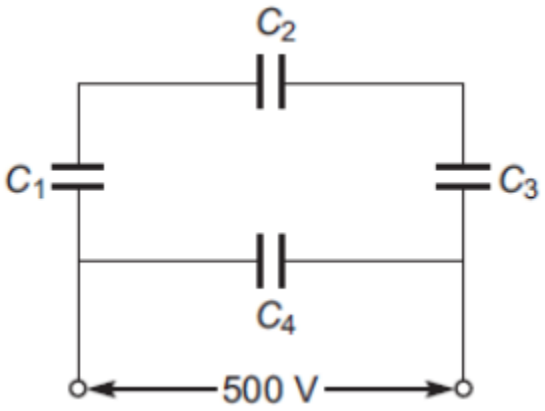
Q.1	The potential at the center of the square is---------- 
Ans.	
Q.2	What is a capacitor? Deduce an expression for the capacitance of a parallel plate Capacitorwith air as the medium between the plates.
Ans	
Q.3	Define an equipotential surface? Write any two properties of an equipotential surface.
Ans	

Q.4	A technician has only two capacitors, by using these singly, in series or in parallel, he is able to obtain the capacitances 4,5,20, and 25 pf, what are the capacitances of the two capacitors?
Ans	
Q.5	Calculate the work done to dissociate the system of three charges placed on the vertices of  an equilateral triangle of ide 10 cm as shown in figure.
Ans	
Q.6	Two identical capacitors of 12 pF each are connected in series across a 50 V battery. Calculate the electrostatic energy stored in the combination. If these were connected in parallel across the

	samebattery, find out the value of the energy stored in this combination.
Ans	
Q.7	The following table shows the dimensions and medium between the plates of three capacitors P, Q and R. Rank them in increasing order of their capacitances.

s.no	Capacitor	Area of plates	Separation between the plates	Medium between the plates
1	P	A	D	Medium of ε_r=4
2	Q	2A	D/2	air
3	R	2A	D	Medium of ε_r=2

Ans	
Q.8	A network of four capacitors each of 15 μF capacitance is connected to a 500 V supply as shown in the figure. Determine (a) equivalent capacitance of the network and (b) charge on each capacitor.

	
Ans	

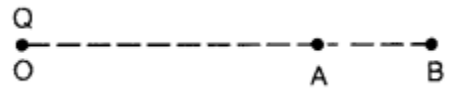
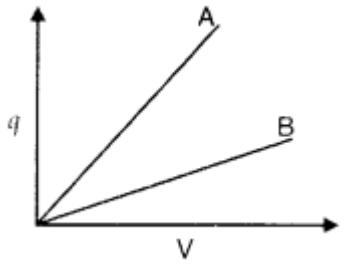
KENDRIYA VIDYALAYA AHMEDABAD REGION

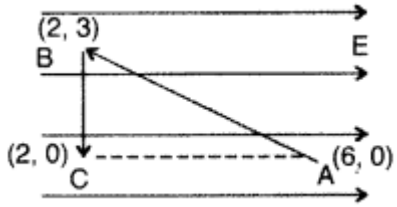
Class- XII (2023-24)

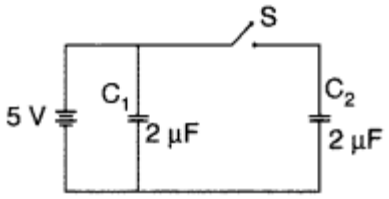
Subject- Physics

Chapter 2: Electrostatic potential & Capacitance

Work sheet-4 Time : 30 min

Q.1	A point charge Q is placed at point O as shown in the figure. Is the potential difference $V_A - V_B$ positive, negative or zero, if Q is (i) positive (ii) negative 
Ans.	
Q.2	Two charges 2μC and – 2μC are placed at points A and B 5 cm apart. Depict an equipotential surface of the system.
Ans	
Q.3	The given graph shows variation of charge 'q' versus potential difference 'V' for two capacitors C_1 and C_2. Both the capacitors have same plate separation but plate area of C_2 is greater than that of C_1. Which line (A or B) corresponds to C_1 and why? 
Ans	

Q.4	A test charge 'q' is moved without acceleration from A to C along the path from A to B and then from B to C in electric field E as shown in the figure.  (i) Calculate the potential difference between A and C. (ii) At which point (of the two) is the electric potential more and why?
Ans	
Q.5	An electric dipole of length 4 cm, when placed with its axis making an angle of 60° with a uniform electric field, experiences a torque of $4\sqrt{3}$ Nm. Calculate the potential energy of the dipole, if it has charge ± 8 nC.
Ans	
Q.6	Two-point charges, $q_1 = 10 \times 10^{-8}$C, $q_2 = -2 \times 10^{-8}$C are separated by a distance of 60 cm in air. (i) Find at what distance from the 1st charge q_1, would the electric potential be zero? (ii) Also calculate the electrostatic potential energy of the system.
Ans	
Q.7	Figure shows two identical capacitors C_1 and C_2, each of 2 μF capacitance, connected to a battery of 5 V. Initially switch 'S' is left open and dielectric slabs of dielectric constant K = 5 are inserted to fill completely the space between the plates of the two capacitors. (i)How will the charge and

	 (ii) potential difference between the plates of the capacitors be affected after the slabs are inserted?
Ans	
Q.8	Two charges of 5 nC and – 2 nC are placed at points (5 cm, 0, 0) and (23 cm, 0, 0) in the region of space, where there is no other external field. Calculate the electrostatic potential energy of this charge system.
Ans	

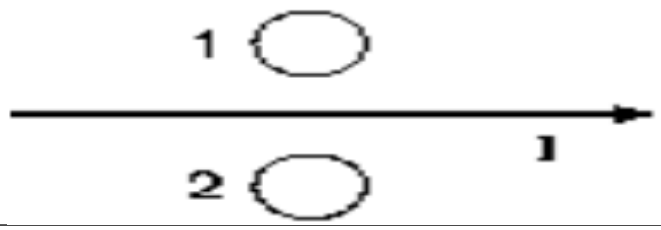
KENDRIYA VIDYALAYA SANGATHAN AHMEDABAD REGION

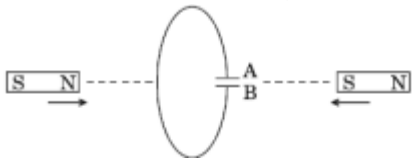
Class- XII (2023-24)

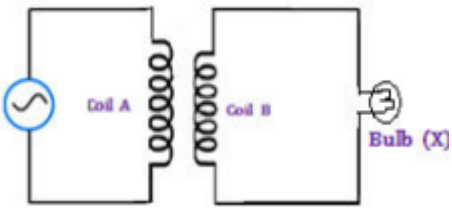
Subject- Physics

Chapter 6: Electromagnetic Induction

Work sheet-6 Time : 30 min

Q.1	Lenz's law is a corollary of the law of the conservation of----------
Ans.	
Q.2	State Lenz's Law. A metallic rod held horizontally along east-west direction, is allowed to fall under gravity. Will there be an emf induced at its ends? Justify your answer
Ans	
Q.3	Predict the directions of induced currents in metal rings 1 and 2 lying in the same plane where current I in the wire is increasing steadily.
Ans	

Q.4	Current in a circuit falls from 5.0 A to 0.0 A in 0.1 s. If an average emf of 200 V induced, give an estimate of the self-inductance of the circuit.
Ans	
Q.5	Define Mutual inductance of a coil. Write its S.I. unit.
Ans	
Q.6	State Faraday's laws of electromagnetic induction. Predict the polarity of the capacitor in the situation described below. 
Ans	

Q.7	Figure given below shows an arrangement by which current flows through the bulb (X) connected with coil , when a.c. is passed through coil . Explain the following observations (i) Bulb lights up (ii) Bulb gets dimmer if coil is moved upwards (iii) If a copper sheet is inserted in the gap between the coils how the brightness of the bulb will change ?
Ans	
Q.8	What is induced emf? Write Faraday's law of electromagnetic induction. Express it

	mathematically
Ans	

KENDRIYA VIDYALAYA SANGATHAN AHMEDABAD REGION

Class- XII (2023-24)

Subject- Physics

Chapter 7: -Alternating current

Work sheet-7 Time : 30 min

Q.1	What is meant by impedance ? Write an expression for impedance of L-C-R circuit. What is it's S.I. unit
Ans.	
Q.2	Define the term power factor. State the condition under which it is (i) maximum and (ii) minimum.
Ans	
Q.3	In a series LCR circuit with an ac source of effective voltage 50 V, frequency $\nu = 50/\pi$ Hz, R = 300 W, C = 20 μF and L = 1.0 H. Find the rms current in the circuit.
Ans	

Q.4	Describe briefly any two energy losses, giving the reason of their occurrence in actual transformer. How are these reduced ?
Ans	
Q.5	A series circuit is connected to an a.c. source having voltage = . Using phasor diagram, derive expressions for impedance, instantaneous current and its phase relationship to the applied voltage. Also draw graphs of and versus for the circuit
Ans	
Q.6	The primary coil of an ideal step-up transformer has 100 turns and transformation ratio is also 100. The input voltage and power are 220 V and 1100 W respectively. Calculate (a) the number of turns in the secondary coil. (b) the current in the primary coil. (c) the voltage across the secondary coil.
Ans	

Q.7	i) Explain with the help of a labelled diagram, the principle and working of an ac generator and obtain expression for the emf generated in the coil. (ii) Draw a schematic diagram showing the nature of the alternating emf generated by the rotating coil in the magnetic field during one cycle.
Ans	
Q.8	Draw a schematic diagram of a step up/step down transformer. Explain its working principle. Deduce the expression for the secondary to primary voltage in terms of the number of turns in the two coils. In an ideal transformer, how is this ratio related to the currents in the two coils ?
Ans	

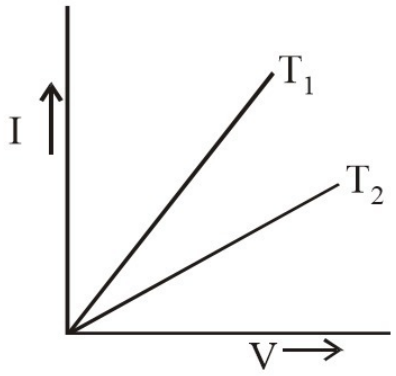
KENDRIYA VIDYALAYA AHMEDABAD REGION
Class- XII (2023-24)
Subject- Physics
Chapter 3: Current Electricity
Work sheet-5 Time : 30 min

Q 1. Give an example of a material each for which temperature coefficient of resistivity is

(*i*) positive (*ii*) negative.

Ans. (i) (ii)

Q 2. *I* – *V* graph for a metallic wire at two different temperatures, T_1 and T_2 is as shown in the figure. Which of the two temperatures is lower and why?



Ans.

Q 3. Define the terms (*i*) drift velocity, (*ii*) mobility.

Ans. (i) Drift Velocity:

(ii) Mobility:

Q 4. A resistance R is connected across a cell of emf ε and internal resistance r. A potentiometer now measures the potential difference between the terminals of the cell as V. write the expression for 'r' in terms of ε, V and R.

Ans.

Q 5. A set of '*n*' identical resistors, each of resistance '*R*' when connected in series have an effective resistance '*X*'. When they are connected in parallel, their effective resistance becomes '*Y*'. Find out the product of *X* and *Y*.

Ans.

Q 6 (*a*) State Kirchhoff's rules and explain on what basis they are justified.

(*b*) Two cells of emfs E_1 and E_2 and internal resistances r_1 and r_2 are connected in parallel. Derive the expression for the (*i*) emf and (*ii*) internal resistance of a single equivalent cell which can replace this combination.

Ans.

Q 7 Using the concept of free electrons in a conductor, derive the expression for the conductivity of a wire in terms of number density and relaxation time. Hence obtain the relation between current density and the applied electric field *E*.

Ans.

Q 8 Give the principle of Wheatstone bridge. Use Kirchhoff's rule to obtain the balance condition in a Wheatstone bridge.

Ans.

KENDRIYA VIDYALAYA AHMEDABAD REGION
Class- XII (2023-24)
Subject- Physics
Chapter 3: Current Electricity
Work sheet-6 Time : 30 min

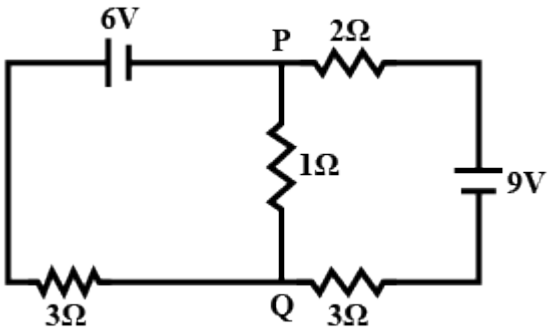
Que1- if current is flowing through a conductor of varying cross section which among the following will change and which will remain constant?

Electric current, 2- current density, 3- Drift speed.

Que2- Obtain the expression of Ohm's law analytically and hence state the factors affecting electric resistance of a conductor.

Que3- Two cells of emfs 1.5 V and 2.0 V having internal resistances 0.2 Ω and 0.3 Ω respectively are connected in parallel. Calculate the emf and internal resistance of the equivalent cell.

Que4- Find the magnitude and direction of current in 1Ω resistor in the given circuit.



Que5- Obtain the relation between electric Current and Drift velocity of electron.

Que6- . Draw a graph to show a variation of resistance of a metal wire as a function of its diameter keeping its length and material constant

Que7- (i) Derive an expression for drift velocity of free electrons.

(iii) How does drift velocity of electrons in a metallic conductor vary with increase in temperature? Explain.

Que8- . Two bulbs are rated (P_1, V) and (P_2, V). If they are connected (i) in series and

(ii) in parallel across a supply V, find the power dissipated in the two combinations in terms of P_1 and P_2.