

SUMMER VACCATION HOLIDAYS HOME WORK

SESSION 2026-27

Grade XII Physics

Q1. If a unit positive charge is taken from one point to another over an equipotential potential surface, then

(a) work is done on the charge (b) work is done by the charge

(c) work done is constant (d) no work is done.

Q2. An electric dipole is placed at an angle of 30° to a non-uniform electric field. The dipole will experience

(a) a translational force only in the direction of the field.

(b) a translational force only in a direction normal to the direction of the field.

(c) a torque as well as a translational force.

(d) a torque only.

Q3. A battery is connected to the conductor of non-uniform cross section area. The quantities which remains constant is

(a) Electric field only (b) drift velocity and electric field

(c) Electric field and current (d) current only.

Q4. If a wire is stretched to make it 0.1% longer, its resistance will

(a) Decrease by 0.2% (b) Decrease by 0.5%

(c) Increase by 0.5%. (d) Increase by 0.2%

Q5. Dielectric constant for a metal is

(a)1 (b) zero (c) infinite (d) 10

Q6. Using Gauss's law deduce the expression for the electric field due to uniformly charged infinitely long straight wire of linear charge density λ .

Q7. An electric dipole of length 4cm, 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 a charge of ± 8 nC.

Q8. Consider a uniform electric field $E=5 \times 10^4$ iN/C.

(a) What is the flux of this field through a square of 10 cm on a side

Whose plane is parallel to the y-z plane?

(b) What is the flux through the same square if the normal to its plane

Makes a 30° angle with the x-axis?

Q9. Two cells of emf 1.5 V and 2.0 V having internal resistance 0.2Ω and 0.3Ω respectively are connected in parallel. Calculate the emf and internal Resistance of the equivalent cell.

Q10. Draw a plot showing the variation of Electric field E and Electric potential V with distance r due to a point charge Q.

Q11. Obtain expression for the electric potential due to an electric dipole of dipole moment p at a general point.

Q12. (a) Derive an expression for the capacitance of a parallel plate capacitor, whose plates are separated by a dielectric medium?

(b) A parallel plate capacitor is charged to a potential difference V by a d.c source. The capacitor is then disconnected from the source. If the distance between the plates is doubled, state with reason how the following will change;

- (i) Electric field between the plates,
- (ii) Capacitance, and
- (iii) Energy stored in the capacitor.

Q13.(a) State Kirchhoff's rules. Explain briefly how these rules are justified.

(b) Draw a circuit diagram showing balancing of Wheatstone bridge. Use Kirchhoffs rules to obtain the balance condition in terms of the resistance of four arms of Wheatstone Bridge

(c) When is the Wheatstone Bridge most sensitive?.

Q14. Explain the term drift velocity of electrons in a conductor .Hence

obtain the expression for the current through a conductor in terms of drift velocity.

Q15. (a)Draw equipotential surfaces for (i)an electric dipole and (ii) two Identical positive charges placed near each other.

(b) In a parallel plate capacitor with air between the plates, each plate has an area of $6 \times 10^{-3}m^2$ and the separation between the Plates is 3 mm.

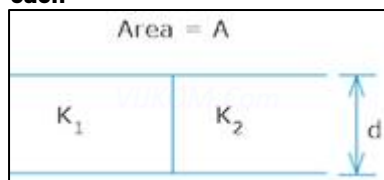
- (i) Calculate the capacitance of the capacitor.
- (ii) If the capacitor is connected to 100V supply, what would be the

The charge on each plate?

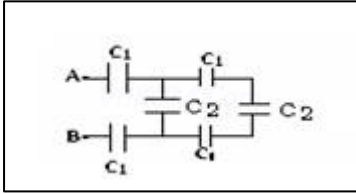
- (iii) How would charge on the plate be affected if a 3 mm thick mica

Sheet of $k=6$ is inserted between the plates while the voltage supply remains connected ?

Q16:-.Two dielectric slabs of dielectric constant K_1 and K_2 are filled in between the two plates, each of area A , of the parallel plate capacitor as shown in the figure. Find the net capacitance of the capacitor? Area of each plate $=A/2$.



Q17:- If C_1 is 2pf and C_2 is 3pf then, calculate the equivalent capacitance of the given network between points A & B?



Q18:- Mark the direction of current in the circuit as per Kirchoff's first rule. What is the value of main current in the shown network?



Q19. A silver wire has a resistance of 2.1Ω at 27.5°C , and a resistance of 2.7Ω at 100°C . Determine the temperature coefficient of resistivity of silver.

Q20. Three charges $-q$, Q and $-q$ are placed at equal distances on a straight line. If the potential energy of the system of these charges is zero, then what is the ratio $Q : q$?

*DO NCERT INTEXT AND EXERCISE QUESTIONS OF CHAPTER 1 , CHAPTER 2, & CHAPTER 3.

*Make a report of 12-15 pages on investigatory project.

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