

St. Mary's School, Dwarka
Holidays Homework
Class – XII
Subject: Physics
Week 4
Worksheet – 4

Objective:

- Revision of concepts
- Skills to carry out research and develop scientific aptitude
- Encouraging learning through experiences

Instructions:

- Neatly write all the answers in your Physics note book.
- Attempt the questions keeping in mind the weightage of each question.
- Assignment 'Summer Holiday Homework' will be created on TEAMS. PDF of handwritten work should be uploaded on it.

M.M: 25

Question number 1 to 25 are MCQ type questions . Please choose the correct option.

Q1. A sphere encloses an electric dipole within it. The total flux across the sphere is

- a) Zero
- b) half that due to a single charge
- c) dependent on the position of dipole
- d) dependent on the position of dipole

Q2. An electric dipole is placed in non-uniform electric field, then it experiences

- a) both a torque and a net force
- b) only a force but no torque
- c) only a torque but no net force
- d) no torque and no net force

Q3. The number of electrons in one coulomb charge are:

- a) 6.25×10^{23}
- b) 6.25×10^{21}
- c) 6.25×10^{18}
- d) 6.25×10^{19}

Q4. A hollow insulated conduction sphere is given a positive charge of $10 \mu\text{C}$. What will be the electric field at the centre of the sphere if its radius is 2 metres?

- a) $5\mu\text{Cm}^{-2}$
- b) $20\mu\text{Cm}^{-2}$
- c) $8\mu\text{Cm}^{-2}$
- d) Zero

Q5. The constant k in Coulomb's law depends upon

- a) nature of medium
- b) system of units
- c) intensity of charge
- d) both (a) and (b)

Q6. Two-point charges of $+3\mu\text{C}$ and $+4\mu\text{C}$ repel each other with a force of 10 N. If each is given an additional charge of $-6\mu\text{C}$, then the new force will be

- a) 2 N
- b) 4 N
- c) 5 N
- d) 7.5 N

Q7. The force per unit charge is known as :

- a) electric flux
- b) electric field
- c) electric potential
- d) electric current

Q8. When the distance between two charged particles is halved, then the force between them becomes:

- a) Half
- b) Double
- c) Four times
- d) None of these

Q9. The SI unit of Electric Flux is

- a) V/m
- b) Vm
- c) N/C
- d) None of these

Q10. An electric dipole is placed at an angle of 30° with an electric field intensity $2 \times 10^5 \text{ N/C}$. It experiences a torque equal to 4 Nm. The charge on the dipole, if the dipole length is 2 cm, is:

- a) 8 mC
- b) 4 mC
- c) 6 mC
- d) 2 mC

Q11. For a point charge, electric field at a point, distant r , varies as

- a) inversely proportional to r .
- b) varies inversely proportional to r^2
- c) varies inversely proportional to r^3
- d)) varies inversely proportional to r^4

Q12. Two charges of equal magnitude exert a force F on each other. If the charges are tripled and the distance is doubled, then the new force acting on each charge is

- a) $F/8$
- b) $F/2$
- c) $9F/4$
- d) $F/16$

Q13. When 10^{14} electrons are removed from a metal sphere. The charge on the sphere becomes

- a) $16\mu\text{C}$
- b) $-16\mu\text{C}$
- c) $10\mu\text{C}$
- d) -1.6C

Q14. A force of 2.25N acts on a charge of $15 \times 10^{-4}\text{C}$. The intensity of electric field at that point is then

- a) 150
- b) 15
- c) 1500
- d) 1.5

Q15. Gauss's law of electrostatics would be invalid if

- a) there were magnetic monopoles
- b) the speed of light was not a universal constant
- c) the inverse square law was not exactly true
- d) the electrical charge was not quantized

Q16. Which of the following is wrong?

Resistivity of a conductor is

- a) independent of temperature
- b) inversely proportional to temperature
- c) independence of dimensions of conductor
- d) less than resistivity of semiconductor.

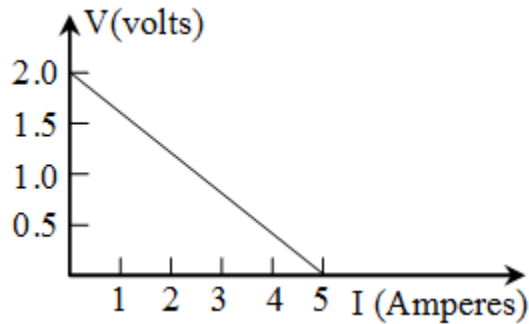
Q17. Drift velocity v_d varies with the intensity of electric field as per the relation

- a) $v_d \propto E$
- b) $v_d \propto 1/E$
- c) $v_d = \text{constant}$
- d) $v_d \propto E^2$

Q18. For measurement of potential difference, a potentiometer is preferred over voltmeter because

- a) potentiometer is more sensitive than voltmeter
- b) the resistance of potentiometer is less than voltmeter
- c) potentiometer is cheaper than voltmeter
- d) potentiometer does not take current from the circuit

Q19. For a cell, the graph between the potential difference (V) across the terminals of the cell and the current (I) drawn from the cell is shown in the figure.



The e.m.f. and the internal resistance of the cell are

- a) 2V, 0.5 Ω
- b) 2V, 0.4 Ω
- c) >2V, 0.5 Ω
- d) >2V, 0.4 Ω

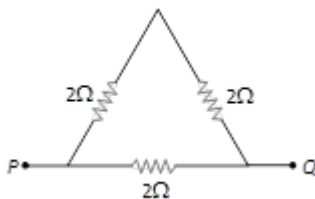
Q20. A Daniel cell is balanced on 125cm length of a potentiometer wire. Now the cell is short – circuited by a resistance 2 ohm and the balance is obtained at 100cm. The internal resistance of the Daniel cell is

- a) 0.5 ohm
- b) 1.5 ohm
- c) 1.25 ohm
- d) 4/5 ohm

Q21. When there is an electric current through a conducting wire along its length, then an electric field must exist

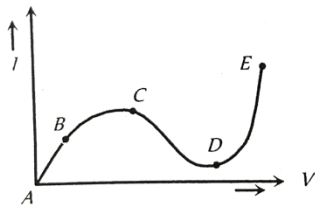
- a) Outside the wire but normal to it
- b) Outside the wire but parallel to it
- c) Inside the wire but parallel to it
- d) Inside the wire but normal to it

Q22. Three resistors each of 2 ohm are connected together in a triangular shape. The resistance between any two vertices will be



- a) 4/3 ohm
- b) 3/4 ohm
- c) 3 ohm
- d) 6 ohm

Q23. From the graph between current I and voltage V shown below, identify the portion of the graph corresponding to negative resistance



- a) AB
- b) BC
- c) CD
- d) DE

Q24. Which of the following characteristics of electrons determines the current in a conductor?

- a) Drift velocity alone.
- b) Thermal velocity alone.
- c) Both drift velocity and thermal velocity.
- d) Neither drift nor thermal velocity.

Q25. Ohm's law is true

- a) For metallic conductors at low temperature
- b) For metallic conductors at high temperature
- c) For electrolytes when current passes through them
- d) For diode when current flows.