

16th July

Home Assignment1.

* Cyclotron is used to accelerate

- (a) some kind of charged particle.
- (b) Any kind of charged particle.
- (c) Both charged and neutral particle.
- (d) None of these.

⇒ (a) some kind of charged particle.

* The force that accelerates the particles in the cyclotron is

- (a) only electrostatic force
- (b) only magnetic force
- (c) both electrostatic and magnetic force called Lorentz force.
- (d) none of these.

⇒ (c) both electrostatic and magnetic force called Lorentz force.

* Choose the correct option:

- (a) Conductor shields any charge within it from electric field created outside the conductor.
- (b) a conductor shield any charge within from magnetic field created outside the conductor.
- (c) a conductor shield any charge within it from both electric and magnetic field created

outside the conductor.

(d) None of this

⇒ (a) Conductor shields any charge within it from electric field created outside the conductor.

* Inside a dee.

(a) The particle's speed changes.

(b) The particle's velocity changes.

(c) The particle velocity does not change.

(d) The particle's kinetic energy changes.

⇒ (c) The particle velocity does not change.

* What is the formula for maximum speed attained by a charge particle in a cyclotron.

(a) $v_{\max} = \frac{qBR}{m}$

(b) $v_{\max} = \frac{mBR}{q}$

(c) $v_{\max} = \frac{qR}{Bm}$

(d) None of these.

⇒ (c) $v_{\max} = \frac{qR}{Bm}$

* In a cyclotron -

- (a) any speed can be obtained by a charge particle by choosing suitable dee radius.
- (b) maximum speed attained by a charged particle is limited by the relativistic variation of mass with speed.
- (c) electrons are best particles to be accelerated.
- (d) none of these.

⇒ (d) None of these

Q.

* Galvanometer was named after

- (a) Italian electricity researcher Luigi Galvani
- (b) Italian electricity researcher Luigi Galvani who discovered galvanometer.
- (c) Italian electricity researcher Luigi Galvani who discovered that a current carrying conductor produces magnetic field.
- (d) None of these

⇒ (a) Italian electricity researcher Luigi Galvani

* Galvanometer is used

- (a) to detect and measure small electric current.
- (b) to detect but not to measure small electric current.
- (c) to measure any amount of electric current.
- (d) None of these.

⇒ (a) to detect and measure small electric current,

* Choose the correct option for current sensitivity of galvanometer.

$$(a) S_i = \frac{\theta}{i} = \frac{NBA}{c}$$

$$(b) S_i = \frac{\theta}{i} = \frac{NB}{cA}$$

$$(c) S_i = \theta i = \frac{c}{NBA}$$

(d) None of these

$$\Rightarrow (a) S_i = \frac{\theta}{i} = \frac{NBA}{c}$$

* Increasing the current sensitivity.

(a) surely increases the voltage sensitivity.

(b) may not change the voltage sensitivity

(c) never changes the voltage sensitivity

(d) None of these.

⇒ (c) never changes the voltage sensitivity.

* Choose the correct option for design formula of galvanometer

$$(a) i = \left(\frac{c}{NBA} \right) \theta$$

$$(b) i = \left(\frac{cA}{NB} \right) \theta$$

$$(c) \quad B i = \left(\frac{C}{B N D \theta} \right)$$

(d) None of these

⇒ (d) None of these

* In the galvanometer the radial magnetic field makes the magnetic torque,

(a) directly proportional to $\sin \theta$

(b) independent of θ

(c) zero

(d) None of these.

⇒ (c) zero.

3-

* Assertion: A steady angular deflection is produced by the spring to produce a counter torque which balances the magnetic torque.

Reason: In order to improve the strength of the magnetic field and to make the field radial a soft iron cone is placed inside the coil.

⇒ (b) Both assertion and reason are true but reason is not a correct explanation of the assertion.

* Assertion: Moving coil Galvanometer uses phosphor-bronze wire for suspension.

Reason: The phosphor-bronze wire has a small couple per unit twist.

⇒ (a) Both assertion and reason are true and the reason is the correct explanation of the assertion.

* Assertion: A wire bent into an irregular shape with the points P and Q fixed. If a current I is passed through the wire, then the area enclosed by the irregular portion of the wire increases.

Reason: Opposite currents carrying wires repel each other.

⇒ (a) Both assertion and reason are true and the reason is the correct explanation of the assertion.

* Assertion: When a magnetic dipole is placed in a non-uniform magnetic field, only a torque acts on the dipole.

Reason: Force would also act on dipole if magnetic field were uniform.

⇒ (d) Both assertion and reason are false.

* Assertion: If the resistance of shunt of an ammeter is increased, the range of ammeter is reduced.

Reason: If the series resistance of a voltmeter is increased, the range of voltmeter is increased.

⇒ (b) Both assertion and reason are true but reason is not a correct explanation of the assertion.

* Assertion: Galvanometer cannot as such be used as an ammeter to measure the value of the current in a given circuit.

Reason: Galvanometer gives a full-scale deflection for a current of the order of micro-ampere.

⇒ (a) Both assertion and reason are true and reason is the correct explanation of the assertion.

4. MCQ

1) A sensitive galvanometer like a moving coil galvanometer can be converted into an ammeter or a voltmeter by connecting a proper resistance to it, which of the following statements is true?

⇒ (d) an ammeter is connected in series in a circuit and the current it is negligible.

A galvanometer can be converted into a voltmeter by connecting a high resistance in series with it, while it can be converted into ammeter by connecting a low resistance in its parallel. Ammeter is always connected in series with the source and current through it is always maximum, so statement is wrong.

2) The resistance of an ideal voltmeter is

⇒ (c) infinity.

A voltmeter is always used in parallel in circuit to get an accurate value of voltage across some element, the resistance of voltmeter is kept very high so that it can draw minimum amount of current from circuit and hence can measure accurate voltage.

3) Two identical galvanometers are connected into an ammeter and a milliammeter. Resistance of the shunt of milliammeter through which the current passes through will be -

⇒ (c) more

Greater the shunt, smaller the range of ammeter. The shunt is connected in parallel with the galvanometer. The shunt of greater resistance will draw less current and the current passing through coil of galvanometer will be more.

4) Choose the correct option for design formula of galvanometer.

⇒ (d) None of these

5) Choose the correct option for current sensitivity of galvanometer.

⇒ (a) $s_i = \frac{\theta}{i} = \frac{NBA}{C}$