

HW

1.

Particle

- i) Cyclotron is used to accelerate some kind of charge.
- ii) The force that accelerates the particles in the cyclotron is both electrostatic and magnetic force called Lorentz force.
- iii) Conductor shields any charge within from electric fields created outside the conductor.
- iv) Inside a dee the particle's kinetic energy changes.
- v) Max speed attained by a charged particle in a cyclotron =  $v_{\max} = \frac{qBR}{m}$
- vi) In a cyclotron maximum speed attained by a charged particle is limited by the relativistic variation of mass with speed.

2

- i) Galvanometer was named after.
  - (a) Italian electricity researcher Luigi Galvani.
- ii) Galvanometer is used
  - (a) to detect and measure small electric current.
- iii) Choose the correct option for current sensitivity of galvanometer
  - (a)  $S_i = \frac{\theta}{i} = \frac{NBA}{c}$

iv  
(c) Increasing the current sensitivity never change the voltage sensitivity

v  
(d) Choose the correct option for design formula of galvanometer  
none of the above

vi  
(c) In the galvanometer the radial magnetic field makes the magnetic torque zero

### 3 Assertion & Reason

i Assertion :- A steady angular deflection is produced by the spring to produce a counter torque which balance the magnetic torque.

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

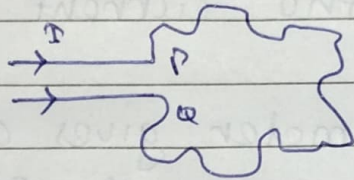
A (a) Both assertion & Reason are correct & the reason is the correct explanation for Assertion

ii Assertion :- Moving coil Galvanometer uses phosphor-bronze wire for suspension.  
Reason :- The phosphor-bronze wire has a small couple per unit twist.

A (a) Both assertion & reason are correct and Reason is the correct explanation of Assertion.

- iii) A wire bent into an irregular shape with the points P & 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 current carrying wires repel each other.



- 1a) Both Assertion & Reason are true and reason is the correct explanation of assertion.

Explain:- Every current element on the irregular shape wire having symmetric elements carrying current in opposite direction is causing repulsion and hence the area enclosed by the wire increases.

- iv) 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 & reason are false

- v) Assertion:- If the resistance of shunt of an ammeter is increased, the range of ammeter is reduced.

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

(b) Both A and R are true but R is not the correct explanation of A.

vi 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 A & R are true & R is the correct explanation of A

Explain:- Galvanometer is very sensitive device, given a full scale deflection for current of the order of micro-ampere.

Also for measuring current the galvanometer has to be connected in series and as it has a large resistance. This will change the value of the current in this circuit. To overcome these difficulties are attached a small resistance,

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MCQs

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 statement is true?

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

2  
(c) The resistance of an ideal voltmeter is  
Infinity

3  
(c) Two identical galvanometer are converted into an ammeter and a milliammeter. Resistance of the shunt of milliammeter through which the current passes through will be  
more

4  
(d) Choose the correct options for design formula of galvanometer.  
none of these

5  
(a) Choose the correct option for current sensitivity of galvanometer.  
$$S_i = \frac{\theta}{I} = \frac{NBA}{C}$$