10. Draw a schematic sketch of a cyclotron.
[Delhi 2008, 2011C, 2012, All India 2013,2014]

11. Draw a labelled diagram of a moving coil galvanometer.
[Foreign 2012, All India 2014]

12. Sketch the magnetic field lines for a finite solenoid.
[Foreign 2010]

13. Draw magnetic field lines when a (i) diamagnetic, (ii) paramagnetic substance is placed in an external magnetic field.
[Delhi 2010]

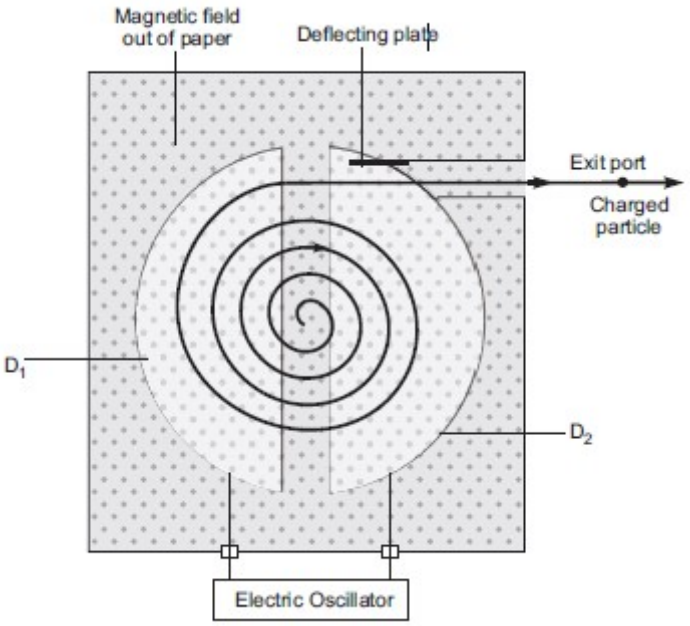
14. Draw the magnetic field lines due to a current carrying loop.
[Foreign 2010, Delhi 2013C]

15. The current flowing through an inductor of self inductance L is continuously increasing. Plot a graph showing the variation of
(i) Magnetic flux versus the current
(ii) Induced emf versus dI/dt
(iii) Magnetic potential energy stored versus the current. [Delhi 2014]

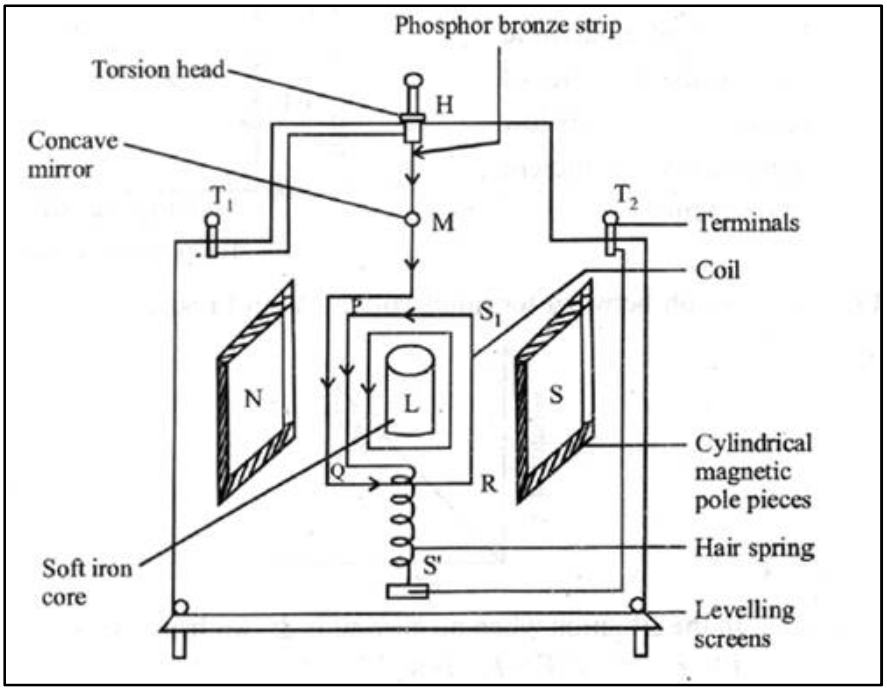
16. Draw the magnetic field lines due to a circular wire carrying current *I*.
[All India 2016]

SOLUTIONS

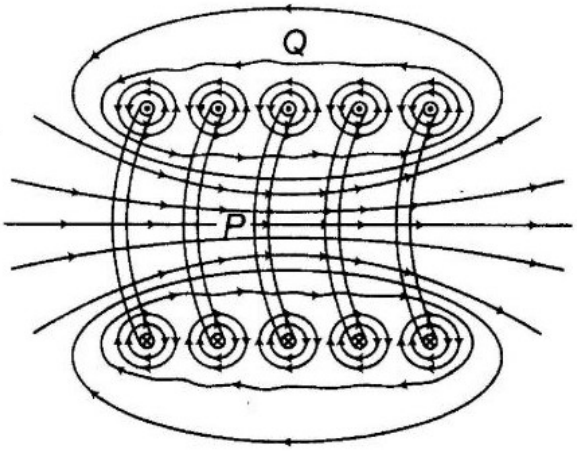
10. Schematic sketch of a Cyclotron.



11. Moving coil Galvanometer.



12. Magnetic field lines due to a finite solenoid has been shown below.



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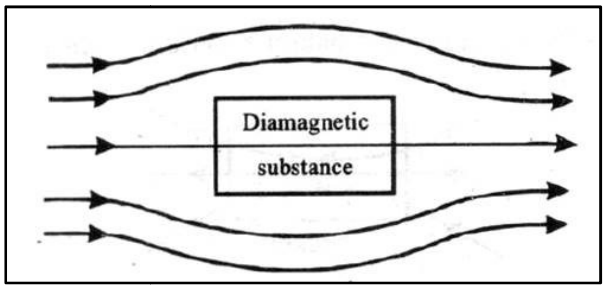
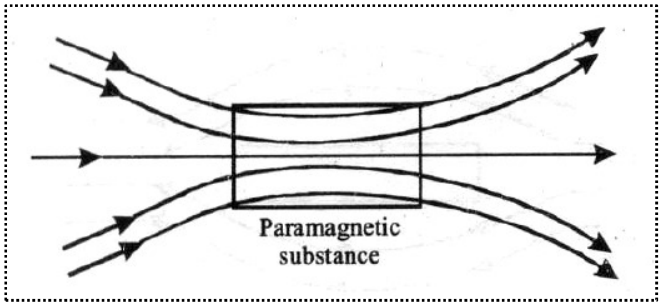
13. (i) Behavior of magnetic field lines when diamagnetic substance is placed in an external field.



(ii) Behavior of magnetic field lines when paramagnetic substance is placed in a external field.



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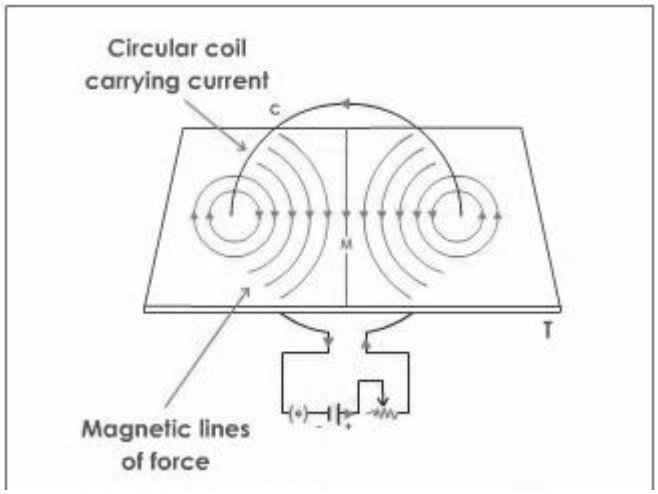
14. Magnetic lines of force due to current carrying coil have been shown in the diagram given below.



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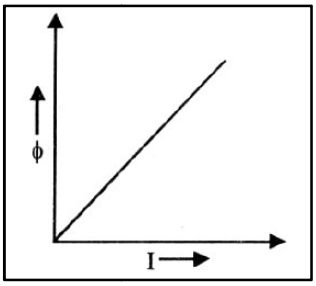
15. (i) Since $\phi = LI$

where, I = Strength of current through the coil at any time

ϕ = Amount of magnetic flux linked with all turns of the coil at the time

and, L= Constant of proportionality called coefficient of self induction

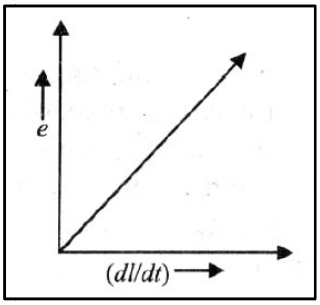


(ii) Induced emf,

$$e = -\frac{d\phi}{dt} = -\frac{d}{dt}(LI)$$

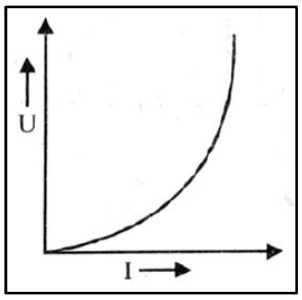
i.e., $e = -L\frac{dI}{dt}$

[drawn considering only magnitude of e]



(iii) Since magnetic potential energy is given by,

$$U = \frac{1}{2}LI^2$$



16.