Quadrant IV – Assessment (Module –wise)

Programme: T.Y.B.Sc

Subject: Physics

Paper Code: PYC 107

Paper Title: Electromagnetic Theory –II and Special Theory of relativity

Unit: 2 Magnetic field in material media

Module Name: Magnetic circuits

Module No: 10

Name of the Presenter: Sanjay Jahagirdar

MCQ:

Completion type (fill-in-the-blanks)

Short Answer – I (short notes - say 20 to 50 words)

1) Draw analogy between electric circuit and magnetic circuit.
2) Bring out differences between electric circuit and magnetic circuit.

Short Answer – II (extended – say 50 to 100 words)

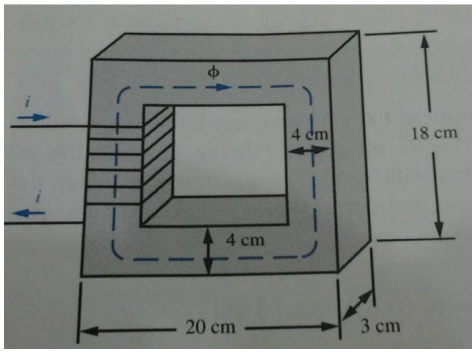
Matching type

Numerical/Problems to Solve

1) For a toroid coil consisting of 500 turns, let the relative permeability μ_r = 1500. average radius R=0.1m = 10 cm , and cross-sectional radius r=0.02m=2cm. What is the current required to establish a flux density B=0.5 T?
2) For a toroid , suppose the iron core has an average radius of 0.1 m, a cross-sectional radius of 0.02 m, and a relative permeability of 1200.

(a) Find the reluctance of the flux path. (b) Determine the mmf when the flux in the core is 1mWb. (c) What is the current in the coil for the case that it has 332 turns.

3) Consider a rectangular iron core, which has a relative permeability of μr= 1500. Determine the reluctance and the magnetic flux in this core when a 200 turns coil has a current of 2A.



4) Problem no. 9.18 page 219 Foundations of electromagnetic theory by Reitz and Milford
5) Problem no. 9.19 page 219 Foundations of electromagnetic theory by Reitz and Milford

Self-reflection:

Explore numerous applications of magnetic circuits in various field of science and technology, from medicine to research …

Create something new (higher order cognition)

1) You can build a magnetic circuit of your own. There is an experiment that is included in the syllabus. Try to construct a series and parallel magnetic circuit and find out reluctance, mmf and magnetic flux experimentally. Confirm how close there values are with the theoretically calculated one.