Hysteresis loss: When an alternating current passes through coil of transformer, the core gets magnetized and demagnetized alternatively. In each cycle of magnetization and demagnetization, the loss of energy proportional to the area of the hysteresis loop takes place. This also reduces the efficiency of transformer. To minimize the hysteresis loss, soft iron having a narrow loop area is used as the core of transformer.

Eddy current loss (Iron loss): Due to induced emf in the core; eddy current flows in the core of transformer which produces heating effect in the core. Such type of energy loss in transformer is called eddy current loss. To minimize the loss due to eddy current laminated sheets of soft iron is used as the core of transformer. The lamination between the sheets reduces the eddy current in the core of transformer.

Humming loss: When alternating current passes through the coil of transformer, the core gets magnetized and demagnetized repeatedly. During magnetization, the core slightly expands and during demagnetization it returns into its original direction. This phenomenon is called the ***Magnetostriction effect***. Due to repeated expansion and compression, the core vibrates producing humming noise. This causes wastage of energy and reduces the efficiency of transformer. To minimize the humming noise, the coil and the core should be firmly held in the transformer.

Questions:

Conceptual question:

1. Lenz law follows the principle of conservation of energy. Explain.
2. A copper ring is held horizontally and a bar magnet is dropped through the copper ring, will the acceleration of the falling magnet be equal to, less than or greater than the acceleration due to gravity?
3. A copper ring is suspended by a thread in a vertical plane. One end of a magnet is brought horizontally towards the ring. How will the position of the ring be affected?
4. An induced current has no direction of its own. Explain?
5. What is self-induction? Why is an inductance coil made of copper?
6. If the number of turns of a solenoid is doubled, keeping the other factors constant, how does the self-inductance of the solenoid change?
7. Two closely wound circular coils have the same number of turns, but one has twice the radius of the other. What is the ratio of self-inductances of the two coils?
8. Can a DC voltage be stepped up or down by using transformer?
9. The laminated sheets are used in the core of the transformer, why?
10. Why soft iron is used as the core of the transformer?
11. An electric bulb connected in series with an inductor does not light up full brilliance
12. immediately when the current is switched on. Why?
13. A metal piece and a stone are dropped from the same height near the earth surface.
14. Which one will reach the earth earlier?
15. Why does the core of the transformer get heated up under operation?
16. What are eddy currents? Write down its uses.
17. What are the different power losses in a transformer? What measures do you take to minimize these losses?