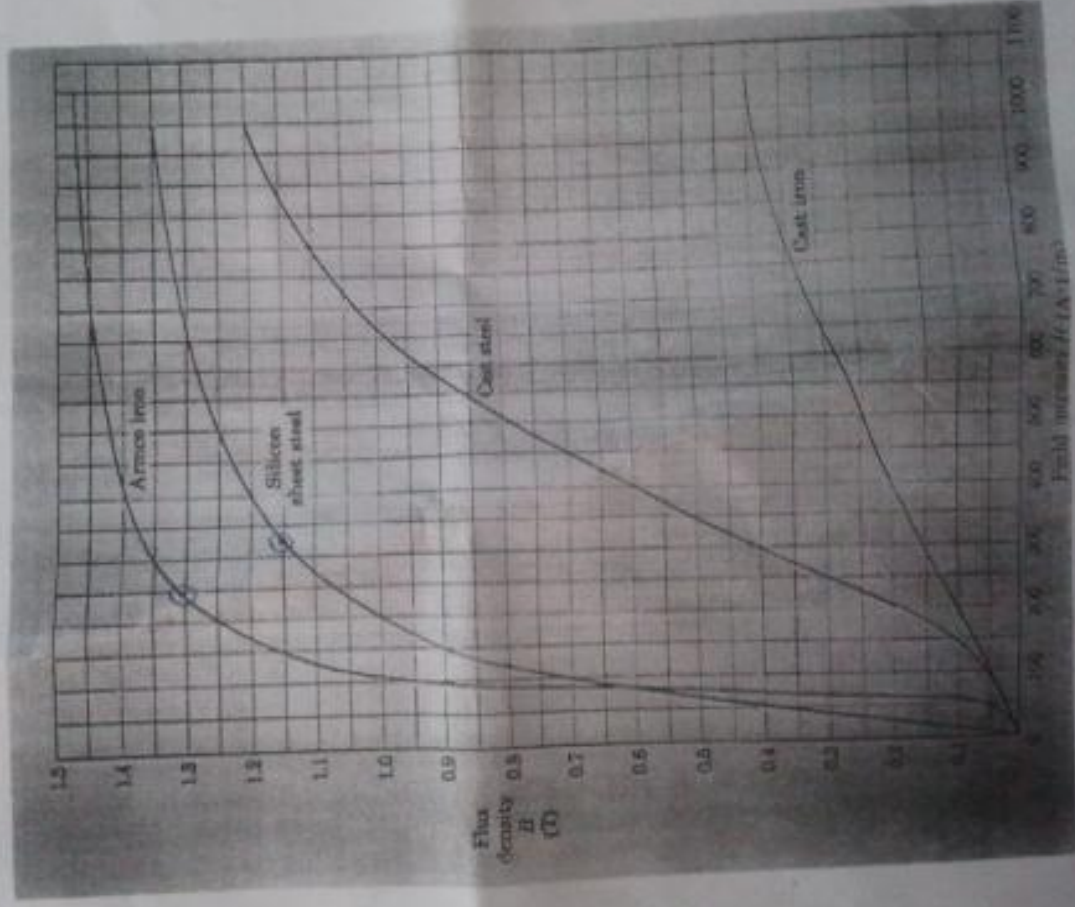


Figure 3



$\mu_0 = 4\pi \times 10^{-7}$ henrys per meter

Que 1.

List five magnetic field quantities with their symbols and units. (5)

Quest 2.

Sketch analogous magnetic and electric circuits. List the 4 analogous terms. (8)

Que 3.

For the core shown in figure 1, $a=5\text{cm}$, $c=10\text{cm}$, $b=d=20\text{cm}$, $N=200$. Predict the current required to establish a flux of 6.5 mWb across (a) a 5mm air gap, (b) if there is no air gap, for core made of

- Armco Iron
- A magnetic material that has relative permeability of 5600 (for flux densities less than 0.8T) and it saturates at 1.4T (2+2+3+3)

Que 4.

Draw three transformer models of increasing precision. Explain how the model parameters represent the transformer characteristics. (6)

Que 5.

A $250:1000\text{-V}$, 60-Hz transformer is tested. Open-circuit data are: $V_1=250\text{V}$, $I_1=0.51\text{A}$, $W_1=31.25\text{W}$, $V_2=1000\text{V}$. Short-circuit data are: $V_1=7.9\text{V}$, $I_1=20\text{A}$, $W_1=50\text{W}$. Determine the values of the hybrid parameter model. (8)

Que 6.

- Draw the wiring diagrams for separately excited, shunt connected, series connected and compound connected generators.
- Draw speed-torque characteristics of shunt motor with constant applied voltage. (6+3)

Que 7.

In figure 2, the total current $I=10\angle 0^\circ\text{A}$ and the current through $X_c=-20\angle 2$ is $I_x=4\angle 127^\circ\text{A}$. Show these on the phasor diagram. Determine R and X . (4+2+2)

Que 8.

In figure 3, when voltage $v_1=V_m(0.5+\sin\omega t)\text{V}$, the high resistance dc voltmeter VM reads 70V .

- What functions are performed by each section of the circuits?
- How is v_1 related to v_2 ?
- Determine V_m and define the function of this instrument. (6)



Figure 1

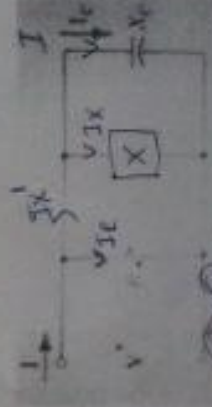


Figure 2

Figure 1