

Prairie View A&M University
Roy G. Perry College of Engineering
Electrical and Computer Engineering Department
Preliminary Exam
Spring 2019

Name: _____ Student ID #: _____

- I. A ferromagnetic circuit has a magnetic core with infinitely high relative permeability. It has three legs, and air gaps of 2 mm and 1 mm are cut from sections A and C as shown in the following figure. A coil is wound on the center leg B, and it has 300 turns and a resistance of 3 ohms. The magnetic core has a 5 x 5 cm uniform cross-sectional area. A DC voltage is applied to the coil.

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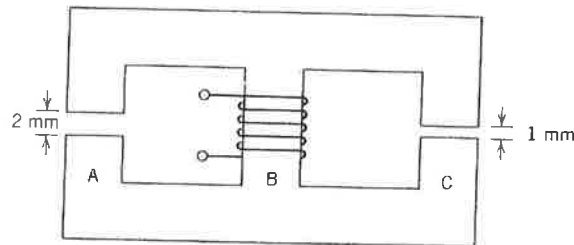
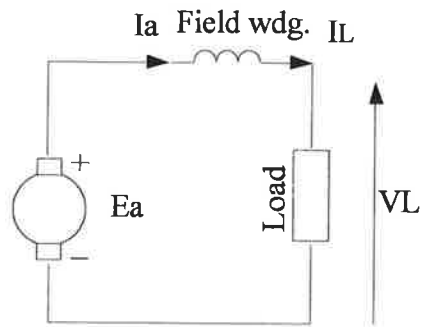


FIGURE 4.22

Determine the value of the applied DC voltage that will produce a flux density of 0.75 T in the right leg

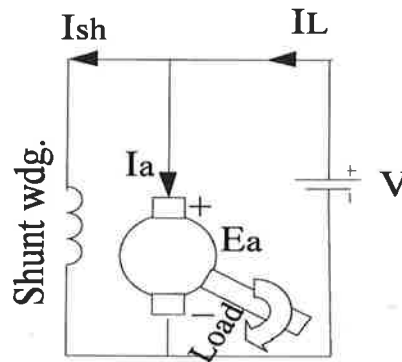
2- a) A dc generator has 8 poles, wound as lap then rewound as a wave, calculate the electrical motive force generated in each case if you know that the number of conductors in the armature slots is 240. The magnetic flux of each pole 0.04 Wb. It runs at 1200 rpm.

- b) A dc generator feeding a load of current 20A and voltage 220V. Calculate the electrical motive force generated in the armature, if it is known that the resistance of the armature 0.02 ohms and the resistance of the field 0.01 ohm.
- c) A dc generator feeding a purely resistive load, if it is known that the current produced by the generator is 20 amperes, the resistance of the field 0.2 ohms and the resistance of the armature 0.1 ohms and the electric motive force generated 230V. Calculate load resistance
- d) A dc generator feeds a load consisting of 22 lamps each lamp capacity 100 W, 220 V, calculate the amount of electrical motive force generated if the resistance of the armature is known as 0.2 ohms while ignoring the resistance of the field winding.

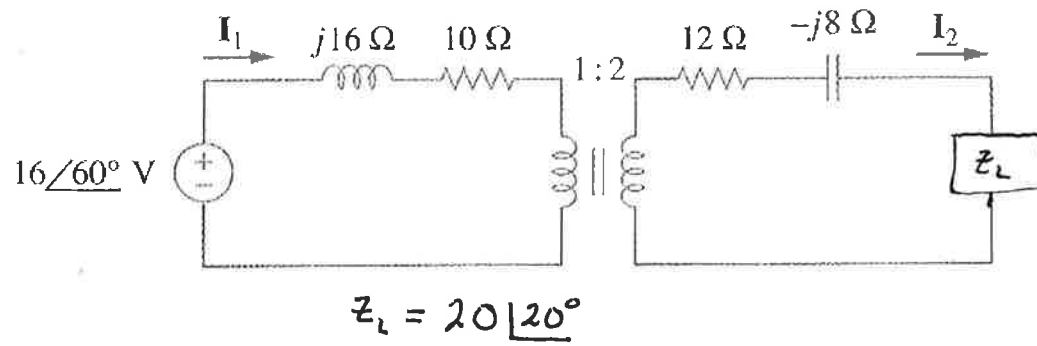


3- a) A shunt motor operates at 220 V and draws a current of 22 A. If the resistance of shunt 110 ohm and of armature 0.2 ohm, calculate the back-electric motive force.

b) A Four-pole dc shunt motor, 220V, the number of conductors in the armature 1000, the typical winding coil, the motor draws 52 A, the magnetic flux per pole 0.02 Wb, the armature resistance 0.2 Ω and shunt resistance 110 ohm. Calculate motor speed.



4. For a transformer having the following equivalent circuit, determine the values of the currents I_1 and I_2 .



5. For the following network find the value of
- Current I_g as supplied by the 8 volt source
 - Real and Reactive power as delivered by the 8 volt source

