Answer on Question 39907, Physics, Electromagnetism Question: A metal ring (radius=1/2m) with its plane normal to a uniform magnetic field B (=2/10 tesla) carries a current of 100 amp. Find the tension developed in the ring.
Solution. First, let us relate the tension force with the force that acts on the little piece of that ring dl from the magnetic field. The difference in tension forces that act on the different ends of that piece is actually force with which magnetic field is acting, and it is amperes force. The force from the magnetic field F acts in the direction from the center of ring and the tension forces acts perpendicular to the ring at every point. Thus, if the piece is $dl = R\theta$ long, that this difference will be $F_{ampere} = F_{tension} \sin\theta$ or just $F_{tension}\theta$ as θ is small. The force it self is actually Amperes force and can be found as

$$F_{ampere} = BIdl = BIR\theta$$

Hence, the tension force is

$$F_{tension} = \frac{F_{ampere}}{\theta} = BIR = 2/10 \cdot 100 \cdot 1/2 = 10N$$