Menoufiya University

Faculty of Engineering, Shebin El-Kom

Department of Civil Engineering

Second Semester Examination, 2015-2016

Examiner: Dr. Ahmed Fathi Abdou



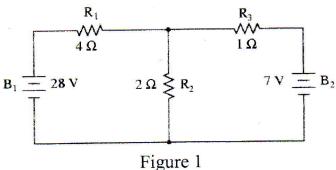
Subject: Electric Circuits Code: ELE 319

Year: 1st year

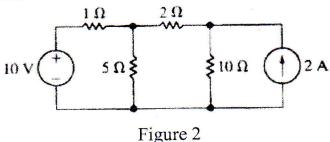
Time Allowed: 3 hours Total Marks: 50 marks Date of Exam: 08/06/2016

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1- Find the current in the 2 Ω resistance of the circuit shown in Figure 1 using Norton's Theorem. (10 Marks)



- 2- Find the current in the 2 Ω resistance of the circuit shown in Figure 2 using: (20 Marks)
 - (a) Superposition theorem, and
 - (b) Thevenin's theorem.



3- An iron-ring of mean length 30 cm is made of three pieces of cast iron, each has the same length but their respective diameters are 4, 3 and 2.5 cm. An air-gap length 0.5 mm is cut in the 2.5 cm piece. If a coil of 1000 turns is wound on the ring, find the value of the current it has to carry to produce a flux density of 0.5 Wb/m² in the air gap. B/H characteristic of cast-iron may be drawn from the following table: (10 Marks)

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$B (Wb/m^2)$:	0.1	0.2	0.3	0.4	0.5	0.6	
H (AT/m):	280	620	990	1400	2000	2800	

Permeability of free space = 4π * 10⁻⁷ H/m. Neglect leakage and fringing.

- 4- An inductor having a resistance of a 10 ohm is connected to a 240 V, 50 Hz alternating current supply. The current flowing through the coil is found to be 12 A. (10 Marks)
 - a. Calculate the impedance, inductive reactance and inductance of the inductor.
 - b. Determine the phase angle between the current and the applied voltage.
 - c. Draw a phasor diagram showing the relation between the current and voltages across the circuit components.

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