



COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electrical & Control Engineering

Lecturer : Dr. Mostafa Saad

Course : Electrical Drives II

Course Code : EE 522

Marks : 40

Date : 4 / 6 / 2016

Time : 2 hour

Answer all the following questions

Question 1: (B.2)

a) With the aid of neat sketches, develop the 2-coil DC machine representation in d-q form.

b) Find out the torque equation from d-q model for the DC machine of question (b).

(5 marks)

Question 2: (A.13)

a) Sketch the phasors and derive the transformation of three-phase balanced sinusoidal variables from abc frame to d-q frame

b) Draw the block diagram of a three-phase (PLL)

c) Explain and show the related waveforms of the PLL operation under distorted utility conditions

(7 marks)

Question 3: (B.2)

For a three-phase symmetrical induction motor,

i. Deduce the voltage equations expressed in terms of machine variables referred to the stator windings

ii. Deduce the voltage equation in arbitrary (dq) reference frame variables

iii. Draw the dq reference-frame equivalent circuits

(10 marks)

Question 4: (A.29)

a) Deduce the indirect rotor flux-oriented control technique and draw the related generic control block diagram

b) State the disadvantage of the direct field-oriented control methods

c) Deduce the indirect field-oriented control methods and draw the related control block diagram

(10 marks)

Question 5: (C.3, A.4)

Obtain the following design information for the stator of a 30 kW, 440 V, 3-phase, 6 pole, 50 Hz delta connected, squirrel cage induction motor;

i. Main dimension of the stator

ii. No. of turns/phase

iii. No. of stator slots

iv. No. of conductors per slot.

Assume suitable values for the missing design data.

(8 marks)

Members of course Examination Committee:		Signature:	Date:
Lecturer:	Dr. Mostafa Saad		25 / 6 / 2016
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