

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

ELECTRICAL ENGINEERING DEPARTMENT

Dr. Ibrahim O. Habiballah

EE 360

MAJOR EXAM # 2

December 26, 2005

5:00 - 7:00 pm

Section:

Student Name:

Student I.D.#

Serial #

Question # 1	
Question # 2	
Question # 3	
Question # 4	
Total	

Q. 1) A three-phase 69 kV feeder is connected to a three-phase load rated at 1000 kVA and 4.16 kV through a **three identical single-phase ideal** transformers. Specfiy the voltage, current, (at both sides) and kVA ratings of each transformer when they are connected as

- (a) wye-wye.
- (b) wye-delta.
- (c) delta-wye.
- (d) delta-delta.

(25 Marks)

Q. 2) A 20 hp, 240 V, 4-pole, 1700 rpm, DC shunt motor has armature and field resistances of 0.2 Ohm and 240 Ohm, respectively. The efficiency of the motor at rated operating condition is 88%. Determine the following:

- (a) the rotational losses.
- (b) the induced voltage.
- (c) the mechanical developed power.
- (d) the shaft torque.

(25 Marks)

Q. 3) A 3-phase, 60 Hz, 6-pole, Y-connected synchronous generator has a synchronous reactance of 4 Ohm and a terminal voltage of 2300 V. The field current is adjusted so that the excitation voltage is 2300 V at a power (torque) angle of 15° . Neglect the armature resistance and rotational losses,

- (a) determine the stator current.
- (b) determine the power factor.
- (c) determine the output power.
- (d) determine the torque required to drive the machine.
- (e) is the machine supplying or absorbing reactive power.

(25 Marks)

Q. 4) A 6-pole, 50-Hz, polyphase induction motor drives a rated load at 950 rpm. Find

- (a) the speed of the stator magnetic field with respect to the stator.
- (b) the speed of the stator magnetic field with respect to the rotor.
- (c) the speed of the rotor magnetic field with respect to the stator.
- (d) the speed of the rotor magnetic field with respect to the rotor.
- (e) the speed of the rotor with respect to the stator.

(25 Marks)