Minoufiya University Faculty of Engineering Shebin El-Kom Second Semester Examination Academic Year: 2012-2013 Third Year	Electrical Engineering Department Course: Electrical Testing (1) Code No.: ELE305 Time allowed: 2 Hours Total Marks: 50 Date: 22 / 6 / 2013

Minufiya University

Question (1) **CONTROL SYSTEMS** **[12.5 Marks]**

a) Describe steps to obtain the time constant of a first system experimentally and draw the time response of a first order linear system to a step change

b) From your lab Experiments and observations of the response of the second order systems:
- Sketch a graph showing the Maximum overshoot, rise time peak time, and settling time
- Draw a graph showing the effects of the damping ratio on the system response to a input step change

c) Describe how could you obtain the phase and gain margin of a type 1 control system experimentally

d) In a table, write the steady state errors of type 0, type 1 and type 2 control systems to unit stem, ramp and velocity inputs.

Question (2) **POWER ELECTRONICS** **[12.5 Marks]**

a) Explain an experiment which shows the operations of a single-phase half-controlled bridge rectifier supplying an inductive load.

b) Sketch the power circuit and the output voltage waveforms of:

i- a boost chopper.

ii- a square wave inverter.

Question (3) **POWER SYSTEMS** **[12.5 Marks]**

a) Discuss the reactive power compensation and different types of compensated transmission lines, asses your answer with circuit diagram and curves.

b) Define the different arrangements for high voltage DC transmission.

c) How much the DC transmission Capacity of an existing 3-phase double circuit AC line can be increased.

Question (4) **ELECTRICAL MACHINES** **[12.5 Marks]**

a) Explain and draw a parallel operation of two synchronous generators and draw the V-curves for synchronous motor.

b) Sketch a representative torque-slip characteristic of squirrel-cage induction motor.

c) List the types of losses in an induction motor and draw the power-flow diagram for its.