COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electrical and Control Engineering

Lecturer : STAFF

Course : Electrical Power & Machines **Marks : 40**

Course Code : EE 328 **Start time: 14:00**

Date : 17/1/2015 **Time : 2 hour**

Final Examination paper

1.a) State how you can control the speed of a dc motor. **(3 Marks)**

1.b) A dc shunt motor has armature and field resistances of 0.5 and 250Ω, respectively. When the motor runs at 900 rpm, it draws 18 A from a 250 V source, calculate: **(7 Marks)**

i. The rotational speed if a 2.5 Ω resistor is connected in series with the motor
ii. The developed power and developed torque at both speeds

---

2) A 10 kVA, 1000/500 V, 50 Hz, single phase transformer gave the following test readings:

Open Circuit Test: 1000 V, 1 A, 100 W (L.V. side open)

Short Circuit Test: 25 V, 10 A, 60 W (L.V. side shorted)

- Calculate the transformer parameters and draw the equivalent circuit referred to primary
- Find the efficiency at full load, 0.8 lagging power factor

(10 Marks)

3.a) Mention the conditions that must be satisfied before a synchronous generator can be synchronized in parallel with another generator or with the main grid system

(4 Marks)

Members of course Examination Committee:	Signature of Members of course Examination Committee:	Date:
Lecturers: Prof. Ahmed Refaat		17 /1/2015
Course Coordinator: Dr Ahmed Kadry		17 /1/2015
Head of Department: Prof. Hamdy Ashour		17 /1/2015

3.b) A 80 kW 3-phase load is supplied by a three-phase, star connected, synchronous generator at 0.8 lagging power factor. If the line voltage is 1200 V and the per phase armature resistance and reactance are 0.3 Ω and 2 Ω respectively. Find: **(6 Marks)**

i) Voltage regulation

ii) Efficiency, if the rotational losses are 1000 W.

iii) Sketch a phasor diagram

4.a) A 20 Hp, four poles, three-phase, 500 V, 50 Hz induction motor runs at 1450 rpm when operated at rated load at a power factor of 0.8 lagging. The total stator losses and the rotational losses are found equal to 1200 W and 746 W respectively. Calculate the following: **(6 Marks)**

(i) Motor slip

(ii) Rotor copper losses

(iii) Motor input current

(iv) Motor Efficiency

4.b) A factory consumes an apparent power of 5000 kVA at a power factor of 0.8 lagging. Calculate the capacity of the required capacitor bank (in kvars) to achieve 0.9 lagging power factor. Draw the power triangle **(4 Marks)**

Members of course Examination Committee:	**Signature of Members of course Examination Committee:**	**Date:**
Lecturers: STAFF		17 /1/2015
Course Coordinator: Dr Ahmed Kadry		17 /1/2015
Head of Department: Prof. Hamdy Ashour	Hamdy	17 /1/2015