Kafrelsheikh University
Faculty of Engineering
Subject: **Electrical testing3**
Year: Fourth Electrical power (R. 2007)
Exam Date: 26/1/2016

Final Exam of 1st semester-2015-2016
Department of Electrical Engineering
Course code: EPM4014   Full Mark: 60 Marks
number of pages: one   Time allowed: 3 hours

Attempt all question

Q1: (15 Mark)

Regarding the induction generator:

  a) Draw the electrical circuit connection diagrams of a test to determine the magnetization curve.
  b) Discuss briefly the importance of the capacitor bank connects at the terminals of the induction generator.
  c) Discuss briefly the effect of loading on the load voltage and frequency.

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Q2: (15 Mark)

  a) Discuss three main practical problems that lead to IM failure. Show the necessary procedures that alleviate these harmful effects. Discuss three main practical problems that lead to IM failure. Show the necessary procedures that alleviate these harmful effects.
  b) The open circuit voltage across the slip rings of a 100 hp induction motor is 273 V at standstill. What resistance in rotor circuit will reduce its full load speed by 25 %. The full load slip 2 % with no additional rotor resistance. Assume rotor to be star connected.

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Q3: (15 Mark)

  a) Discuss the possible methods used for speed control in IM, in both armature and rotor sides, then steps that follow for the most effective of them in your lab.
  b) The traditional DC electric motor driving an electric train operates at the following operation stages between two stations: At Station 1, the train starts from standstill and gradually accelerates its speed to its rated speed. After 30 min from starting, the train decelerates its speed to 0.5 of its rated speed for 2 min, again it returns to rated speed for 13 min. The train alarms before reaching station 2 and gradually decrease its speed within 5 min. Again, the train goes back to station 1 with a similar sequence. As an electrical engineering, show the suitable drive mechanism may be applied to emulate the required sequence.

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Q4: (15 Mark)

  a- Describe the no load test and the blocked rotor test on an induction motor. And how the parameters can be obtained?
  b- A 400 V, 3-phase delta connected induction motor gave the following results:
No load: 400 V   3 A   64.5 W
S.C. :   200 V   12 A   1660 W

P_{F+W} = 183 W. determine the energy and magnetizing components, no load p.f., R_{e+h}, X_m, equivalent resistance and reactance as referred to primary circuit, p.f. on S.C. and S.C. current with normal applied voltage. Stator resistance may be assumed to be 5 Ω.

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With my best wishes
Dr. Eng./Mohamed I. Abd EL_Wanis