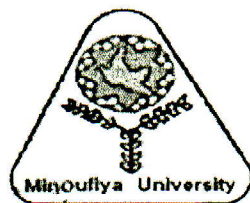


Menoufia University
Faculty of Engineering
Dept. of Electrical Engineering.
Date: 31 /5/2017
Total Marks: 100



Final Term Exam
Academic Year: 2016-2017
Post graduate Students (Ph.D)
Allowed Time: 3 Hours

جودة القدرة فى نظم القوى الكهربائية

Subject/Code: **Power Quality in Electrical Power Systems / ELE 715**

This exam measures ILO's no. (A1, A3, A5, B1, B2, B3, C3, C4)

Remarks: No. of pages: 1 No. of questions: 4

Allowed Tables and Charts: (None)

Answer All The Following Questions:

Question 1

[25 Mark]

- What is the common definition of power quality? Describe the following terms: Crest Factor – Distortion factor – Flicker – Form Factor – Interruption – Isolation – Notch – Power Factor (displacement) – Power Factor (total) – Sag – Swell – Transient.
- Explain the characteristics of voltage dip its sources and list three solutions to mitigate its effect.

Question 2

[25 Mark]

- What is the main sources of voltage unbalance in electrical grid? List two methods for compensating voltage and current unbalance in electrical grids using power electronic devices.
- Harmonics have always been present in power systems due to the widespread use of power electronic systems. List three sources of harmonics and explain their contributions on generating harmonics.

Question 3

[25 Mark]

- Three phase rectifiers are one of the main sources of harmonics. Explain the current waveforms for various types of converters explain the difference between 6 pulses and 12 pulses converters in terms or harmonic order generation.
- Active and Passive filters are commonly used to mitigate harmonic in industrial network. Explain the filter system used for mitigating harmonics produced by dc-drives. List the drawbacks of using passive filters and explain the theory of Shunt active power filter and its purpose.

Question 4

[25 Mark]

- Power converters are widely used in industrial networks, explain the impact their loads and how to reduce their effect on motors.
- What is the impact of non-ideal grids on operation of power converters? Explain Ride-Through term and how converter design could play an important rule to rid-through during grid faults.

***With best wishes
Prof. Elwy E. El-kholy***