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| Menoufia University<br>Faculty of Engineering, Shebin El-Kom<br>Electrical Engineering Department<br>Postgraduate-Ph.D.<br>Final Term Exam |  | Subject/Code: High Voltage Engineering, ELE 702<br>Year : 2015-2016<br>Time Allowed : 3 hours<br>Exam Date : 15 / 6 / 2016<br>Total Marks : 100 marks |

**Allowed Tables and Charts: (None)**

## Answer the following questions

*Question (1)* *(40 Marks)*

**(1-a) Define each term: "nanotechnology", and "nanocomposite".**

**(1-b) What is the effect of particle size on surface area?. Illustrate your answer with suitable sketches.**

**(1-c) Explain briefly, using suitable sketches, the effect of nanofillers on the tracking resistance of polymeric nanocomposites.**

**(1-d) Explain briefly, with the aid of a suitable schematic diagram, a solvent extraction method for removal of sulphur compounds from mineral oil.**

*Question (2)* *(30 Marks)*

**(2-a) Dibenzyl Disulfide (DBDS) and Dibenzyl Sulfide (DBS) have adverse effects on transformer commper winding. What are these effects? Which compound has the more adverse effect?**

**(2-b) Explain the effect of electric field on the formation of corrosive sulphur in mineral transformer oil. The explanation should cover the following points: the experimental setup, the detection method, and the effect of electric field.**

**(2-c) Discuss briefly the effect of surface roughness of the copper winding on the corrosion rate due to the presence of corrosive sulphur in transformer oil.**

*Question (3)* *(30 Marks)*

**(3-a) Describe the effect of semiconductive nanoparticles on the breakdown characteristics of oil nanofluids.**

**(3-b) Discuss briefly the reasons for the improvement in breakdown characteristics of transformer nanofluid.**

**(3-c) Explain, using suitable curves, the effect of front and tail times on the breakdown characteristics of a paper immersed oil when exposed to repeated impulses.**

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**Good Luck ..... Prof. Dr. Mohamed A. Izzularab**

**Dr. Mohamed E. Ibrahim**