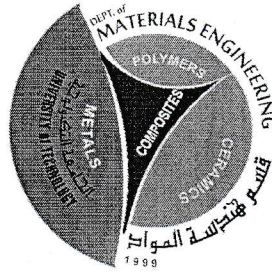


Ministry of Higher Education &
Scientific Research
University of Technology
Department of Materials Engineering
Class: 4th
Date: 13.06.2015
Subject: Surface Engineering



وزارة التعليم العالي والبحث العلمي
الجامعة التكنولوجية
قسم هندسة المواد

Allowed time: 3 h

Examiner: Dr. Ahmed Al-Ghaban

Signature:

Final Exam 2014-2015

Note: Answer 5 questions only

Q1) Give specific reasons for the following: (20 marks)

- PVD processes are favored in semiconductors production.
- It is fluent to have a ceramic coating by evaporation.
- In hot-dipping the submersion direction is very important for large subjects.
- CVD techniques are basically run out under highly controlled systems.
- Laser treatments may include several treatments in one operation system.

Q2) Clarify with drawings the items and the concept of the following processes: (20 marks)

- Anodizing
- Thermal spraying
- Electroforming
- Spin coating
- Pack cementation (Carburizing)

Q3)

- Explain in details and drawings the roller burnishing treatment together with some applications that use such surface process. (10 Marks)
- Compare with regard to the basic principles of electro and electro-less plating. (10 Marks)

Q4) Detonation combustions are regularly used in material surface treatments. Give in details the way of utilizing detonation combustion in two surface treatment processes. (20 marks)

Q5) Illustrate with details and drawings the complete physical procedure of Ion-plating. Suggest also the complete proceedings for the sample pre-preparation. (20 marks)

Q6) Most paints have four basic types of ingredients, set them and give the details of each. (20 marks)

-Good Luck-