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10NT73

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Surfaces and Interfaces

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

- 1 a. What is Interface? Explain briefly along with their different types including abrupt and non - abrupt. (08 Marks)
b. What is Surface tension? Explain briefly about surface tension and their dependence on surfactants and temperature. (07 Marks)
c. What is Gibbs free energy? Explain about the surface energy. (05 Marks)
- 2 a. Explain about kinetics model of adsorption and desorption including :
i) Rate of adsorption ii) Rate of desorption and iii) The desorption energy. (10 Marks)
b. Explain the concept of adsorption isotherms and also explain Langmuir adsorption isotherm and BET adsorption isotherm. (10 Marks)
- 3 a. What is Electron Emission? Explain the different types of electron emission along with the neat diagram. (08 Marks)
b. Explain briefly about the different electron spectroscopy and also explain different types of thermionic emitters used. (05 Marks)
c. Write a short note on Ion implantation and surface ionization. (07 Marks)
- 4 a. Mention different microscopic technique used in diagnostic methods and explain any one method in detail. (10 Marks)
b. With a neat diagrams, explain different growth modes in epitaxial growth. (06 Marks)
c. Write a short note on “Small angle X – ray scattering (SAXS). (04 Marks)

PART – B

- 5 a. Explain the phenomenon of Adsorption of gases on solids and all factors affecting them. (09 Marks)
b. Write short note on : “Purification of colloidal solutions”. (05 Marks)
c. Explain “Turkevich method” for colloidal gold synthesis. Mention its uses. (06 Marks)
- 6 a. Explain the concept of depth profile for minerals. (05 Marks)
b. Explain about investigation of adsorption on glass surfaces. (09 Marks)
c. Describe the concept of grain boundaries and inter-granular films for ceramics. (06 Marks)
- 7 a. Explain the following protocols for corrosion film analysis : i) Preliminary sample handling ii) Preliminary examination. (10 Marks)
b. Discuss briefly about the electrochemical techniques for surface corrosion studies.
i) Basic electrode kinetics ii) Linear polarization iii) Anodic polarization. (10 Marks)
- 8 a. What is Electrochemistry? Describe about Electrochemical impedance spectroscopy. (10 Marks)
b. Explain contrived corrosion experiments on monel for following cases :
i) Microscopy studies of oxides from P^H 10 exposures.
ii) Electrochemical and microscopy studies of alloys exposed to P^H1. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any candidate at identification, appeal to evaluator and/or equations written on 4, 7, 8, 9, 10 will be treated as malpractice.