Fourth Semester B.E. Degree Examination, June/July 2016
Properties of Nanomaterials

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. Write a short note on quantum–size effect. **(06 Marks)**
   b. Explain chemical physics of atomic and molecular clusters. Name any one cluster and its features. **(06 Marks)**
   c. Write about : i) nano scale magnets ii) melting point and phase transition process. **(08 Marks)**

2 a. What is surface energy? Explain about the importance of surface energy. **(06 Marks)**
   b. Explain about the nature of electric potential at the proximity of a solid surface. **(10 Marks)**
   c. Write a note on vander Waal's attraction potential. **(04 Marks)**

3 a. Explain the following : i) Nanoscale heat transfer and ii) transition metal atoms on nanocarbon surfaces. **(08 Marks)**
   b. Write a short note on photo chemistry and photo conductivity. **(04 Marks)**
   c. What is nano catalysis? Name the types of catalysts and explain different kinds of sensitivity. **(08 Marks)**

4 a. What is fracture mechanics? Explain the importance of fracture mechanics. **(08 Marks)**
   b. Explain in detail about the micro features of fracture in metallic materials. **(12 Marks)**

PART – B

5 a. Explain the Hall-Petch relationship. What is reverse hall-Petch relation? **(10 Marks)**
   b. Write a note on strengthening mechanism of materials and microstructures. **(10 Marks)**

6 a. Write a short note on chemical corrosion. **(04 Marks)**
   b. Explain electrochemical corrosion with an example. **(08 Marks)**
   c. Briefly describe about corrosion current and polarization. **(08 Marks)**

7 a. Write a note on ferroelectric materials and ferroelectricity. Explain the applications of ferroelectricity materials. **(06 Marks)**
   b. Briefly explain about dipole theory of ferroelectricity and its drawbacks. **(10 Marks)**
   c. Give a short note on general properties of ferroelectric materials. **(04 Marks)**

8 a. Describe about weiss theory. **(10 Marks)**
   b. Explain about Ising model and its applications. **(10 Marks)**

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