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Question Paper Code : 4117005/05/18
AN**B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018****Sixth/Seventh/Eighth Semester****Electrical and Electronics Engineering****GE 6081 – FUNDAMENTALS OF NANOSCIENCE**

(Common to : Electronics and Instrumentation Engineering/Instrumentation and
Control Engineering/Manufacturing Engineering/Mechanical Engineering/
Production Engineering/Technology/Chemical Engineering/Pharmaceutical
Technology/Polymer Technology)
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A**(10×2=20 Marks)**

1. Give two examples of materials and their specific properties which change when synthesised as nanomaterials.
2. Give a brief classification of nanomaterials.
3. What are the two main approaches followed for nanomaterial synthesis?
4. Write a short note on MOMBE.
5. What are nanoclays?
6. What are quantum dots? Explain.
7. Derive Bragg's law.
8. Name any two surface analysis techniques. What is nanoindentation?
9. Write a short note on molecular switch.
10. How nanotechnology is useful for solar cell applications?



PART – B

(5×13=65 Marks)

11. a) Explain in detail the implications, advantages and disadvantages of materials in nanoscale. (13)
(OR)
b) Explain the effect of length scale on the properties of various materials. (13)
12. a) Explain different methods of nanoparticle synthesis through solution. (13)
(OR)
b) Explain any two methods of thin film deposition and their advantages. (13)
13. a) Write in detail about various nanoforms of carbon and brief about the synthesis methods. (13)
(OR)
b) Give details of structure, properties and few applications of the following materials. (13)
i) ZnO ii) ZrO_2
iii) Nanoalumina iv) AgTiO_2
14. a) Explain in detail electron microscopy techniques to analyse surface and bulk features of materials. (13)
(OR)
b) Explain the following : (13)
i) SPM ii) ESCA
15. a) Write in detail about MEMS and NEMS and their applications. (13)
(OR)
b) Explain in detail applications of nanoscience in biotechnology field. (13)

PART – C

(1×15=15 Marks)

16. a) List out all the characterization technique used for nanomaterial characterization purpose. (OR)
b) Give the applications of nanomaterials in Biomedical, Agriculture and Catalysis field. Explain with examples.
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