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14/11 EEE 4/

Question Paper Code : 91655

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Sixth/Seventh/Eighth Semester
Mechanical Engineering
GE 6081 – FUNDAMENTALS OF NANOSCIENCE
(Common to Electrical and Electronics Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/ Manufacturing Engineering/Production Engineering/Biotechnology/Chemical Engineering/Pharmaceutical Technology/Polymer Technology)
(Regulations 2013)
(Also Common to PTGE 6081 – Fundamentals of Nanoscience for B.E. (Part-Time) – Sixth Semester – Electrical and Electronics Engineering/Seventh Semester – Mechanical Engineering – Regulations – 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What are nanowires ?
2. Write about the optical properties of nanomaterial.
3. What is meant by self-assembly of nanostructures ?
4. Brief on the principle of ball milling.
5. Write a note on Buckminster fullerenes.
6. Give a brief note on the applications of Ferrites.
7. What is the working principle of Nanoindentation ?
8. Give the significance of XRD peak.
9. What are molecular switches ? Give example.
10. What is meant by active targeting of drugs ?

PART – B (5×13=65 Marks)

11. a) What is the effect of nanoscale on the properties of materials ?

(OR)

b) What are nanostructured materials ? Classify nanostructured materials with suitable examples.

12. a) Write notes on :
i) Co-precipitation. (6)
ii) Ultrasonication. (7)

(OR)

b) Enumerate the different chemical methods of synthesis of nanomaterials and state its advantages and disadvantages.

13. a) Explain any two methods used to prepare CNTs.

(OR)

b) Discuss the preparation, properties and applications of two nanometal oxides.

14. a) Discuss in detail the principle, sample preparation and working protocol of TEM with a sketch.

(OR)

b) Discuss the principle, working and applications of AFM with a neat diagram.

15. a) Explain in detail about nanocomputers with examples.

(OR)

b) How are nanomaterials used in bioimaging ?

PART – C (1×15=15 Marks)

16. a) Write about the applications of nanoparticles in medical diagnosis.

(OR)

b) Give a detailed account on nanomaterials based solar cell and battery.