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Question Paper Code: 42003

B.E. / B.Tech. DEGREE EXAMINATION, AUGUST 2021

Second Semester

Civil Engineering

14UPH203- MATERIAL SCIENCE

(Common to Mechanical Engineering)

(Regulation 2014)

Duration: 1:45 hour

Maximum: 50 Marks

PART A - (10 x 2 = 20 Marks)

(Answer any ten of the following questions)

1. List the postulates of free electron theory.
2. Compare intrinsic and extrinsic semiconductor.
3. Recall Meissner effect in superconductors.
4. Define dielectric constant.
5. What is meant by glass transition temperature?
6. Define Cooper pairs?
7. Define dielectric constant.
8. What is dielectric loss?
9. State some applications of shape memory alloys.
10. What is shape memory effect?
11. What is Meissner effect?
12. What are dielectric losses?
13. Define dielectric constant of a material.
14. What are metallic glasses?

15. What are carbon nanotubes?

PART – B (3 x 10= 30 Marks)

(Answer any three of the following questions)

16. Define density of states and derive an expression for carrier concentration in metals
(10)
17. Obtain an expression for the intrinsic charge density of an intrinsic semiconductor.
(10)
18. Explain the domain theory of ferromagnetism. Using that theory, explain the formation of hysteresis in ferromagnetic materials.
(10)
19. Define Local field in a dielectric. Obtain an expression for the internal field in dielectric and hence Deduce Clausius-Mosotti equations.
(10)
20. Illustrate in detail the Sol-gel method to prepare nano material
(10)