Material Science and Engineering
VTU CBCS Question Paper Set
2018
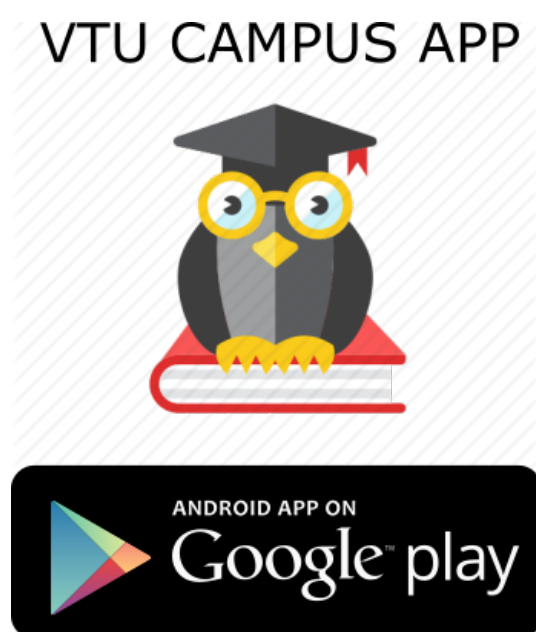
CBCS Scheme

USN [| | | | | | |]   **15NT42**

Fourth Semester B.E. Degree Examination, June/July 2017
Material Science and Engineering

Time: 3 hrs.   Max. Marks: 80

Note: *Answer FIVE full questions, choosing one full question from each module.*

Module-1

1   a. Discuss the classification of materials based on functionality.   (08 Marks)
    b. Explain different types of Atomic bonding, with examples.   (08 Marks)

OR

2   a. Describe the electronic structure of the atom.   (08 Marks)
    b. Explain the following :
       i) Lattice   ii) Unit cells   iii) Basis   iv) Crystal structure.   (08 Marks)

Module-2

3   a. Discuss the influence of high density planes on crystal behaviour.   (08 Marks)
    b. Explain the following : i) Crystallographic point groups   ii) Space groups.   (08 Marks)

OR

4   a. Explain Bravais Lattices in two and three dimensional spaces.   (10 Marks)
    b. What is Wigner – Seitz cell? Explain its construction.   (06 Marks)

Module-3

5   a. Explain Effusion and Graham's law.   (06 Marks)
    b. What is Photon diffusion? Explain different kinds of passive transport.   (10 Marks)

OR

6   a. Describe the mechanism of diffusion in solids.   (06 Marks)
    b. Derive an expression for unsteady state diffusion.   (06 Marks)
    c. Discuss applications of Diffusion.   (04 Marks)

Module-4

7   a. Discuss the possible Mesophases in Lyotropic liquid crystals.   (08 Marks)
    b. Describe Liquid Crystalline Behavoiur in any two homologous series.   (08 Marks)

OR

8   a. Explain how Liquid Crystals are identified.   (06 Marks)
    b. Discuss the role of Chiral Liquid Crystals in thermography.   (10 Marks)

Module-5

9   a. What are Ceramics? Discuss types of ceramics.   (06 Marks)
    b. Discuss Electrical properties of Ceramics.   (04 Marks)
    c. Explain Electro – rheological fluids with applications and limitations.   (06 Marks)

OR

10 a. Mention applications of Ceramics.   (04 Marks)
    b. Explain Piezoelectric materials mechanisms.   (08 Marks)
    c. What are Shape memory Alloys? Explain.   (04 Marks)

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