20U610 (Pages: 2) Name: .....

Reg.No: .....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2023

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U PHY6 B14 / CC20U PHY6 B14 - MATERIALS SCIENCE

(Physics - Elective Course)

(2019, 2020 Admissions)

Time : 2.00 Hours Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 2 marks.

1. Explain important properties of solid materials.
2. Draw the graph of interatomic separation versus potential energy for two atoms.
3. Define unit cell.
4. What is Burgers vector?
5. What is the driving force behind the diffusion process?
6. State the applications of Fick's law.
7. What are the different clay products?
8. What are Fullerenes?
9. What is meant by unsaturated hydrocarbon?
10. Define diffraction with example.
11. Give a short note on optical microscopy.
12. Differentiate between transmission electron microscope and scanning electron microscope.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer ***all*** questions. Each question carries 5 marks.

13. If the atomic radius of aluminum is 0.143 nm, calculate the volume of its unit cell in cubic meters.
14. Calculate the theoretical density of Chromium. Given atomic weight 50g/mol, atomic radius 0.125nm.
15. What is the composition, in atom percent, of an alloy that consists of 97 wt% Fe and 3 wt% Si?
16. Explain the factors that influence the diffusion mechanism.
17. Explain the different applications of advanced ceramics.

18. Explain the physical characteristics of a polymer based on its structure.

19. Make comparisons of thermoplastic and thermosetting polymers (a) on the basis of mechanical characteristics upon heating and (b) according to possible molecular structures.

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

20. Explain secondary bonding with suitable examples.

21. Derive Bragg's law for X-ray diffraction in crystals. Describe and explain rotating crystal method of crystal structure analysis.

(1 × 10 = 10 Marks)

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