

21U610

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Name:

Reg.No:

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2024

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U PHY6 B14 / CC20U PHY6 B14 - MATERIALS SCIENCE

(Physics - Core Course)

(2019 Admission onwards)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

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

1. What are actuators?
2. With an example explain how covalent bonding is formed?
3. Differentiate between crystalline and non crystalline materials.
4. What is a surface imperfection?
5. What is meant by diffusion in solids?
6. Explain diffusion in ionic materials.
7. What is meant by Glass-Ceramics?
8. What are Carbon nanotubes?
9. What is meant by unsaturated hydrocarbon?
10. Mention the uses of X-ray diffraction technique.
11. Explain photomicrograph.
12. Give the relationship between ASTM grain size number and number of grains per square inch.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. Explain why hydrogen fluoride (HF) has a higher boiling temperature than hydrogen chloride (HCl)
14. Copper has an atomic radius of 0.128 nm, an FCC crystal structure, and an atomic weight of 63.5 g/mol. Calculate density.

15. Molybdenum forms a substitutional solid solution with tungsten. Compute the weight percent of molybdenum that must be added to tungsten to yield an alloy that contains 1.0×10^{22} Mo atoms per cubic centimeter. The densities of pure Mo and W are 10.22 and 19.30 g/cm³, respectively.
16. Explain the Fick's second law for the non steady state diffusion.
17. Explain the different applications of advanced ceramics.
18. Sketch cis and trans structures for (a) butadiene, and (b) isoprene
19. Differentiate between thermosetting and thermoplastic polymers.

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. In detail explain different crystal structures.
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)
