Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Examination – January 2021
V Semester

Class : III UG **Time : 3 Hours**
Major : Physics **Max. Marks: 100**

18BPHC14 Materials Science

Part A **10 x 1 = 10**
Choose the Correct Answer

1. Atoms undergo bonding in order to
   a. Attain stability b. Lose stability
   c. Move freely d. Increase energy

2. Which among the following formation is not an example of Covalent bond?
   a. NH_3 b. LiF c. CF_4 d. HF

3. _____ are thermodynamically stable defects.
   a.Point defects b. Line defects
   c Surface defects d. Volume defects

4. Which of the following statement is false?
   a. Line defects are thermodynamically stable
   b. Dislocation can end inside a crystal without forming loop
   c .ABC ABC ABC...is stacking sequence for HCP crystal
   d. All the above

5. Homogenous nucleation is
   a. the first step of any crystal growth.
   b. always leads to crystal growth.
   c. a process that can lead to crystal growth.
   d. a process that leads to crystal growth if paired with heterogeneous nucleation.

6. The critical nuclei radius is
   a. proportional to the free energy.
   b. not related to the free energy.
   c. inversely proportional to the surface tension.
   d. proportional to the surface tension.

7. For sputter deposition, an intermediate energy process is required which results in cosine behavior with n~
   a. 3-6 b. 9-10 c. 10-15 d. 20-30

8. Which of the following metals cannot be electroplated?
   a. Tungsten b. Nickel
   c. Silver d. Copper

9. Radiography is based on
   a. Differential absorption
   b. Reflection of radio waves
   c. Reflection of visible light
   d. Transmitting and receiving the radio waves

10. _____ can be used to find any defect in electronic circuit modules.

a. Thermography
b. Holography
c. Ultrasonic flaw reactor
d. X-ray radiography

Part B **5 x 6 = 30**

Answer ALL questions

Each answer should not exceed 400 words or two pages

11. a. Briefly describe hydrogen bond.

(or)

11. b. Give short notes on the binding energy of crystals.

12 a. Enumerate the differences between an edge dislocation and screw dislocation.

(or)

12 b. Mention a few applications of crystal imperfections.

13. a Give the difference between the solubility and super solubility with necessary examples

(or)

13. b. Explain the concept of crystal growth.

14. a Discuss the kinetic theory of gases for molecular velocities

(or)

14. b. Give a brief account on Cathodic sputtering

15. a. Write a short note on the electrical non-destructive testing method

(or)

15. b.Distinguish the difference between an electron and optical microscope.

Part C **5 x 12 = 60**

Answer ALL questions

Each answer should not exceed 800 words or four pages

16. a. With a suitable diagram, explain covalent bonding.

(or)

16. b. Describe ionic bonding.

17. a. Discuss the properties of screw and edge locations.

(or)

17. b. Describe in detail i. Line defects and ii. Surface defects

18. a. Explain the concept of nucleation with suitable theories

(or)

18. b. Describe the importance of supersaturation and the significance of single crystals.

19. a. What is chemical vapour deposition? Explain with suitable examples.

(or)

19. b. Discuss the working principle of electron beam technique and electrolysis plating

20. a. Discuss the methodological approach of I.radiographic and ii. ultrasonic non-destructive method.

(or)

20. b Explain in detail about the i. surface defect detection and
ii. Scanning Electron Microscope.

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