Amrita Vishwa Vidyapeetham

Amrita School of Engineering,Amaravati

B. Tech Mid-term Examinations – November 2024

1st Semester

Computer and Communication Engineering

23PHY110 Physics of Semiconductors

Duration: Two hours

Maximum: 50 Marks

Course Outcomes (COs):

CO	Course Outcomes
CO01	Understand the crystal structure of semiconductors
CO02	Understand semiconductors based on energy band gap
CO03	Understand current flow in semiconductors
CO04	Understand the behaviour of pn junctions & MOSFETs

Answer all the questions (Each question carries 2 Marks)

1) Distinguish between crystalline and amorphous solids. Give examples? [2 Marks] [CO01] [BTL 2]
2) Define Miller indices? How are they useful in crystallography? [2 Marks] [CO01] [BTL 1]
3) A crystal lattice plane (326) makes an intercept of 1.5 Å on X-axis in a crystal having lattice constant 1.5 Å, 2 Å, and 2 Å respectively on X, Y and Z axis. Find Y and Z intercept? [2 Marks] [CO01] [BTL 3]
4) Explain the term 'basis' in the context of crystal structures? [2 Marks] [CO01] [BTL 2]
5) Distinguish between primitive and nonprimitive unit cells. Give examples? [2 Marks] [CO01] [BTL 2]
6) Find the distance between two parallel planes with Miller indices (111) in a cubic crystal with lattice constant a=0.5 nm? [2 Marks] [CO01] [BTL 3]
7) What is a Bravais lattice? [2 Marks] [CO01] [BTL 1]
8) A crystal plane cuts the crystallographic axes at 2a, 3b, and is parallel to the c-axis. Determine the Miller indices for this plane? [2 Marks] [CO01] [BTL 3]
9) What is a crystal lattice? [2 Marks] [CO01] [BTL 1]
10) Differentiate between vacancy defects and interstitial defects? [2 Marks] [CO01] [BTL 2]

Answer all the questions (Each question carries 10 Marks)

11) Explain different types of crystal system with their parameters? [10 Marks] [CO01] [BTL 2]

12) What do you mean by packing fraction? Calculate the packing efficiencies of BCC, FCC, and diamond cubic structures? [10 Marks] [CO01] [BTL 2]

13) Explain the different types of point defects in crystalline materials? [10 Marks] [CO01] [BTL 2]

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Course Outcome /Bloom's Taxonomy Level (BTL) Mark Distribution Table

CO	Marks	BTL	Marks
CO01	**50**	BTL 1	**6**
		BTL 2	**38**
		BTL 3	**6**