Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (New) EXAMINATION – WINTER 2015

Subject Code: 2133901 **Date:23/12/2015**

Subject Name: Fundamentals of Solid State Technology

Time: 2:30pm to 5:00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 Give the answer of short question **14**

1. Define miller indices.
2. What is Nano crystalline material?
3. Define unit cell in material.
4. What is point defect in solid?
5. How many possible defects in solid? List their name.
6. Define crystal structure.
7. Define lattice in crystal structure.
8. Write full form of XRD.
9. Define basis in crystal structure.
10. Define hall effect.
11. What is dielectric material?
12. Define intrinsic semiconductor.
13. What is magnetic material?
14. Define extrinsic semiconductor.

Q.2	**(a)**	Write features of miller indices.	**03**
	(b)	Draw miller indices for (*110*) and (*101*)	**04**
	(c)	Explain seven crystal system of material.	**07**
		OR	
	(c)	Explain geometric factor reciprocal lattice.	**07**
Q.3	**(a)**	Write applications of XRD	**03**
	(b)	Describe XRD method in short.	**04**
	(c)	Write short note on bonds in solids	**07**
		OR	
Q.3	**(a)**	Explain Nano crystalline materials.	**03**
	(b)	Write a short note on Physical properties of Nano materials.	**04**
	(c)	Describe defects in solids.	**07**
Q.4	**(a)**	What is lattice vibration and thermal heat capacity?	**03**
	(b)	Describe Debye theory for molar heat capacity.	**04**
	(c)	Explain Einstein theory and its limitation.	**07**
		OR	
Q.4	**(a)**	Explain intrinsic semiconductor in brief.	**03**
	(b)	Explain P – n junction diode with its application.	**04**
	(c)	Describe simple model for semiconductor donor and acceptor levels.	**07**
Q.5	**(a)**	Write in brief about extrinsic semiconductor.	**03**

	(b)	Write short note on rectification by semiconductor device.	**04**
	(c)	Describe Hall effect in semiconductor.	**07**
		OR	
Q.5	**(a)**	What is dielectric material? Explain it in brief.	**03**
	(b)	Write a short note on magnetic materials.	**04**
	(c)	Write applications of dielectric & magnetic materials.	**07**

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