8. (a) What are ] agnetic materials ? Discuss Langevin's th or paramagnetism in detail. 15

(b) The magneti d strength in silicon is 1500 amp/m. If magnetic susceptibility is $-0.6 \times 10^{-5}$. C e its magnetization. 5

9. (a) Describe th 'eiss molecular theory of ferromagneti nd derive the Curie-Weiss law. 15

(b) A paramagn lt contains $10^{29}$ ions/$m^3$ with magnetic m of one Bohr magneton. Calculate the nagnetic susceptibility and the magnetizatio duced in a magnetic field of $4 \times 10^6$ amp/ n the temperature is 27°C. 5

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*Roll No.* .....

# 24019

## B. Tech. 2nd Semester (Common for All Branches) Examination – May, 2017

### PHYSICS - II

**Paper : Phy-102-F**

*Time : Three Hours ]* *[ Maximum Marks : 100*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

***Note :*** Attempt ***five*** questions in all, selecting at least ***one*** question from each Unit. Question No. 1 is ***compulsory***.

**1.** (a) Define space lattice, primitive and non-primitive cells and coordination number. 4

(b) Define Fermi energy and thermionic work function. 4

(c) Define Schottk Frenkel defects. 4

(d) Define atomic netic moment. Also give its value. 4

(e) Define the ter ve function, eigen value and eigen function 4

T – I

2. (a) What do you rstand by Bravais lattices ? Explain differ pes of Bravais lattice in *two* and three dim s. 9

(b) Explain X-ra ffraction and derive an expression for 's law. 6

(c) Derive formul listance between two adjacent planes in a boc tered lattice. 5

3. (a) Differentiate b n group velocity and phase velocity. 10

(b) Prove that (i) velocity is less than phase velocity in a d ive medium and (ii) for a non relativistic fre cle, the phase velocity is 50% of the group v . 10





UNIT – II

4. Discuss important features of nanosystems. What are quantum dots and discuss their important applications. Also discuss quantum size effect. 20

5. What is free electron theory of metals ? Derive the expression for conductivity of metals on the basis of Drude-Lorentz theory. 20

UNIT – III

6. (a) Discuss the origin of energy bands in solids. How can you distinguish between metals, semiconductors and insulators on the basis of energy bands. 10

(b) Explain E-K diagram and Brillouin zones. 10

7. Define photoconductivity. What are traps ? Discuss a simple model to show the effect of traps on the photoconductivity. Also discuss the factors which effect photoconductivity. 20