



AC-3076

B. Sc. (Sem. IV) Examination

April / May - 2015

Physics (For Electronics) : Paper - V

(Crystallography & Material Science)

Time : Hours]

[Total Marks : 50

Instructions :

(1)

नीचे दर्शायेव निशानीवाणी विगतो उतरवडी पर अवश्य कपनी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
B. SC. (SEM. IV)	<input type="text"/>
Name of the Subject :	<input type="text"/>
PHYSICS (FOR ELECTRONICS) : PAPER - V	<input type="text"/>
Subject Code No. : <input type="text"/> 3 <input type="text"/> 0 <input type="text"/> 7 <input type="text"/> 6	Student's Signature
Section No. (1, 2,...): <input type="text"/> Nil	

- (2) Draw neat and clean diagram wherever necessary.
- (3) Symbols used in the paper have their usual meaning.
- (4) Figures to right indicate full mark.
- (5) Constants :

Rest mass of electron $m_e = 9.1 \times 10^{-31}$ kg

Charge of electron $e = 1.6 \times 10^{-19}$ C

Speed of light $C = 3 \times 10^8$ m/s

Planck's constant $h = 6.062 \times 10^{-34}$ Js.

1. Answer the following questions in short. Each question carries **one** marks. (08)

- (1) Define Bravais lattice in crystal structure.
- (2) Define permanent magnetic materials.
- (3) Give few examples of trivalent impurity.
- (4) Define electrical conductivity and state its unit .
- (5) What is the energy band gap in semiconductor ?
- (6) Define Fermi energy.
- (7) What do you mean by drift velocity?
- (8) What is Lorentz number ?

2. (a) Explain FCC and simple cubic structure and find its packing density. (10)

OR

2. (a) Explain allotropy, Describe it for Carbon. (10)
2. (b) Sketch the planes (001), (110), (101) in simple cubic cell. (04)
- OR
2. (b) Copper has FCC structure and the atomic radius is 1.278 Å and molecular weight of 63.54. Compute its theoretical density. (4)
3. (a) Explain the various class of magnetic materials. (10)
- OR
3. (a) Define term electrical conductivity and derive the necessary expression for the electrical conductivity of metals. (10)
3. (b) Find the concentration of electrons diffused to the p-side of the p-n junction in unbiased state, under the conditions : (a) forward bias of 0.1 V (b) reverse bias of 1 V. (04)
- OR
3. (b) A silicon wafer is doped with 10^{21} phosphorus atoms/m³, Calculate (a) the majority carrier concentration, (b) and the minority carrier concentration. (ionisation of the dopant atom = $1.5 \times 10^{16} \text{ m}^{-3}$) (04)
4. Write short note : (Any two) (14)
- (1) Synthesis and properties of Ni-Ti alloys.
 - (2) HCP crystal structure.
 - (3) Metallic Glasses.
 - (4) Hall effect.
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