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energy band diagram.

semiconductors and conductors on the basis of

(d) What is forbidden energy gap? Classify insulators,

(ii) Screw dislocation

(1) Edge dislocation

(c) Explain with simple sketches the following :

(wavelength is 1.57 μ m)

$(\nu = 3.57 \text{ \AA})$ crystal are exposed to X-range

calculate the Bragg angle if (III) planes of a cubic

Calculate their interplanar distance. And also

Show in diagram the (III) planes of a cubic lattice.

value for simple cube and body centered cube.

What is Atomic Packing factor ? Calculate its

1 Attempt any three parts of the following: 5×3=15

[Total Marks : 50]

Time : 2 Hours]

MATERIALS

ELECTRICAL & ELECTRONICS ENGINEERING

(SEM. IV) THEORY EXAMINATION, 2014-15

B. Tech.

[illegible]

EEB-403



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2 Attempt any three parts of the followings : **5×3=15**

- (a) Explain super conductivity.
Determine the temperature coefficient of resistance of material used in resistor if the resistance at 25°C is 50 ohms and at 70°C is 57.2 ohms.
- (b) Explain thermal conductivity and obtain an expression for coefficient of thermal conductivity.
- (c) Explain in brief the zone theory of solids.
- (d) State the following thermo-electric effects
 - (i) Seebeck effect
 - (ii) Peltier effect
 - (iii) Conduction effect

3 Attempt any two parts of the followings : **5×2=10**

- (a) What is Hall effect ?
The resistivity of semiconductor material was known to be 0.0082 Ωm at room temperature. The flux density in the Hall model was 0.48 wb/m².
- (b) Explain the working principle of a MOSFET. Discuss also the types of MOSFET and their working.
- (c) Discuss the volt-ampere characteristics and the application of the following semiconductors.
 - (i) Zener diode
 - (ii) Tunnel diode.

4 Attempt any two parts of the followings : **5×2=10**

- (a) Explain briefly any three of the following magnetic hard materials :
 - (i) Tungsten steel
 - (ii) Cobalt steel
 - (iii) Chromium steel
 - (iv) Alnico.
- (b) Explain the phenomenon of magnetostriction with particular reference to iron and nickel. Mention major application of magnetostrictive materials.
- (c) Explain the Ferromagnetism.
The hysteresis loop of a specimen of iron weighing 10 kg is equivalent in area of 255 joules/m³ of iron. Find the loss of energy per hour at the rate of 50 c/s. Assume the density of iron as 7500 kg/m³.