1.a)

2.a)

b)

c)

3.a)

b)

c)

4.a)

b)

c)

5.a)

b)

6.a)

b)

7.a)

b)

b)





Code.No: R05010201 **I B.TECH – EXAMINATIONS, JUNE - 2011** APPLIED PHYSICS (COMMON TO EEE, ECE, CSE, ECOMPE, EIE, ETM, IT, ICE, BME) **Time: 3hours** Max.Marks:80 Answer any FIVE questions All questions carry equal marks Describe the various types of bonds in solids with suitable examples. Derive an expression for estimation of cohesive energy of a solid. [8+8] Derive Bragg's law of crystal diffraction. Describe, in detail, Laue method to determine the crystal structure. A certain crystal reflects monochromatic X-rays strongly when Bragg's angle is 15° for the first order diffraction. Calculate the glancing angle for third order spectrum. [5+7+4]Explain, in detail, Planck's quantum theory of radiation. Derive one-dimensional, time-independent Schrodinger wave equation. Calculate the first three permitted energy levels of an electron in a potential box of 0.1 nm width. [6+6+4]How does the electrical resistance of a metal change with temperature? Explain Fermi-Dirac distribution for electrons in a metal. Discuss its variation with temperature. What is effective mass of an electron? [4+8+4]What is meant by polarization of a dielectric material? Explain the different mechanisms of polarization in a dielectric material. How ferroelectrics are different from ordinary dielectrics? [10+6] Obtain the equation for the conductivity of an intrinsic semiconductor, and hence explain the determination of energy gap. What are the drift and diffusion currents in a semiconductor? Explain. [10+6] Describe the various methods to achieve population inversion in the case lasers. Describe the construction and working of a semi-conductor laser. [6+10]

- Describe the construction and working of various types of optical fibers. 8.a)
- b) Draw the block diagram of fiber optic communication system and explain the function of each block.
- Write the advantages of optical communication system. [6+6+4]c)

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[4+8+4]

I B.TECH – EXAMINATIONS, JUNE - 2011 APPLIED PHYSICS

(COMMON TO EEE, ECE, CSE, ECOMPE, EIE, ETM, IT, ICE, BME)

Time: 3hours

Code.No: R05010201

Max.Marks:80

Answer any FIVE questions All questions carry equal marks

- 1.a) Explain, in detail, Planck's quantum theory of radiation.
- b) Derive one-dimensional, time-independent Schrodinger wave equation.
- c) Calculate the first three permitted energy levels of an electron in a potential box of 0.1 nm width. [6+6+4]
- 2.a) How does the electrical resistance of a metal change with temperature?
- b) Explain Fermi-Dirac distribution for electrons in a metal. Discuss its variation with temperature.
- c) What is effective mass of an electron?
- 3.a) What is meant by polarization of a dielectric material? Explain the different mechanisms of polarization in a dielectric material.
- b) How ferroelectrics are different from ordinary dielectrics? [10+6]
- 4.a) Obtain the equation for the conductivity of an intrinsic semiconductor, and hence explain the determination of energy gap.
 - b) What are the drift and diffusion currents in a semiconductor? Explain. [10+6]
- 5.a) Describe the various methods to achieve population inversion in the case lasers.
- b) Describe the construction and working of a semi-conductor laser. [6+10]
- 6.a) Describe the construction and working of various types of optical fibers.
- b) Draw the block diagram of fiber optic communication system and explain the function of each block.
- c) Write the advantages of optical communication system. [6+6+4]
- 7.a) Describe the various types of bonds in solids with suitable examples.
- b) Derive an expression for estimation of cohesive energy of a solid. [8+8]
- 8.a) Derive Bragg's law of crystal diffraction.
- b) Describe, in detail, Laue method to determine the crystal structure.
- c) A certain crystal reflects monochromatic X-rays strongly when Bragg's angle is 15° for the first order diffraction. Calculate the glancing angle for third order spectrum. [5+7+4]

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Code.No: R05010201

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I B.TECH – EXAMINATIONS, JUNE - 2011 APPLIED PHYSICS

(COMMON TO EEE, ECE, CSE, ECOMPE, EIE, ETM, IT, ICE, BME) **Time: 3hours**

Max.Marks:80

Answer any FIVE questions All questions carry equal marks

- What is meant by polarization of a dielectric material? Explain the different 1.a) mechanisms of polarization in a dielectric material.
- b) How ferroelectrics are different from ordinary dielectrics? [10+6]
- 2.a) Obtain the equation for the conductivity of an intrinsic semiconductor, and hence explain the determination of energy gap.
 - What are the drift and diffusion currents in a semiconductor? Explain. [10+6] b)
- Describe the various methods to achieve population inversion in the case lasers. 3.a)
- Describe the construction and working of a semi-conductor laser. b) [6+10]
- Describe the construction and working of various types of optical fibers. 4.a)
- Draw the block diagram of fiber optic communication system and explain the b) function of each block.
- Write the advantages of optical communication system. [6+6+4]c)
- 5.a) Describe the various types of bonds in solids with suitable examples.
- b) Derive an expression for estimation of cohesive energy of a solid. [8+8]
- 6.a) Derive Bragg's law of crystal diffraction.
- Describe, in detail, Laue method to determine the crystal structure. b)
- A certain crystal reflects monochromatic X-rays strongly when Bragg's angle is c) 15° for the first order diffraction. Calculate the glancing angle for third order spectrum. [5+7+4]
- 7.a) Explain, in detail, Planck's quantum theory of radiation.
 - b) Derive one-dimensional, time-independent Schrodinger wave equation.
 - Calculate the first three permitted energy levels of an electron in a potential box of c) 0.1 nm width. [6+6+4]
- 8.a) How does the electrical resistance of a metal change with temperature?
 - Explain Fermi-Dirac distribution for electrons in a metal. Discuss its variation b) with temperature.
 - What is effective mass of an electron? [4+8+4]c)

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Code.No: R05010201 **I B.TECH – EXAMINATIONS, JUNE - 2011** APPLIED PHYSICS (COMMON TO EEE, ECE, CSE, ECOMPE, EIE, ETM, IT, ICE, BME) **Time: 3hours** Max.Marks:80 Answer any FIVE questions All questions carry equal marks 1.a) Describe the various methods to achieve population inversion in the case lasers. Describe the construction and working of a semi-conductor laser. b) [6+10]2.a) Describe the construction and working of various types of optical fibers. Draw the block diagram of fiber optic communication system and explain the b) function of each block. c) Write the advantages of optical communication system. [6+6+4] 3.a) Describe the various types of bonds in solids with suitable examples. b) Derive an expression for estimation of cohesive energy of a solid. [8+8] 4.a) Derive Bragg's law of crystal diffraction. b) Describe, in detail, Laue method to determine the crystal structure. A certain crystal reflects monochromatic X-rays strongly when Bragg's angle is c) 15° for the first order diffraction. Calculate the glancing angle for third order spectrum. [5+7+4] Explain, in detail, Planck's quantum theory of radiation. 5.a) Derive one-dimensional, time-independent Schrodinger wave equation. b) Calculate the first three permitted energy levels of an electron in a potential box of c) 0.1 nm width. [6+6+4]How does the electrical resistance of a metal change with temperature? 6.a) Explain Fermi-Dirac distribution for electrons in a metal. Discuss its variation b) with temperature. What is effective mass of an electron? c) [4+8+4]7.a) What is meant by polarization of a dielectric material? Explain the different mechanisms of polarization in a dielectric material. b) How ferroelectrics are different from ordinary dielectrics? [10+6] 8.a) Obtain the equation for the conductivity of an intrinsic semiconductor, and hence explain the determination of energy gap. b) What are the drift and diffusion currents in a semiconductor? Explain. [10+6]

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