

Code No: 07A4BS05

R07**Set No. 2**

II B.Tech II Semester Examinations, APRIL 2011

ENGINEERING PHYSICS

Bio-Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain briefly the basic principles of an optical fiber.
(b) Explain the basic principle of Holography.
(c) An optical fiber refractive index of core and cladding are 1.53 and 1.42 respectively. Then calculate its critical angle. [6+6+4]
2. (a) Distinguish between spontaneous emission and stimulated emission.
(b) With the help of suitable diagrams, explain the mechanism of a semiconductor laser. [8+8]
3. (a) Discuss about Dulong and petit's law.
(b) What is piezoelectric effect? Describe the process to produces piezoelectric effect in quantz crystal.
(c) Explain the important requirements of insulators. [4+8+4]
4. (a) Explain the terms
 - i. constructive interference and
 - ii. destructive interference.
 (b) Derive the condition for the maxima and minima in the Young's experiment.
(c) A Young's double-slit experiment is performed with a monochromatic source of light having wavelength of 589.0 nm, and a distance of 2.00 m between the slits and the screen. The 10th interference minimum is observed at 7.26 mm from the central maximum. Determine the separation between the slits. [5+7+4]
5. (a) Derive Braggs law of X-ray diffraction.
(b) Describe with a neat diagram, Laues method for the determination of crystal structure.
(c) A beam of X-rays is incident on an ionic crystal with lattice spacing 0.313 nm. Calculate the wavelength of X-rays if the first order Bragg reflection takes place at a glancing angle of 7°48'. [4+8+4]
6. (a) Explain the terms
 - i. transition temperature,
 - ii. critical magnetic field and
 - iii. critical current relating to superconductivity.

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- (b) Write a note on Meissner effect relating to superconductivity.
- (c) The London penetration depth for Pb at 3.0 K and 7.1 K are respectively 39.6 nm and 173 nm. Calculate the transition temperature as well as depth at absolute zero
7. (a) If the reverberation time is lower than the critical value, how will it affect the acoustical quality of a building?
- (b) Write, in detail, the acoustic requirements of a good auditorium. Explain how these requirements can be achieved.
- (c) The reverberation time of an empty hall is 1.65 sec. The reverberation time is reduced to 1.2 sec. by suspending a curtain cloth of 20 m^2 at the centre of the hall. If the dimensions of the hall are $15 \times 10 \times 8 \text{ m}^3$, calculate the coefficient of absorption of curtain cloth. [4+8+4]
8. (a) What are Nano materials and explain.
- (b) Describe the applications of Nanomaterials. [8+8]

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R07**Set No. 4**

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ENGINEERING PHYSICS

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1. (a) Derive Braggs law of X-ray diffraction.
(b) Describe with a neat diagram, Laues method for the determination of crystal structure.
(c) A beam of X-rays is incident on an ionic crystal with lattice spacing 0.313 nm. Calculate the wavelength of X-rays if the first order Bragg reflection takes place at a glancing angle of $70^\circ 48'$. [4+8+4]
2. (a) Distinguish between spontaneous emission and stimulated emission.
(b) With the help of suitable diagrams, explain the mechanism of a semiconductor laser. [8+8]
3. (a) If the reverberation time is lower than the critical value, how will it affect the acoustical quality of a building?
(b) Write, in detail, the acoustic requirements of a good auditorium. Explain how these requirements can be achieved.
(c) The reverberation time of an empty hall is 1.65 sec. The reverberation time is reduced to 1.2 sec. by suspending a curtain cloth of 20 m^2 at the centre of the hall. If the dimensions of the hall are $15 \times 10 \times 8 \text{ m}^3$, calculate the coefficient of absorption of curtain cloth. [4+8+4]
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5. (a) Discuss about Dulong and petit's law.
(b) What is piezoelectric effect? Describe the process to produces piezoelectric effect in quantz crystal.
(c) Explain the important requirements of insulators. [4+8+4]
6. (a) Explain the terms
 - i. transition temperature,
 - ii. critical magnetic field and
 - iii. critical current relating to superconductivity.
 (b) Write a note on Meissner effect relating to superconductivity.
(c) The London penetration depth for Pb at 3.0 K and 7.1 K are respectively 39.6 nm and 173 nm. Calculate the transition temperature as well as depth at absolute zero

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7. (a) Explain briefly the basic principles of an optical fiber.
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(c) A Young's double-slit experiment is performed with a monochromatic source of light having wavelength of 589.0 nm, and a distance of 2.00 m between the slits and the screen. The 10th interference minimum is observed at 7.26 mm from the central maximum. Determine the separation between the slits. [5+7+4]

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R07**Set No. 1**

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Time: 3 hours**Max Marks: 80**

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R07**Set No. 1**

5. (a) Explain briefly the basic principles of an optical fiber.
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(b) What is piezoelectric effect? Describe the process to produces piezoelectric effect in quantz crystal.
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(b) With the help of suitable diagrams, explain the mechanism of a semiconductor laser. [8+8]
8. (a) What are Nano materials and explain.
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R07**Set No. 3**

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ENGINEERING PHYSICS

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(b) What is piezoelectric effect? Describe the process to produces piezoelectric effect in quantz crystal.
(c) Explain the important requirements of insulators. [4+8+4]
2. (a) Distinguish between spontaneous emission and stimulated emission.
(b) With the help of suitable diagrams, explain the mechanism of a semiconductor laser. [8+8]
3. (a) If the reverberation time is lower than the critical value, how will it affect the acoustical quality of a building?
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- (b) Describe the applications of Nanomaterials. [8+8]
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- (b) Derive the condition for the maxima and minima in the Young's experiment.
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