$\boxed{\textbf{Set No. 1}}$

I B.Tech Supplimentary Examinations, Aug/Sep 2008
ENGINEERING PHYSICS
(Common to Civil Engineering, Mechanical Engineering, Chemical
Engineering, Mechatronics, Metallurgy & Material Technology, Production
Engineering, Aeronautical Engineering and Automobile Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain the formation of multiple spectra with grating
   (b) Mention the characterization of grating spectra.
   (c) Find the condition for absence of spectra.   [8+4+4]

2. (a) Explain the factors like reverberation, reverberation time, loudness and echo are affecting the architectural acoustics.
   (b) How the above mentioned difficulties are overcome.   [10+6]

3. (a) What are soft and hard magnetic materials?
   (b) Compare their properties?
   (c) Give some examples of soft and hard magnetic materials.   [4+8+4]

4. (a) Distinguish between SC and FCC crystal structures.
   (b) What is Bravais lattice? What are the different space lattices in the cubic system?
   (c) Copper crystallizes in the FCC structure. The density and atomic weight of copper are 8960 Kg/m^3 and 63.54 a.m.u respectively. Calculate its lattice constant.   [4+6+6]

5. (a) The first line of principle series of Sodium D - Line at 5890 A^0. This corresponds to a transition from the first excited state to the ground state. What is the energy of electron volts of the first excited state?
   (b) Discuss the application of laser in Engineering, Medical and Other fields.
   (c) Explain the pumping methods.
       i. Optical pumping
       ii. Electron excitation pumping.   [4+8+4]

6. (a) Derive Sin i$_{max}$ = $\sqrt{n_1^2 - n_2^2}$ and NA = $\sqrt{n_1^2 - n_2^2}$
   (b) Classify the differences between step index and graded index fiber.
   (c) An optical fiber fractional index change 0.14 and refractive index of cladding is 1.3, calculate refractive index of core.   [4+6+6]

7. (a) Define dielectric constant.

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(b) Explain the electronic polarization with neat diagram and also give the relation between electronic polarization and dielectric constant.

(c) Define polarization vector and electric displacement vector.   [4+8+4]

8. (a) Explain, in detail, the various properties of nanomaterials.

(b) What are carbon nanotubes? Explain.   [12+4]

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Set No. 2

I B.Tech Supplimentary Examinations, Aug/Sep 2008
ENGINEERING PHYSICS
(Common to Civil Engineering, Mechanical Engineering, Chemical Engineering, Mechatronics, Metallurgy & Material Technology, Production Engineering, Aeronautical Engineering and Automobile Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain the concept of coherence.
   (b) Discuss why two independent sources of light of the same wavelength cannot produce interference fringes.
   (c) What are the necessary conditions for obtaining interference fringes.
   [4+8+4]

2. (a) Explain inverse piezo-electric effect with diagram.
   (b) Discuss indetail piezo- electric method.
   (c) Discuss various procedures for detection of ultrasonics. [4+6+6]

3. (a) What is meant by magnetic hysteresis?
   (b) Show that area of the B-H curve denotes the energy dissipated per cubic meter of material during each cycle of magnetization.
   (c) Mention the importance of hysteresis curve. [4+8+4]

4. (a) Define the terms number of atoms per unit cell, coordination number, atomic radius and packing factor.
   (b) Derive the expressions for number of atoms per unit cell, coordination number, atomic radius and packing factor of Face Centered Cubic, Body centered cubic and simple cube. [6+10]

5. (a) Classify the laser with major categories and give example for each type.
   (b) What is the principle of laser action? Explain briefly population inversion, Active medium and active centre. Explain different pumping methods involved in laser production.
   (c) Give any four differences between stimulated emission and spontaneous emission. [4+8+4]

6. (a) What is meant by attenuation in optical fiber?
   (b) Explain the different types of attenuation. [4+12]

7. (a) Define orientation polarization.
   (b) Obtain an expression for the frequency dependence of the electronic polaraisability and show that the imaginary part of the polarisability gives rise to absorption of energy by the system from the field.

(c) Prove that p = $\in_0$ ($\in_r$ −1)E. [4+8+4]

8. (a) Discuss fabrication techniques of nano materials.

(b) Discuss the structure of carbon nano tubes. [10+6]

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$$\boxed{\textbf{Set No. 3}}$$

I B.Tech Supplimentary Examinations, Aug/Sep 2008
ENGINEERING PHYSICS
(Common to Civil Engineering, Mechanical Engineering, Chemical Engineering, Mechatronics, Metallurgy & Material Technology, Production Engineering, Aeronautical Engineering and Automobile Engineering)

Time: 3 hours   Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
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1. (a) What do you mean by constructive and destructive interference of light?

   (b) Derive an expression for constructive maxima and destructive minima. [4+12]

2. (a) Explain the factors like reverberation, reverberation time, loudness and echo are affecting the architectural acoustics.

   (b) How the above mentioned difficulties are overcome. [10+6]

3. (a) State Meissner effect.

   (b) Explain the Meissner effect with the suitable diagram.

   (c) Explain the penetration depth in a superconductor. [4+8+4]

4. (a) Define coordination number and atomic radius.

   (b) Obtain the expressions coordination number and atomic radius for SC, BCC and FCC lattices. [6+10]

5. (a) Classify the laser with major categories and give example for each type.

   (b) What is the principle of laser action? Explain briefly population inversion, Active medium and active centre. Explain different pumping methods involved in laser production.

   (c) Give any four differences between stimulated emission and spontaneous emission. [4+8+4]

6. (a) Derive an expression for acceptance angle.

   (b) Derive briefly the different types of fiber with neat diagram.

   (c) Derive the fractional index change. [4+8+4]

7. (a) Define orientation polarization.

   (b) Obtain an expression for the frequency dependence of the electronic polaraisability and show that the imaginary part of the polarisability gives rise to absorption of energy by the system from the field.

   (c) Prove that $p = \in_0 (\in_r -1)E$. [4+8+4]

8. (a) What are nanomaterials? Explain.

(b) How the physical and chemical properties of nano-particles vary with their size? [6+10]

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Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What do you mean by resolving power of an instrument?
   (b) Explain Rayleigh's criterion for resolution.
   (c) Explain the usefulness of the Rayleigh's criteria for the resolving power of an optical instrument.   [4+8+4]

2. (a) What do you meant by Acoustics?
   (b) Define reverberation.
   (c) Explain the basic requirement of acoustically good hall.   [4+4+8]

3. (a) Define magnetic field intensity and magnetic flux density.
   (b) Derive the equation for relating these two.
   (c) What are the applications of ferrites.   [4+8+4]

4. (a) Define number of atoms per unit cell and packing factor.
   (b) Obtain the expressions for number of atoms per unit cell and packing factor for SC, BCC and FCC lattices.   [6+10]

5. (a) Classify the laser with major categories and give example for each type.
   (b) What is the principle of laser action? Explain briefly population inversion, Active medium and active centre. Explain different pumping methods involved in laser production.
   (c) Give any four differences between stimulated emission and spontaneous emission.   [4+8+4]

6. (a) What are the points are important to mention single mode fiber?
   (b) Explain with a block diagram, the basic instrumentation technique adopted to explain the communication system.
   (c) A fiber has a core refractive index of 1.44 and cladding refractive index of 1.4. Find its numerical aperture and acceptance angle.   [4+8+4]

7. (a) Define Einstein's model.
   (b) Explain briefly Einstein's model.
   (c) Mention the importance of Einsteins model.   [4+8+4]

8. (a) Mention properties of nano materials and discuss any one of the property in detail.

   (b) Discuss various types of nano materials. [10+6]

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