# 2009-ACHARYA NAGARJUNA UNIVERSITY

## B.TECH I SEMESTER DEGREE EXAMINATION

## PHYSICS

FEBRUARY-2009

TIME-3HOUR
MARKS-80

**ANSWER ALL QUESTIONS**

**PART A [10*2=20 MARKS]**

a. What is populaiton inversion?

b. Physical significance of wave function.

c. What is Lenz's law?

d. Write Maxwell's equations in integral form.

e. What is Hall effect?

f. What are matter waves?

g. Write the applications of photocells.

h. What do you mean by LASER?

i. What is Hologram?

j. What is solar cell?

**PART B [4*15=60 MARKS]**

1. a. State and prove Gauss's law in electrostatics.

b. DERIVE AN EXPRESSION FRO ELECTRIC FELD DUE TO a non-conducting sphere

c. Derive Coulomb's law from Gauss law.

(or)

2. a. State and explain Biot-Savart's law and Faraday's law.

b. Derive an expression for magnetic field due to a current carrying circular loop.

3. a. State and explain Heisenberg's uncertainty principle in detail.

b. Explain in detail principle and working of Davisson and Germer's experiment of matter waves.

(or)

4. a. Derive the Schrodinger's time independent wave equation.

b. Explain the construction and working of a G.M. Counter.

5. a. Give the theory of Direct recombination of carriers in semiconductors.

b. Discuss the drift and diffusion phenomenon in semiconductors.

(or)

6. a. What is Superconductivity and explain Meissner effect.

b. Explain types of Superconductors.

c. Write applications of Superconductors.

7. a. Explain spontaneous and stimulated emission of radiation

b. Discuss the construction and working of a gas laser.

c. Mention various applications of lasers.

(or)

8. a. Explain the principle of propagation of light in optical fibers.

b. Explain different types of optical fibers.

c. Write the applications of optical fibers.

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