

Roll. No.....

1211002

**B.Tech 1<sup>st</sup> Semester Examination**

**Jan.2014**

**Applied Physics-1**

**Subject Code: AHL-101**

Time Allowed: 03 hours.

Maximum Marks: 100

**Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.**

*Note: Question No. 1 is Compulsory and attempt two questions from each section. All questions carry equal marks.*

- 1(a) What are conditions to obtain interference of Light (4)
- (b) What is the condition of absent spectra in a diffraction pattern of a grating (4)
- (c) What do you mean by a Quarter wave plate and a Half wave plate (4)
- (d) What do you mean by population inversion? (4)
- (e) What do you mean by length contraction? Write expression for this. (4)

**SECTION-A**

2. What are coherent sources? Explain the formation of coherent sources using Fresnel's biprism. How will you measure the wavelength of monochromatic light using it? (20)
- 3(a) Explain Rayleigh criterion of resolution. What do you mean by resolving power? Find expression for it. (10)
- (b) A diffraction grating having 4000 lines/cm is illuminated normally by light of wavelength  $5000\text{\AA}$ . Calculate its dispersive power in 3rd order spectrum. (10)
4. Explain principle, construction and working of Nicol prism. Give its limitations. How it can be used as a polarizer and as an analyser? (20)

**SECTION-B**

5. Describe the construction and working of a He-Ne laser with necessary diagrams. What is the utility of lasers in various fields of modern science? (20)
6. Describe the Michelson's-Morley experiment and explain the physical significance of negative results. (20)
- 7(a) What are nanomaterials? Explain the sol-gel method for the synthesis of nanomaterials. (10)
- (b) Explain acceptance angle and acceptance cone of a fibre. What do you mean by numerical aperture of a fibre? Derive expressions for them. (10)