

Roll. No.....

**1211002**

**B.Tech / Integrated (MBA/M.Tech) 1<sup>st</sup> Semester Examination**

**Dec.2012 – Jan.2013**

**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: Attempt any five questions and all questions carry equal marks.**

**Section – A**

1. (a) What are Newton rings? Explain the formation of Newton rings in reflected light. Derive an expression for diameter of  $n^{\text{th}}$  dark ring in the reflected light. (16)  
(b) A thin film of a plastic of refractive index 1.5 for a wavelength of  $5890\text{\AA}$  is inserted in one arm of Michelson interferometer. Find the thickness of the film if a shift of 10 fringes is observed. (4)
2. (a) What do you mean by resolving power and dispersive power of a grating? Find expression for them. (16)  
(b) What is the highest order or how many orders will be seen with monochromatic light of wavelength  $5000\text{\AA}$  by means of a diffraction grating with 5000 lines/cm? (4)

3. Define specific rotation. Describe the construction and working of Half Shade Polarimeter. How would you use it to determine the specific rotation of sugar solution? (20)

**Section – B**

4. (a) Describe the construction and working of a He-Ne laser with necessary diagrams. (10)  
(b) Derive expression for acceptance angle and numerical aperture of an optical fiber (10)
5. (a) Derive Lorentz transformation equations of relativity and show that in non-relativistic limits these equations reduces to Galilean Transformation equations. (16)  
(b) At what velocity the mass of a particle becomes five times of its rest mass. (4)
6. (a) Explain the recording and reconstruction process of a hologram. (10)  
(b) Explain the reasons for the property changes that take place in a material when its size is reduced to nano-scale. (10)