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TEST -2 EXAMINATION- Oct 2018

B.Tech. I Semester (CSE, CE, ECE, IT)

COURSE CODE: 18B11PH111 **MAX. MARKS:** 25

COURSE NAME: ENGINEERING PHYSICS-I

COURSE CREDITS: 04 **MAX. TIME:** One Hour Thirty Minutes

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Section A

1. (a) Describe the effect of introducing a thin plate of glass in the path of one of the interfering beams in bi-prism experiment. **[3 Marks]**

   (b) When a Wedge shaped air film is viewed by a monochromatic source of light incident normally the interference fringes 4mm apart are observed. If the air space is filled with water (μ=1.33) how far apart will the fringes be observed? **[2 Marks]**

Section B

2. (a) Derive an expression to find the missing orders in a double slit diffraction pattern. **[2 Marks]**

   (b) A parallel bean of sodium light is allowed to be incident normally on a plane transmission grating having 4250 line per centimeter and the second order spectral line is observed to be deviated through 30^{o}, calculate the wavelength of spectral line. **[2 Marks]**

3. (a) Derive the resolving power for a transmission grating having number of lines 'N'. **[2 Marks]**

   (b) Calculate the angular dispersion in degrees/Å for a diffraction grating having 14438 line/inch when used in third order at 4200Å. **[2 Marks]**

Section C

4. (a) Derive Brewster's Law. **[2 Marks]**

   (b) Refractive index of glass in 1.5, calculate Brewster's angle for it and also calculate the angle of refraction. **[2 Marks]**

5. (a) Discuss the production and detection of circularly polarized light. **[2 Marks]**

   (b) Refractive indices of e-ray and o-ray are 1.486 and 1.658 respectively, with sodium light of wavelength 5890 Å, find the thickness of quarter and half wave plates. **[2 Marks]**

Section D

6. (a) Explain briefly the construction and working of Ruby Laser. **[2 Marks]**

   (b) Give the energy level diagram for He-Ne laser showing only the relevant energy levels. **[2 Marks]**