

I B. Tech I Semester Supplementary Examinations, Nov/Dec - 2017
ENGINEERING PHYSICS-I
 (Com to All Branches)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
 All Questions carry **Equal** Marks
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1. a) Explain the interference of light due to thin films. (10M)  
 b) Light of wavelength 589.3nm is reflected at nearly normal incidence from a soap film of refractive index 1.42. What is the least thickness of the film for the appearance of dark and bright fringes? (5M)
2. a) Obtain the condition for primary maxima in Fraunhofer diffraction due to a single slit and derive an expression for width of the central maxima. (10M)  
 b) Find the angular width of the central maximum in the Fraunhofer diffraction when a single slit of width  $1\mu\text{m}$  is illuminated by light of wavelength 600nm. (5M)
3. a) Discuss the various methods by which polarized light can be produced. (10M)  
 b) Explain the phenomenon of double refraction. (5M)
4. a) Name the seven types of crystal systems and mention the lengths of axes and the relation of angles between the axes of a unit cell in each type. (10M)  
 b) Explain the terms 'primitive cell' and 'unit cell'. (5M)
5. a) Describe Laue's method of determination of crystal structure. (10M)  
 b) Derive Bragg's law of x-ray diffraction. (5M)
6. a) Derive the relationship between Einstein's coefficients and discuss their physical significance. (10M)  
 b) Distinguish between spontaneous and stimulated emission. (5M)
7. a) Define acceptance angle of an optical fibre and derive an expression for it in terms of refractive indices of the core and cladding. (10M)  
 b) An optical fibre has a core of refractive index 1.51 and cladding of refractive index 1.49. Calculate (i) numerical aperture (ii) acceptance angle. (5M)
8. a) What is non-destructive testing? Explain with principle how flaw in a solid can be detected by non-destructive method using ultrasonics. (10M)  
 b) What are the benefits in nondestructive testing of products? (5M)

