

**I B. Tech I Semester Supplementary Examinations, January - 2020**  
**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) Describe Young's double slit experiment demonstrating interference of light (10M)  
b) In Young's double slit experiment the slits are separated by 0.28 mm and the screen is placed at a distance of 1.4 m away from the slits. The distance between the central bright fringe and the fifth dark fringe is measured to be 1.35 cm. Calculate the wavelength of the light used. Also find the fringe width if the screen is moved 0.4 m towards the slits, for the same experimental set up. (5M)
2. a) Explain theory of Fraunhofer diffraction due to single slit and draw the intensity distribution curve. (10M)  
b) Discuss Rayleigh's criterion for resolving power. (5M)
3. a) Describe construction and working of a Nicol's prism and explain how it is used as a polarizer and analyzer. (10M)  
b) Distinguish between polarized light and unpolarized light. (5M)
4. a) Define packing factor? Determine the Atomic Packing factor of FCC and BCC lattice. (10M)  
b) What is Bravais Lattice? Discuss with suitable examples. (5M)
5. a) Describe the principle and the whole experimental setup of Laue's Method of crystallography. Explain with the neat diagram. (10M)  
b) Why X-rays are preferred for crystal structure determination? Derive an expression for Bragg's law. How Bragg's law is used in crystallography? (5M)
6. a) Describe Einstein's coefficients and the significance of relation between them. (10M)  
b) Point out the differences between spontaneous emission and stimulated emission. (5M)
7. a) Express the numerical aperture of a step index fiber in terms of the refractive index profile of core and cladding. Also mention two technological applications of optical fibers. (10M)  
b) Write the Principle involved in optical fiber communication. (5M)
8. a) What do you understand by Non-destructive testing? Explain the roll of Nondestructive testing using ultrasonics today. (10M)  
b) Explain the working principle of a transducer. (5M)