

**I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2019****APPLIED PHYSICS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)2. Answering the question in **Part-A** is Compulsory3. Answer any **FOUR** Questions from **Part-B****PART -A**

1. a) Why is central fringe a dark spot in Newton's rings? (2M)
- b) Michelson interferometer experiment is performed with a source which consists of two wavelengths  $4882 \text{ \AA}$  and  $4886 \text{ \AA}$ . Through what distance does the mirror have to be moved between two positions of disappearance of fringes. (2M)
- c) Explain essential requirement for the production of laser action. (2M)
- d) Define gradient of a vector field. (2M)
- e) Define Fermi factor. (2M)
- f) What is de-Broglie's hypothesis? (2M)
- g) How energy bands are formed in Solids? (2M)

**PART -B**

2. a) Explain why Newton's rings are circular in shape. Prove that in reflected system, diameters of bright rings are proportional to square root of odd natural number. (10M)
- b) In Newton's rings experiment, the diameters of  $10^{\text{th}}$  dark ring are reduced to half of its value on introducing a liquid below the convex surface. Calculate refractive index of liquid. (4M)
3. a) Discuss Fraunhofer diffraction of light at a single slit. (10M)
- b) Diffraction pattern of a single slit of width  $0.5 \text{ cm}$  is formed by a lens of focal length  $40 \text{ cm}$ . Calculate the distance between the first dark and the next bright fringe from the axis. Given the wavelength is  $5000 \text{ \AA}$ . (4M)
4. a) Explain construction and working of a Laurent's half-shade polarimeter. (10M)
- b) Distinguish between the spontaneous emission and stimulated emission. (4M)
5. a) Derive Maxwell's equations from the basic laws of electromagnetism. (10M)
- b) Discuss Stoke's and Gauss's theorems. (4M)
6. a) Write down the Schrödinger's time dependent wave equation and derive Schrödinger's time independent wave equation from it. (10M)
- b) Explain properties of matter waves. (4M)
7. a) On the basis of band theory how the crystalline solids are classified into metals, semiconductors and insulators? (10M)
- b) Explain Hall effect. (4M)