

Code No: RA161253

**R16****SET - 1****I B. Tech II Semester Regular/Supplementary Examinations, April/May - 2018****APPLIED PHYSICS**

(Com to CSE, IT)

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**

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**PART -A**

1. a) How coherence of two reflected rays can be achieved as in the case of thin films? (2M)
- b) What is resolving power of grating? (2M)
- c) Is it possible to polarize sound waves?-Discuss (2M)
- d) What are the basic elements required to construct a LASER? (2M)
- e) Define drift and diffusion currents in a semiconductor. (2M)
- f) Write any two important features of quantum free electron theory of metals. (2M)
- g) How does the conductivity vary with temperature for an extrinsic semiconductor? (2M)

**PART -B**

2. a) Describe briefly the theory behind the formation of Newton's rings and derive an expression for the wave length of the light source used. (10M)
- b) In Newton's ring arrangement, a source is emitting two wavelength  $\lambda_1=600\text{nm}$  and  $\lambda_2 = 590\text{nm}$ . It is found that  $n^{\text{th}}$  dark ring and  $(n+1)^{\text{th}}$  dark ring coincides with each other. Find the diameter of the  $n^{\text{th}}$  dark ring if the radius of curvature of lens is 90 cm. (4M)
3. a) What is diffraction grating? Find the conditions for all maximal and minima. (10M)
- b) Plot the intensity distribution curve when a grating is exposed to monochromatic light. (4M)
4. a) Explain the terms spontaneous emission, stimulated emission and population inversion. (10M)
- b) Describe briefly the characteristics of a laser beam. (4M)
5. a) Deduce Maxwell's four equations in free space. (10M)
- b) What are vector and scalar fields? Explain them with examples. (4M)
6. a) Obtain the time independent Schrodinger's wave equation. (10M)
- b) Write down the Fermi Dirac distribution function. Explain how the function varies with temperature? (4M)
7. a) What is Hall effect? Derive equations for Hall Coefficient. (10M)
- b) A Silicon plate of thickness 1mm, breadth 10 mm and length 100 cm is placed in a magnetic field of  $0.5 \text{ Wb/m}^2$  acting perpendicular to its thickness. If  $10^{-2} \text{ A}$  current flows along its length, calculate the Hall voltage developed if the Hall co-efficient is  $3.66 \times 10^{-4} \text{ m}^3/\text{coulomb}$ . (4M)