Code No: R161104 **R16** SET - 1

**I B. Tech I Semester Supplementary Examinations, November - 2020**
**APPLIED PHYSICS**
(Com. to ECE, CSE, IT, EIE, E Com E)

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 Compulsory
3. Answer any **FOUR** Questions from **Part-B**

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**PART –A**

1. a) What are Newton's rings? (2M)
   b) When white light incidents on a diffraction grating, which colored light will be diffracted more? Justify your answer. (2M)
   c) Mention the characteristic properties of laser. (2M)
   d) For which ray Canada balsam acts as a rarer medium? Explain why? (2M)
   e) Write the Maxwell's electromagnetic equations in differential or integral form. (2M)
   f) What are the necessary conditions of physically acceptable wave function? (2M)
   g) Write the statement of Bloch's theorem. (2M)

**PART -B**

2. a) With necessary theory explain the experimental procedure to determine the wavelength of the light using Newton's rings. (10M)
   b) Newton's rings are observed in the reflected light of wavelength 5900Å. The diameter of $10^{th}$ dark ring is 0.5cm. Find the radius of curvature of the lense used. (4M)

3. a) Explain what is meant by diffraction of light. How diffraction is different from interference? (5M)
   b) Obtain the condition for primary maxima in Fraunhoffer diffraction due to a single slit and derive an expression for width of the central maxima. (9M)

4. a) Distinguish between Spontaneous and Stimulated emissions. (5M)
   b) Derive the expression for energy density of radiation in terms of Einstein coefficients. (9M)

5. a) Define gradient, and divergence of a field. (4M)
   b) Derive the Electromagnetic wave equation for electric and magnetic fields its free spaces. (10M)

6. a) What is Fermi level? Explain the Fermi-Dirac distribution function of electrons and explain the effect of temperature on the distribution. (9M)
   b) Calculate the velocity and kinetic energy of an electron of wavelength $1.66 \times 10^{-10}$m. (5M)

7. a) State and explain Hall effect. Show that for n-type semiconductor the Hall coefficient $R_H = -\frac{1}{n_e}$. (10M)
   b) Explain the applications of Hall effect. (4M)
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