Code No: R161207 **R16** SET - 1

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2017
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 Compulsory
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Explain why two flashlights held close together do not produce an interference pattern on a distant screen. (2M)
   b) Describe how diffraction differs from interference. (2M)
   c) Outline spontaneous emission with the help of energy level diagram. (2M)
   d) Define scalar field. Give an example. (2M)
   e) What are the eigen values and eigen functions for first two energy levels? (2M)
   f) Define circularly and elliptically polarized lights. (2M)
   g) Write Bloch's function. (2M)

PART -B

2. a) Explain the working of Michelson interferometer and describe how refractive index of a material is determined. (10M)
   b) When a thin film of a transparent material of μ=1.45 and λ = 5890Å is inserted in one of the arms of a Michelson's interferometer, a shift of 65 circular fringes is observed. Calculate the thickness of the film. (4M)

3. a) Define resolving power of a grating. Obtain an expression for resolving power of plane transmission grating. (10M)
   b) Calculate the minimum number of lines in a grating which will just resolve the lines of wavelengths 589nm and 589.6nm in the second order. (4M)

4. a) Describe the construction and working of He-Ne laser and its uses. (10M)
   b) Describe the Construction of a Nicol prism. (4M)

5. a) Derive electromagnetic wave equation in dielectric medium. (10M)
   b) Define curl of a vector field and explain its physical significance. (4M)

6. a) Explain Fermi-Dirac distribution function. Explain how it varies with temperature with the help of plots. (10M)
   b) Discuss the failures of classical free electron theory. (4M)

7. a) What is an energy band? Classify solids into conductors, semiconductors and insulators on the basis of band theory of solids. (10M)
   b) Discuss Hall effect. Applications. (4M)
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