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

I B. Tech I Semester Supplementary Examinations, May/June - 2019
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) State the superposition theorem. (2M)
   b) When slit width increases, what will happen to central maximum? Why? (2M)
   c) What do you mean by optical pumping? (2M)
   d) Give the probability interpretation of wave function. (2M)
   e) Define vector field with example. (2M)
   f) Write one assumption in quantum free electron theory. (2M)
   g) What is an N-type semiconductor? Explain with one example. (2M)

PART –B

2. a) Explain how Newton's rings are formed in the reflected light. Derive an expression for diameter of bright ring. (10M)
   b) Newton's rings are observed in the reflected light of wavelength 5900 Å. The diameter of 10^{th} dark ring is 0.5 cm. Find the radius of curvature of lens used. (4M)

3. a) What is grating? Explain formation of spectra by a plane transmission grating when monochromatic light is incident normally on it. (10M)
   b) A plane transmission grating having 5500 lines per cm is used to produce a spectrum of mercury light. What will be the angular separation between two yellow lines 5770 Å and 5790 Å in a second order? (4M)

4. a) Describe the construction and working of Laurent's half shade polarimeter. (10M)
   b) 80 gm of impure sugar when dissolved in one litre of water, gives an optical rotation of 9.9°, when placed in a tube of length 200 mm. If the specific rotation of sugar is 66 degree/dm / (gm/cc), find the percentage purity of sugar sample. (4M)

5. a) State and prove the Stoke's theorem. (10M)
   b) Write down the physical significance of Maxwell equations. (4M)

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6. a) Write down Schrodinger's equation for a particle confined in a one dimensional box and solve it to obtain its wave function. (10M)

   b) A particle is moving in one-dimensional potential box of infinite height of width 25 Å. Calculate the probability of finding the particle within an interval of 5 Å at the centres of the box when it is in its state of least energy. (4M)

7. a) Explain the 'Kronig-Penney' model of solids and show that it leads to energy band structure of solids. (10M)

   b) What is a drift and diffusion current in semiconductors? Obtain Einstein's equations. (4M)

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