

**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

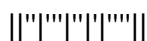
- Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answering the question in **Part-A** is Compulsory  
 3. Answer any **FOUR** Questions from **Part-B**

**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<sup>th</sup> 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)



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  $25 \text{ \AA}$ . Calculate the probability of finding the particle within an interval of  $5 \text{ \AA}$  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)

