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**A – 2108**

Reg. No. : .....

Name : .....

**Combined First and Second Semester B.Tech.  
Degree Examination, April 2016  
(2008 Scheme)  
08-102 : ENGINEERING PHYSICS**

Time : 3 Hours

Max. Marks : 100

**PART – A**

Answer **all** questions. **Each** question carries **4** marks.

1. Calculate the frequency of the fundamental note of a string 1 m long, weighing 2 gm when stretched by a weight of 400 kg.
2. Define divergence of a vector field. Explain its physical significance.
3. Describe some important applications of bio materials.
4. Write a note on anti-reflection coatings.
5. Obtain expression for the resolving power of a microscope.
6. Explain Kerr effect.
7. Explain the concept of length contraction.
8. What are operators in quantum mechanics ? Explain with examples.
9. Obtain the expression for the volume of a unit cell in phase space in quantum statistics.
10. Explain some important applications of holography.



## PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

**Module – I**

11. Derive differential equation of forced harmonic oscillations and deduce its solution. Discuss possible cases.
12. Starting from the basic laws of electricity and magnetism derive Maxwell's equations.
13. Obtain the expression for inter-planar spacing in terms of Miller indices. Copper has FCC structure and its atomic weight and density are 63.54 and 8960 kg/m<sup>3</sup> respectively. Calculate its lattice constant.

**Module – II**

14. Give the theory of Newton's rings. Explain how the wavelength of monochromatic light can be determined using Newton's rings.
15. Describe the theory of Fraunhofer diffraction at a single slit. Explain Rayleigh's criterion for resolution.
16. What is photo-elasticity ? Explain with necessary theory the formation of isoclinic and isochromatic fringes.

**Module – III**

17. What are matter waves ? Derive the expression for de Broglie wavelength. Explain the concept of quantum mechanical tunnelling. Give examples.
18. Give the postulates of Fermi-Dirac statistics. What is Fermi energy ? Derive the expression for Fermi energy.
19. Describe the construction and working of a Ruby laser. Mention the important characteristics of lasers.