

Registration No. :

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Total number of printed pages – 2

B. Tech  
BS 1102

First Semester Examination – 2013

PHYSICS – I

QUESTION CODE : C- 611

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10
- (a) Distinguish between velocity resonance and amplitude resonance.
  - (b) Mention the conditions for formation of stationary waves.
  - (c) The amplitude of light waves emerging from two slits in Young's experiment is in the ratio 1 : 2. Find the intensity ratio of the interference pattern.
  - (d) Why diffraction pattern is not generally observed with an extended source of light ?
  - (e) What are the essential conditions for Fraunhofer diffraction ?
  - (f) When a beam of light is polarized, does its intensity vary ?
  - (g) Distinguish between conduction and displacement current.
  - (h) Write the differential and integral form of Faraday's law.
  - (i) What is the phase difference between E and B ? Explain
  - (j) What is the physical significance of threshold frequency ?
2. (a) Derive the general differential equation of the wave motion. 7
- (b) Mention different types of progressive waves. 3

P.T.O.

3. (a) Discuss the formation of Newton's ring by reflected light. 6  
 (b) Describe the experimental arrangement and give necessary theory. 2  
 (c) Why Newton's rings are circular? 2
4. (a) What is a zone plate? Derive an expression for its focal length. 5  
 (b) Show that the radii of its half period zones are proportional to the square root of natural numbers. 3  
 (c) Show that a zone plate has multiple foci. 2
5. (a) How are plane polarized, elliptically polarized and circularly polarized light produced experimentally? 7  
 (b) If the refractive indices for the ordinary ray in case of calcite and canadablasms are 1.658 and 1.550 respectively, calculate the maximum possible inclination with the canadablasms surface, so that the ordinary ray is still quenched. 3
6. (a) Explain physical significance of  $\text{grad } \phi$ . 2  
 (b) Write Maxwell's electromagnetic equations and discuss their physical significance. 6  
 (c) State Ampere's circuital law and write its differential form. 2
7. (a) What are the characteristics of electromagnetic waves? 4  
 (b) Derive Electromagnetic wave equations for  $\vec{E}$  and  $\vec{B}$  in a conducting medium. 6
8. (a) Show how uncertainty relation can be applied to Bohr's orbit. 3  
 (b) Discuss physical significance of wave function  $\psi$ . 4  
 (c) Write Schrodinger time dependent wave equation and discuss its practical use. 3



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