

This question paper contains 2 printed pages.]

Your Roll No. ....

**516**

**Subsidiary for B.Sc. Honours/II A**  
**PHYSICS – Paper III**  
**Waves and Oscillation**

**Time : 3 Hours**

**Maximum Marks : 50**

*(Write your Roll No. on the top immediately on receipt of this question paper.)*

Attempt any five questions.

All questions carry equal marks.

Parts of a question should be attempted together.

1. (a) What do you mean by free, damped and forced vibration ? Explain each by giving examples.  
(b) Give theory of damped vibration and discuss the case of critically damped vibration. 3 + 7
  
2. (a) Explain, how standing waves are formed ?  
(b) Prove in case of organ pipe closed at one end, first three frequencies are in the ratio of 1 : 3 : 5. 3 + 7
  
3. (a) State Fermat's Principle.  
(b) Prove the Laws of Refraction using Fermat's Principle. 3 + 7

4. (a) Derive an expression for equivalent focal length of two lenses separated by a finite distance.
- (b) If two lenses having powers of 2 diopters and 4 diopters are separated by a distance of 10 cms respectively, calculate equivalent focal length of the combination.  $7 + 3$
5. (a) Give theory and construction of Michelson-Interferometer.
- (b) How can we determine the difference of two close lines by using this method?  $7 + 3$
6. (a) What do you mean by Half Period Zones? Give their significance.
- (b) Give theory and construction of zone-plate. How it can be compared with a convex lense?  $3 + 7$
7. (a) Explain Rayleigh's Criterion of Resolution.
- (b) Derive a relation between dispersive power and resolving power of a diffraction grating.  $3 + 7$
8. Write short notes on any two of the following:  $2 \times 5 = 10$
- (a) Huyghen's Eyepiece
- (b) Newton's Ring
- (c) Quarter shade polarimeter
- (d) Chromatic aberration