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**B. Sc. (Hons.) Physics 4th Semester  
Examination – May, 2019**

**VIBRATIONS AND WAVE OPTICS-I**

Paper : Phy-403

Time : Three Hours ] [ Maximum Marks : 40

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting at least *two* questions from each Unit.

**UNIT – I**

1. What are the Fresnel's integrals? Derive them. 8
2. (a) Write short note on Kirchoff's integral theorem. 4  
(b) Discuss the application of Fresnel - Kirchoff integral formula to diffraction problems. 4
3. (a) Write about the construction and theory of a plane diffraction grating of the transmission type and explain the formation of spectra. 6

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(b) Calculate the minimum number of lines in a grating which will resolve the doublet of sodium lines of wavelengths 5890 Å and 5896 Å in the first order.

4. (a) Explain the Rayleigh's criterion of resolution. Define the limit of resolution and resolving power.

(b) Derive the intensity pattern of diffraction due to a double slit.

**UNIT - II**

5. (a) Explain the formation and properties of Cornu's spiral.

(b) Using Cornu's spiral, explain the Fresnel diffraction due to a straight edge.

6. Find the intensity distribution of diffraction pattern from a slit using Cornu's spiral.

7. Draw and explain the diffraction patterns due to a straight edge using Cornu's spiral.

8. What is holography? Describe its principle and the process of recording and reconstruction of a hologram.

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Roll No.

41274

**B. Sc. (Hons.) Physics 4th Year  
Examination - May, 2000  
ATOMIC AND NUCLEAR PHYSICS**

Paper : Phy-404

Time : Three Hours ] *Maximum*  
*Before answering the questions, candidates should check that they have been supplied the correct and complete paper. No complaint in this regard, will be entertained during examination.*

Note : Attempt *five* questions in all, selecting at least one question from each section. All questions carry equal marks.

**SECTION - I**

1. (a) Distinguish between normal Zeeman Effect and anomalous Zeeman effect. Discuss classical theory of Zeeman effect.

(b) Show Normal Zeeman effect for transition of a p-d system.

2. Write notes on :

(a) Pauli's Exclusion Principle

(b) Symmetric and Non-symmetric Wavefunctions

(c) Compute Zeeman components of  $^2D_{3/2} \rightarrow ^2P_{3/2}$