

21U205

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Name: .....

Reg.No: .....

**SECOND SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2022**

(CBCSS - UG)

(Regular/Supplementary/Improvement)

**CC19U PHY2 C02 / CC20U PHY2 C02 - OPTICS LASER AND ELECTRONICS**

(Physics - Complementary Course)

(2019 Admission onwards)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 2

**Part A** (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. What are the conditions of constructive and destructive interferences?
2. Explain the phenomenon of colours of thin films.
3. Draw the intensity distribution curve in Fraunhofer single slit diffraction pattern.
4. What is Brewsters law?
5. Define optical activity.
6. Write down the expression for efficiency and ripple factor of a full wave and bridge rectifier.
7. Explain the action of a Pi filter.
8. Define the three current amplification factors.
9. Draw the block diagram of a feedback amplifier.
10. Draw the truth tables of exclusive OR.
11. What is meant by spontaneous emission?
12. What is population inversion?

**(Ceiling: 20 Marks)**

**Part B** (Short essay questions - Paragraph)

Answer *all* questions. Each question carries 5 marks.

13. The distance between the slit and biprism is 4 cm and between the biprism and screen is 40 cm each. The angle of biprism is 178 degrees and its refractive index is 1.52. If the distance between successive fringes is 0.012 cm, calculate the wavelength of light.

14. A parallel beam of monochromatic light is allowed to be incident normally on a plane transmission grating having 5000 lines/cm and the third order spectral line is found to be diffracted through angle  $45^\circ$ . Calculate the wavelength of light.
15. How can we detect if a light is circularly/elliptically/un-polarised using wave plates?
16. Explain the reverse characteristics of a Zener diode with circuit diagram.
17. Describe the input and output characteristics of common emitter npn transistors.
18. Explain the construction of an AND gate using diodes and construction of a NOT gate using a transistor.
19. Explain the construction and working of a semiconductor laser.

**(Ceiling: 30 Marks)**

**Part C (Essay questions)**

Answer any *one* question. The question carries 10 marks.

20. Describe an experiment with theory to determine the wavelength of sodium light using Newton's ring system.
21. Describe Fraunhofer single slit experiment with the necessary theory.

**(1 × 10 = 10 Marks)**

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