23U205 (Pages: 2) Name: .....

Reg.No: .....

SECOND SEMESTER B.Sc./M.Sc. INTEGRATED GEOLOGY DEGREE EXAMINATION, APRIL 2024

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U PHY2 C02 / CC20U PHY2 C02 / CC23I PHY2 IC02 - 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. State superposition theorem of waves
2. What is meant by optical path?
3. What should be the order of the size of obstacle for diffraction of light?
4. Differentiate between uniaxial crystals and biaxial crystal. Give one example each
5. Define specific rotation.
6. Write down the expression for r.m.s current in a full wave rectifier
7. What are filter circuits?
8. Draw the practical circuit of a CE transistor amplifier.
9. What is Barkhausen criterion?
10. What are universal gates?
11. What is meant by metastable state?
12. Name the different types of lasers.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. A parallel beam of sodium light is incident normally on the plane parallel film of refractive index 1.5. What is the least thickness of the film that will appear bright by reflection?
14. A parallel beam of sodium light is incident normally on a plane transmission grating having 6×10^5 lines per meter length. The first order spectrum is found to be deviated through an angle of 20.7 degree from the normal. Calculate the wavelength of the light used.

15. A quarter wave plate is constructed from quartz crystal whose refractive indices are 1.553 (e) and 1.544 (o). Calculate the thickness of the plate for a wavelength of 6500 A^o.

16. A half wave rectifier has a transformer of turns ratio 2 : 1. If the rms value of input voltage is 230 V and the load resistance is 330 ohm, find the dc output voltage and efficiency.

17. For a transistor of ß =50, collector resistance is 7500 ohm. If the voltage across the collector resistance is 5 V, find the base current.

18. Explain XOR gate and write the truth table.

19. Compare induced absorption, spontaneous emission and stimulated emission.

(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 Newtons ring system.

21. Explain polarization of light by reflection and Brewster's law. Prove that when the light is incident at angle of polarization, the angle between reflected and refracted ray is 90^o.

(1 × 10 = 10 Marks)

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