

C 4394

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Name.....

Reg. No.....

**SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION, APRIL 2021**

Physics/Applied Physics

PHY 2C 02—OPTICS, LASER, ELECTRONICS

Time : Two Hours

Maximum : 60 Marks

*The symbols used in the question paper have their usual meanings.***Section A (Short Answer Type)***Answer at least **eight** questions.**Each question carries 3 marks.**All questions can be attended.**Overall Ceiling 24.*

1. What is meant by destructive interference ?
2. Explain, why very thin film appears black in reflected light ?
3. What is Fraunhofer class of diffraction ?
4. What is meant by resolving power of a grating ?
5. State and explain Brewster's law.
6. Define optical activity.
7. What is a zener diode ? Explain its characteristics.
8. Define ripple factor of rectifier circuit. What is the value of ripple factor for full wave rectification ?
9. What are the different types of transistor configurations ? Explain.
10. Describe the action of a capacitor-filter circuit.
11. Explain OR function with a two input OR gate.
12. Explain population inversion. How it is achieved ?

(8 × 3 = 24 marks)

**Section B (Paragraph/Problem Type)***Answer at least **five** questions.**Each question carries 5 marks.**All questions can be attended.**Overall Ceiling 25.*

13. Explain constructive and destructive interference using Young's experiment.
14. Describe the principle and working of He-Ne laser.

**Turn over**

15. How are unpolarized, plane circularly polarized and elliptically polarized light distinguished ?
16. Distinguish between Positive and Negative crystals.
17. Obtain the relation between current amplification factors  $\alpha$  ,  $\beta$  and  $\gamma$  .
18. A diffraction grating has 0.15 m of surface ruled with  $6 \times 10^5$  lines per meter. What is its resolving power in the first order ?
19. A transistor is connected in common emitter (CE) configuration in which collector supply is 8 V and voltage drop across resistance  $R_C = 800 \Omega$  connected in the collector circuit is 0.5V and  $\alpha = 0.96$ . Determine the collector-emitter voltage and base current.

(5 × 5 = 25 marks)

### Section C (Essay Type)

*Answer any one question.*

*The question carries 11 marks.*

20. Derive an expression for the radius of  $n^{\text{th}}$  ring in a Newton's ring arrangement in the reflected system. Describe an experiment to determine the wavelength of monochromatic light using Newton's ring arrangement.
21. Describe principle and working of any oscillator with neat diagram and explain how it produces sustained oscillation. Derive the necessary formula.

(1 × 11 = 11 marks)