

C 23889

(Pages : 2)

Name.....

Reg. No.....

**SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2022**

Physics/Applied Physics

PHY 2C 02—OPTICS, LASER, ELECTRONICS

(2019—2020 Admissions)

Time : Two Hours

Maximum : 60 Marks

The Symbols used in the question paper have their usual meanings.

Section A (Short Answer Type)

*Answer **all** questions in two **or** three sentences.*

Each correct answer carries a maximum of 2 marks.

1. What is meant by constructive interference ?
2. Why don't thick films exhibit interference ?
3. What is the phenomenon of diffraction ? Give an example.
4. Obtain an expression for the dispersive power of a grating.
5. State and explain Malu's law.
6. Write different methods to produce polarized light.
7. Explain the reverse characteristics of a zener diode.
8. Define rectifier efficiency. Write down the expression for the efficiency of a half wave rectifier.
9. Define transistor α and β .
10. Describe the action of a π -filter circuit.
11. Explain AND function with a two input AND gate.
12. What is a coherent source of light ? Give example.

(Ceiling - 20)

Section B (Paragraph/Problem Type)

*Answer **all** questions in a paragraph of about **half a page to one page**, each correct answer carries a maximum of 5 marks.*

13. Obtain an expression for fringe width, β using Fresnel's double mirror arrangement.
14. Explain the theory of population inversion. What is the significance of metastable state in lasing action.

Turn over

15. State and explain Brewster's law. How it can be used to find polarizing angles in crystals.
16. Distinguish between a quarter wave plate and a half wave plate.
17. With a neat diagram, explain the working of a full wave bridge rectifier.
18. Light of wavelength 500 nm. is incident normally on a plane transmission grating. A second order spectral line is observed at an angle of 30° . Calculate the number of lines per meter on the grating surface.
19. Determine the Q-point of the transistor circuit in CE configuration in which collector load is $4\text{ k}\Omega$, zero signal collector current is 1 mA and $V_{cc} = 10\text{ V}$. what will be the Q-point if $R_c = 5\text{ k}\Omega$.

(Ceiling - 30)

Section C (Essay Type)

Essays-Answer about two pages, any one question.

Answer question carries 10 marks.

20. Explain the construction and working of : (a) Ruby laser ; and (b) He-Ne laser.
21. With the help of circuit diagram explain the principle and working of a full wave rectifier. Show that the rectification efficiency of full wave rectifier is twice that of a half wave rectifier.

(1 × 10 = 10 marks)