

D 124482

(Pages : 2)

Name.....

Reg. No.....

**SECOND SEMESTER (CBCSS—UG) DEGREE [SUPPLEMENTARY]
EXAMINATION, APRIL 2025**

Physics/Applied Physics

PHY 2C 02—OPTICS, LASER, ELECTRONICS

(2019 Syllabus)

Time : Two Hours

Maximum : 60 Marks

*The symbols used in this 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. Why are Newton's rings circular in shape.
2. Soap bubble or a thin film of oil spread over the surface of water appears coloured in sunlight. Why ?
3. What is ripple factor ? What is its value for a half - wave and full - wave rectifier ?
4. Distinguish between prism and grating spectra.
5. Draw the symbol, Boolean algebra and truth table of exclusive OR gate.
6. What is population inversion ? How is it achieved in Ruby laser ?
7. What is a zener diode ? Draw the equivalent circuit of an ideal zener diode in the breakdown region.
8. How does the metastable state help in lasing action.
9. What are quarter wave plates.
10. What are open loop gain and closed loop gain ?
11. How will you distinguish between a quarter wave plate and a half wave plate by allowing plane polarized light to fall normally on them ?
12. What is meant by optical activity ?

(Ceiling - 20)

Turn over

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. What value of series resistance is required when three 10-watt, 10-volt, 1000 mA zener diodes are connected in series to obtain a 30-volt regulated output from a 45 volt d.c. power source ?
14. What are universal gates ? How will you obtain the fundamental gates from them ?
15. Explain the principle and essential requirements of a laser.
16. Show that in general the polarized light is elliptically polarized.
17. A transistor in CE configuration has collector supply 8V and collector resistance $1000\ \Omega$. If voltage drop across collector resistor is 0.6V and $\alpha = 0.96$, find collector-emitter voltage and base current.
18. If in an interference pattern, the ratio between maximum and minimum intensities is 36 : 1, find the ratio between the amplitudes and intensities of the two interfering waves.
19. How many orders will be visible if the wavelength of the incident radiation is 480 nm and the number of lines on the grating is 25000 per inch ?

(Ceiling-30)

Section C (Essay Type)

Essays - Answer in about two pages, any one question.

Answer carries 10 marks.

20. Give an account of the construction of a plane transmission grating. How will you determine the wavelengths of different lines of mercury light using a grating in normal incidence method.
21. With a neat sketch explain the working of a :
 - (i) Centre-tap full wave rectifier ; and
 - (ii) Full wave bridge rectifier.

(1 × 10 = 10 marks)