20U317S (Pages: 2) Name: ……………………….

Reg. No: …………………….

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS-UG)

CC15U PH3 C03 - OPTICS, LASER, ELECTRONICS & COMMUNICATION

(Physics – Complementary Course)

(2015 to 2018 Admissions – Supplementary/Improvement)

Time: Three Hours Maximum: 64 Marks

Section A

Answer ***all*** questions. Each question carries 1 mark.

1. Refractive index of glass is ……..….
2. Relation between path difference & phase difference is ……..….
3. The grating spectrum is caused by ……..….
4. Polarization of light proves that they are ……..….Waves.
5. In diffraction pattern, fringes have ……..…. Width.
6. Efficiency of a full wave rectifier is ……..….
7. The AC component of the rectifier output can be removed by using ……..….
8. The Boolean expression for NAND gate is ……..….
9. A Zener diode is used as a ……..….
10. Give an example for broadcast communication.

(10 × 1 = 10 Marks)

Section B

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

11. State the laws of reflection.
12. What is meant by resolving power of a grating?
13. Distinguish between coherent & incoherent sources.
14. Explain the working of an AND gate. Draw the truth table.
15. What is meant by frequency response curve?
16. State and explain the superposition principle.
17. Explain amplitude modulation & frequency modulation.

(7 × 2 = 14 Marks)

Section C

Answer any ***three*** questions. Each question carries 4 marks.

18. Distinguish between Fresnel's and Fraunhofer's diffraction.
19. Explain the working of quarter wave plate.

20. Explain polarisation by reflection and refraction.
21. Briefly explain the necessities of modulation.
22. Explain the working of half wave rectifier.

(3 × 4 = 12 Marks)

Section D

Answer any ***three*** questions. Each question carries 4 marks.

23. Fresnel's biprism of refractive index 1.5 has an angle of 1^0. If the biprism is kept at a distance of 0.3m from the slit illuminated by a monochromatic light of λ=6000 A^0. find the fringe width. D=8m.
24. 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 45^0. Calculate the wavelength of light.
25. Calculate the minimum thickness of a quarter wave plate of quartz for light of wavelength 6000A^0. Given μ_e=1.544 & μ_o=1.553.
26. Explain the working of Zener diode as a voltage stabiliser.
27. Using De Morgan's theorem solve (i) $(A + B)(\bar{A} + \bar{B})$ (ii) $(A + \bar{A})A + B$

(3 × 4 = 12 Marks)

Section E

Answer any ***two*** questions. Each question carries 8 marks.

28. What are Newton's rings? Derive the expression for the radii of dark and bright rings.
29. Discuss in detail Fraunhofer diffraction due to a single slit.
30. Describe the principle, construction and working of He- Ne laser.
31. With neat diagram explain the action of a full wave bridge rectifier. Derive the expression for efficiency and ripple factor.

(2 × 8 = 16 Marks)

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