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K19U 2485

Reg. No. : .....

Name : .....

III Semester B.Sc.Degree (CBCSS- Reg./Sup./Imp.)

Examination, November-2019

(2014 Admn. Onwards)

COMPLEMENTARY COURSE IN PHYSICS

3C03 PHY: OPTICS AND PHOTONICS

Time : 3 Hours

Max. Marks : 32

Instruction: Write answers in English only.

**SECTION-A**(Very short answer type - each carries 1 Mark - answer all 5 questions)  
(5×1=5)

1. The phenomenon of intensity variation due to the overlapping of two waves is called\_\_\_\_\_
2. LASER is the acronym for\_\_\_\_\_
3. The Fraunhofer diffraction pattern due to single slit consists of \_\_\_\_\_bands.
4. Plane polarised light can be produced by passing ordinary light through\_\_\_\_\_
5. Fiber optic sensors convert input variables into\_\_\_\_\_

**SECTION-B**(Short answer type- each carries 2 marks - answer any 4 questions)  
(4×2=8)

6. A plane mirror is used instead of the glass plate in a Newton's rings arrangement. Can we still observe the rings? Give reasons for your answer.
7. What are the differences between Fresnel and Fraunhofer classes of diffraction.
8. State Brewster's law.
9. What is population inversion? What is the condition to achieve it?

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10. What is an optic fiber. Explain it's principle.
11. How the blue of the sky is explained?

### SECTION - C

(Short essay/ problem type - each carries 3 marks - answer any 3 questions)  
(3×3=9)

12. Newton's rings are formed in reflected light using a Plano convex lens of radius of curvature 1m and a plane glass plate. Find the radius of the 10<sup>th</sup> dark ring if sodium light of wavelength 590nm is used.
13. Show that the rectilinear propagation of light is only an approximation.
14. Explain the working of a Nicol Prism.
15. Explain the principle of dimension and construction of Optic fiber.
16. Establish the relation between Einstein coefficients.

### SECTION-D

(Long essay type- each carries 5 marks - answer any 2 questions)

(2×5=10)

17. With a neat diagram explain the formation of Newton's rings in reflected light. How can you determine the wavelength of light?
  18. Discuss the Fraunhofer diffraction of light on a single slit and deduce a relation for the intensity variation of the diffraction pattern produced on a screen.
  19. What is meant by double refraction? Explain how you can make a quarter and half wave plate from a uniaxial doubly refracting crystal.
  20. Give the theory of Raman effect and describe an experimental arrangement for studying it.
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